

# IMPLEMENTATION OF THE ABC METHOD FOR COST CALCULATION

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## **Abstract:**

*The Activity-Based Costing (ABC) method represents an important innovation in accounting and cost management. It offers a detailed and precise approach to allocating indirect costs based on the activities that generate them. Unlike traditional cost allocation methods, which can often be arbitrary and imprecise, the ABC method allows for a clearer understanding of how various activities and products use resources. This provides a more accurate picture of real costs and the profitability of each product or service, facilitating better-informed and strategic decision-making. This paper aims to demonstrate how implementing the ABC method can bring substantial benefits in the efficient management of costs and alignment with accounting regulations, therefore contributing to better economic performance and increased organization competitiveness in the market*

**Key words:** cost calculation, costs, activities, expenses, production, accounting

## INTRODUCTION

Partenie Dumbravă specified in his work<sup>1</sup>, the cost calculation method based on activities (Activity-Based Costing - ABC) is a current and detailed method for allocating indirect costs. Unlike traditional methods, ABC allocates indirect costs based on causal relationships between activities and the utilization of resources necessary for producing goods and services. This method was developed as a response to the limitations of traditional cost calculation methods, which often subsidize product costs and affect the results' validity.

The impact of the ABC method on organizations is profound, offering multiple advantages such as identifying non-value-adding activities, optimizing processes and resources, and improving operational efficiency.<sup>2</sup> The importance of this method is reflected in its ability to provide crucial information for cost reduction, profitability growth, and ensuring long-term competitiveness. The ABC method is also recognized for its compliance with International Financial Reporting Standards (IFRS) and national regulations regarding accounting and cost management.

This paper was designed and structured to implement the final cost calculation of a product using the ABC method at I.M.P. ROMANIA INDUSTRIAL CO S.A., based on the balance sheet for 2022. The data used in this analysis is extracted from Class 6 accounts, including both direct and indirect costs, which are divided between the company's two similar production lines.

The relevance of this paper in the field of accounting and financial management is particularly important, as the ABC method not only improves the accuracy of cost allocation but also ensures compliance with national and international accounting regulations. Under Accounting Law no. 82/1991 and the regulations of the Ministry of Public Finance of Romania, the implementation of the ABC method at I.M.P. ROMANIA INDUSTRIAL CO S.A. will

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<sup>1</sup> Dumbravă, P. (2009). Contabilitate Managerială, Universitatea Babeș-Bolyai Cluj-Napoca, Facultatea de Business, Centrul de Formare Continuă și Învățământ la Distanță, 2009

<sup>2</sup> Grosu, Corina, Almășan, Alina (2012), Contabilitate de gestiune ed. a II-a revizuită, Editura de Vest, Timișoara.

contribute to the transparency and accuracy of financial reporting, providing managers with indispensable tools for strategic decision-making.

## PRODUCT COST CALCULATION BASED ON THE ABC METHOD FOR 2022

To determine the costs, we will follow the steps below<sup>3</sup>:

### Step 1: Identifying the activities within the company:

By identifying these activities and their efficiency indicators, SC I.M.P. ROMANIA INDUSTRIAL CO S.A. can successfully implement the ABC method, ensuring that all costs are suitably allocated and that activities are efficiently managed to maximize the organization's performance.

### Step 2: Identifying and evaluating the resources spent by activities:

The management activity of SC I.M.P. ROMANIA INDUSTRIAL CO S.A. may have limited influence on the pricing levels and directly related production expenses, which can be reduced. However, management can have a substantial impact on the handling of human, material, and financial resources within the company. From this perspective, the company's expenses can be grouped according to two different criteria:

1. Direct revenue-generating expenses and indirect revenue-generating expenses
2. Expenses based on production volume and expenses based on time (annual, monthly, etc.)

To conduct a comprehensive expense analysis, we will use data extracted from the trial balance, focusing on Class 6 expenses, which will be divided into direct and indirect expenses. The analysis will concentrate on the company's cost centers, particularly on the two similar production lines in Timișoara. The trial balance provides a detailed picture of the company's expenses, classified by accounts. We will examine in more depth the expenses from Class 6, which include all relevant expenses for production activities (see Table 1).

|      |                                                       | total      | directe    | transport | eliminari | indirecte |
|------|-------------------------------------------------------|------------|------------|-----------|-----------|-----------|
| 601  | Cheltuieli cu materiile prime                         | 17,386,554 | 17,386,554 |           |           | 0         |
| 6021 | Cheltuieli cu materialele auxiliare                   | 75,610     |            |           |           | 75,610    |
| 6022 | Cheltuieli privind combustibilul                      | 40,717     |            |           |           | 40,717    |
| 6023 | Cheltuieli priv. materialele pt.ambalat               | 733,571    | 733,570    |           |           | 1         |
| 6024 | Cheltuieli priv. piesele de schimb                    | 165,626    | 163,172    |           |           | 2,454     |
| 6028 | Cheltuieli priv. alte materiale consumabile           | 34,253     |            |           |           | 34,253    |
| 603  | Cheltuieli priv. mat. de natura ob.de inventar        | 11,189     |            |           |           | 11,189    |
| 604  | Cheltuieli privind materialele nestocate              | 38,047     |            |           |           | 38,047    |
| 605  | Cheltuieli privind energia si apa                     | 2,472,475  | 2,092,552  |           |           | 379,923   |
| 607  | Cheltuieli privind marfurile                          | 923,018    | 9          |           | 923,018   | (9)       |
| 609  | Reduceri comerciale primite                           | (4,461)    |            |           | (4,461)   | (0)       |
| 611  | Cheltuieli cu intretinerea si reparatiile             | 24,909     |            |           |           | 24,909    |
| 612  | Chelt. cu redev., locatiile de gest. si chirii        | 79,456     |            |           |           | 79,456    |
| 613  | Cheltuieli cu primele de asigurare                    | 36,693     |            |           |           | 36,693    |
| 615  | Cheltuieli cu pregatirea personalului                 | 1,720      |            |           |           | 1,720     |
| 622  | Cheltuieli privind comisioanele si onorariile         | 30,356     |            |           |           | 30,356    |
| 623  | Cheltuieli de protocol, reclama si publicitate        | 56,478     |            |           |           | 56,478    |
| 624  | Cheltuieli cu transportul de bunuri si personal       | 1,181,083  |            | 1,181,083 |           | 0         |
| 625  | Cheltuieli cu deplasari, detasari si transferari      | 26,406     |            |           |           | 26,406    |
| 626  | Cheltuieli postale si taxe de telecomunicatii         | 31,770     |            |           |           | 31,770    |
| 627  | Cheltuieli cu serviciile bancare si asimilate         | 25,239     |            |           |           | 25,239    |
| 628  | Alte cheltuieli cu serviciile executate de terti      | 1,124,760  |            |           |           | 1,124,760 |
| 635  | Chelt. cu alte impozite, taxe si varsaminte asimil    | 205,562    |            |           |           | 205,562   |
| 641  | Cheltuieli cu salariile personalului                  | 3,187,394  | 2,146,046  |           |           | 1,041,348 |
| 6422 | Cheltuieli cu tichetele de masa acordate salariatii   | 150,800    |            |           |           | 150,800   |
| 6458 | Alte chelt. priv. asigurarile si protectia sociala    | 55,449     |            |           |           | 55,449    |
| 6461 | Cheltuieli privind contributia asig.de munca          | 72,246     |            |           |           | 72,246    |
| 655  | Cheltuieli din reevaluarea imobilizarilor corporale.  | 78,833     |            |           |           | 78,833    |
| 6581 | Despagubiri, amenzi si penalitati                     | 69,492     |            |           | 69,492    | 0         |
| 6588 | Alte cheltuieli de exploatare                         | 201,207    |            |           | 201,207   | (0)       |
| 6651 | Ch. din dif de curs leg de el. monetare exp.in valuta | 388,348    |            |           | 388,348   | 0         |
| 666  | Cheltuieli privind dobinzile                          | 5,472      |            |           |           | 5,472     |
| 6811 | Chelt de exploat priv.amortiz si provizioanele        | 547,677    | 152,666    |           |           | 395,011   |
| 6814 | Chelt. de exploatare priv. ajust. pt.depr.act.circ.   | 72         |            |           |           | 72        |
|      |                                                       |            |            |           |           | 0         |
|      | Total:                                                | 29,458,024 | 22,674,569 | 1,181,083 | 1,577,60  | 4,024,768 |
|      |                                                       |            |            |           |           | 18%       |

Table 1-Class 6 accounts for the year 2022  
Source: own processing

<sup>3</sup> Radu, Mariana, (2011), Contabilitate de gestiune, Editura Bibliotheca, Târgoviște.

We will concentrate on studying the expenses related to the two production lines in Timișoara. In this study, we will detail how the expenses are distributed and their impact on production costs.

A percentage of 18% is applied to the direct cost to determine the amount of indirect and specific direct costs. These costs are calculated as a percentage of the total direct cost, reflecting the expenses necessary for maintaining and supporting production activities.

Calculation formula:

Percentage of 18% = Indirect Costs / Direct Costs

### Step 3: Calculating the machine cost for 2022:

The two tables below will represent the theoretical and real cost calculations for the production machine, with the amounts and hours divided between the two production lines:

| Theoretical hours/ year |                                    | Production line RON |            |
|-------------------------|------------------------------------|---------------------|------------|
|                         |                                    | year                | hour       |
| Fixed costs             | Cost of a single production line   |                     |            |
|                         | Line depreciation                  | 76,333              |            |
|                         | Theoretical hours/ year            | 4,937               |            |
|                         | cost /theoretical hour             |                     | 15         |
|                         | electricity+ gas                   | 1,046,276           | 212        |
|                         | <b>total machine</b>               | <b>1,122,609</b>    | <b>227</b> |
|                         | Maintenance labor                  | 260,333             | 53         |
|                         | Spare parts                        | 81,576              | 17         |
|                         | <b>Total maintenance</b>           | <b>341,909</b>      | <b>69</b>  |
|                         | <b>Total machine + maintenance</b> | <b>1,464,518</b>    | <b>297</b> |
|                         | Direct labor                       | 812,690             | 165        |
|                         | <b>total machine+operator</b>      | <b>2,277,208</b>    | <b>461</b> |

Table 2 – Theoretical machine cost calculation

Source: own processing

The table below (see Table 3) presents the machine cost calculation for 2022. This calculation is carried out following the steps from the theoretical machine cost calculation table, which includes an exhaustive study of the fixed and variable costs necessary for operating and maintaining a production line.

| Total actual worked in 2022 |                                    | Production line RON |           |
|-----------------------------|------------------------------------|---------------------|-----------|
|                             |                                    | year 2022           | hour      |
| Fixed costs                 | New line cost                      | 4,937               |           |
|                             | cost /theoretical hour             | 0                   |           |
|                             | Effective hours                    | 3,045               |           |
|                             | cost /hour/line                    |                     | 0         |
|                             | electricity+ gas                   | 260,333             | 85        |
|                             | <b>total machine</b>               | <b>260,333</b>      | <b>85</b> |
|                             | Maintenance labor                  | 69                  | 0         |
|                             | Spare parts                        | 297                 | 0         |
|                             | <b>total maintenance</b>           | <b>366</b>          | <b>0</b>  |
|                             | <b>total machine + maintenance</b> | <b>260,699</b>      | <b>86</b> |
|                             | Direct labor                       | 0                   | 0         |
|                             | <b>total machine+operator</b>      | <b>260,699</b>      | <b>86</b> |

Table 3 – Actual machine cost calculation for the year 2022

Source: own processing

To correctly reflect production costs and guarantee the accuracy of financial calculations, it is necessary to adjust costs according to the current average exchange rate. The table below (see Table 4) presents the hourly costs of the machine, direct labor, and indirect process expenses, expressed in euros. This is important because all raw material and production costs, including the machine cost, are presented to customers in euros.

| Description              | Hourly cost (Euro) |
|--------------------------|--------------------|
| Machine cost/hour        | 97.53              |
| Direct labor/hour        | 54.12              |
| Indirect processing/hour | 21.18              |

Table 4-Table of cost in euros per hour

Source: own processing

The calculation of the machine cost for 2022 is important for understanding and efficiently managing production costs. In the two presented tables (Table 2 - Theoretical Machine Cost Calculation and Table 3 - Actual Machine Cost Calculation for 2022), the necessary steps for calculating both the theoretical and real costs of operating and maintaining a production line are detailed. All this data is important and will further help us in calculating the final product cost.

The comprehensive study of theoretical and real costs for operating and maintaining a production line provides us with a clear picture of resource efficiency and utilization. Comparing theoretical costs with real costs highlights the differences and helps us identify areas where improvements can be made to optimize costs and increase operational efficiency.

By following the calculation methodology steps and using accurate data from the trial balance, we can ensure efficient cost management and proper resource allocation within the production process.<sup>4</sup> All this data is crucial and will further help us in calculating the final product cost, providing us with a solid foundation for evaluating and optimizing production costs.

#### Step 4: Raw Material Prices for Creating the Product Recipe:

In this stage, we concentrate on evaluating and using the raw material prices to create the final product recipe. The attached table presents the current prices of the raw materials needed in the production process, expressed in euros.

| PREȚURI MATERIE PRIMĂ  |                   |                       |
|------------------------|-------------------|-----------------------|
| Denumire materie primă | Preț unitate(EUR) | Procentaj de adăugare |
| green 3                | 1.94              |                       |
| dae                    | 1                 |                       |
| kospol                 | 1.1               |                       |
| svapol                 | 1                 |                       |
| dobest                 | 1.06              |                       |
| do best                | 1.06              |                       |
| cavo svapol            | 1.36              |                       |
| Svapol                 | 1                 |                       |
| BICO                   | 1.4               |                       |
| cavo huvis             | 1.36              |                       |
| SUP.3/ml               | 0.88              | 3.50%                 |
| SUP.4                  | 0.98              | 3.50%                 |
| SUP5                   | 1.02              | 3.50%                 |
| RAS.1 EVA              | 1.36              |                       |
| RAS.2 VINAVIL          | 1.45              |                       |
| RAS.3 orgal            | 2                 |                       |
| TUB 1,5                | 0.2               |                       |
| tub2                   | 0.67              |                       |
| SAC 118                | 0.95              |                       |
| sac145                 | 1.09              |                       |

Table 5-Raw material prices

Source: own processing

<sup>4</sup> Bătcă-Dumitru, Corina-Graziella, Calu, Daniela Artemisa, Andreea Gabriela, Ponorică. (2020). Contabilitate managerială, ediția a IV-a, revizuită. Editura CECCAR. București

The table (see Table 5) presents a detailed list of raw materials along with their unit prices. This information is vital for calculating the total cost of raw materials needed for production.

#### Step 5: Creating the Recipe for the Termoflex+BEX 200g 1.5m Product

Creating the product recipe for Termoflex+BEX 200g 1.5m is an important process that involves the precise identification of raw materials and determining the necessary proportions for manufacturing this product. The recipe ensures the uniformity and quality of the final product, allowing for the accurate replication of each production batch. Termoflex+BEX 200g 1.5m is composed of high-quality polymers, known for their durability and efficiency. The main components are:

- RAS.1 EVA (Ethylene-Vinyl Acetate): This polymer offers good flexibility and mechanical strength, being essential for ensuring the structural integrity of the insulating material.
- RAS.2 VINAVIL: This copolymer contributes to improving the adhesion and internal cohesion of the material, thus ensuring exceptional dimensional stability.
- SUP.3/ml: This additive is used to improve the material's thermal and acoustic properties, offering superior insulation against temperature variations and noise.

This product is part of a diverse range of similar products, depending on weight and cutting length, for numerous clients.

In the Table below (see Table 6), the recipe for this product can be observed:

| TermoFlex+BEX 200gr,1,5 standard |          |            |             |             |
|----------------------------------|----------|------------|-------------|-------------|
|                                  | quantity | price euro | cost euro   | %           |
| Bico                             | 0.2      | 1.4        | 0.28        | 13 %        |
| do best                          | 0.2      | 1.06       | 0.21        | 10 %        |
| kospol                           | 0.1      | 1.1        | 0.11        | 5%          |
| do best                          | 0.4      | 1.06       | 0.42        | 20 %        |
| cavo svepol                      | 0.1      | 1.36       | 0.14        | 6%          |
| losses 2%                        |          |            | 0.02        | 1%          |
| Cardboard tube 1,5               | 0.08     | 0.2        | 0.02        | 1%          |
| SAC 118                          | 0.08     | 0.95       | 0.08        | 4%          |
| <b>total material costs</b>      |          |            | <b>1.28</b> | <b>60 %</b> |
| productivity ef                  | 550      |            |             | 0%          |
| ef.teh.                          | 80       |            |             | 0%          |
| productivity                     | 440      |            |             | 0%          |
| Machine cost/hour                | 97.53    |            | 0.22        | 11 %        |
|                                  |          |            |             | 0%          |
| Labor/hour                       | 54.12    |            | 0.12        | 6%          |
| <b>total direct cost</b>         |          |            | <b>1.62</b> | <b>77 %</b> |
| indirect 18%                     |          |            | 0.29        | 14 %        |
| <b>Total complete cost</b>       |          |            | <b>1.91</b> | <b>91 %</b> |

|                    |     |  |             |              |
|--------------------|-----|--|-------------|--------------|
| Profit             | 10% |  | 0.19        | 9%           |
| <b>Total price</b> |     |  | <b>2.11</b> | <b>100 %</b> |

Table 6-Termoflex product recipe 200 gr,1.5

Source: own processing

Raw materials: Bico: With a cost of 0.28 EUR, it represents 13% of the total material costs; Do best: Used in two different proportions, totaling 0.63 EUR and representing 30% of the total material costs; Kospol and Cavo Svepol: Add a combined value of 0.25 EUR, contributing 11% to the material costs; Losses: Estimated at 2%, adding a cost of 0.02 EUR; Cardboard tube and SAC 118: Represent minor, but necessary, costs for packaging and integrity, totaling 0.10 EUR.

The total material cost is 1.28 EUR, which represents 60% of the total (complete) product cost.

➤ Direct Costs:

- Productivity and technical efficiency: Productivity and technical efficiency parameters are included to evaluate manufacturing performance, but they do not have a direct monetary value specified in the table.
- Machine and labor costs: The cost of using the machine is 0.22 EUR/hour, and labor costs are 0.12 EUR/hour, totaling 0.34 EUR. These represent 17% of the total costs.

The total direct costs amount to 1.62 EUR, which represents 77% of the total product cost.

- Indirect costs: These represent 18% of the total costs, adding 0.29 EUR to the product cost. These costs include overall manufacturing expenses, maintenance, and other indirect operational expenses.
- Total complete cost: By combining direct and indirect costs, the whole cost amounts to 1.91 EUR, which represents 91% of the total product cost.
- Profit: A 10% profit is added to the whole cost, resulting in an additional 0.19 EUR.
- Total price: The final price of the product, including all costs and profit, is 2.11 EUR.

The making of the recipe for TermoFlex+Bex 200g 1.5m provides a detailed picture of the costs involved in producing this product. The analysis of material, direct, and indirect costs, as well as profit, allows for the creation of an accurate and competitive final price in the market. This recipe not only ensures the quality and uniformity of the product but also facilitates efficient financial planning and transparency in cost management.

**Step 6: Defining the product cost sheets:**

The product cost sheet is an important tool in financial and production management, providing a detailed indication of all costs associated with manufacturing a product<sup>5</sup>. In our case, we will analyze the cost sheet for the TermoFlex +BEX 200g 1.5m product.

This sheet details the direct and indirect costs, helping to establish the final price and ensure the profitability of the product.

The adjacent table represents the cost sheet for standard items with different specifications (see Table 7).

<sup>5</sup> Carol J., McNair-Connolly, Kenneth A., Merchant,(2020), Management Accounting: An Integrative Approach, 2nd Edition, Wiley Publishing

|                 | materiale | TOT.MAT. | Prod | e.t | cost mas. | man. | tot.direct | ind.de proc | cost proces | indirecte | cost total | profit | pret propus |
|-----------------|-----------|----------|------|-----|-----------|------|------------|-------------|-------------|-----------|------------|--------|-------------|
| <b>TMX+BEX</b>  |           |          |      | 80% | 97.53     | 54   |            | 0           |             | 18%       |            | 10%    |             |
| 70g             | 1.28      | 1.28     | 250  | 200 | 0.49      | 0.27 | 2.04       | 0.00        | 2.04        | 0.37      | 2.40       | 0.24   | 2.64        |
| 90g             | 1.28      | 1.28     | 300  | 240 | 0.41      | 0.23 | 1.91       | 0.00        | 1.91        | 0.34      | 2.25       | 0.23   | 2.48        |
| 100g            | 1.28      | 1.28     | 330  | 264 | 0.37      | 0.21 | 1.85       | 0.00        | 1.85        | 0.33      | 2.18       | 0.22   | 2.40        |
| 100 nestandard  | 1.28      | 1.28     | 265  | 212 | 0.46      | 0.26 | 1.99       | 0.00        | 1.99        | 0.36      | 2.35       | 0.24   | 2.59        |
| 110g            | 1.28      | 1.28     | 350  | 280 | 0.35      | 0.19 | 1.82       | 0.00        | 1.82        | 0.33      | 2.15       | 0.21   | 2.36        |
| 120g            | 1.28      | 1.28     | 380  | 304 | 0.32      | 0.18 | 1.78       | 0.00        | 1.78        | 0.32      | 2.10       | 0.21   | 2.31        |
| 130g            | 1.28      | 1.28     | 400  | 320 | 0.30      | 0.17 | 1.75       | 0.00        | 1.75        | 0.32      | 2.07       | 0.21   | 2.27        |
| 140g            | 1.28      | 1.28     | 430  | 344 | 0.28      | 0.16 | 1.72       | 0.00        | 1.72        | 0.31      | 2.03       | 0.20   | 2.23        |
| 150g            | 1.28      | 1.28     | 480  | 384 | 0.25      | 0.14 | 1.67       | 0.00        | 1.67        | 0.30      | 1.97       | 0.20   | 2.17        |
| 175g            | 1.28      | 1.28     | 500  | 400 | 0.24      | 0.14 | 1.66       | 0.00        | 1.66        | 0.30      | 1.95       | 0.20   | 2.15        |
| 175g nestandard | 1.28      | 1.28     | 400  | 320 | 0.30      | 0.17 | 1.75       | 0.00        | 1.75        | 0.32      | 2.07       | 0.21   | 2.27        |
| 180g            | 1.28      | 1.28     | 550  | 440 | 0.22      | 0.12 | 1.62       | 0.00        | 1.62        | 0.29      | 1.91       | 0.19   | 2.11        |
| 200g            | 1.28      | 1.28     | 550  | 440 | 0.22      | 0.12 | 1.62       | 0.00        | 1.62        | 0.29      | 1.91       | 0.19   | 2.11        |
| 200g nestandard | 1.28      | 1.28     | 400  | 320 | 0.30      | 0.17 | 1.75       | 0.00        | 1.75        | 0.32      | 2.07       | 0.21   | 2.27        |
| 230g            | 1.28      | 1.28     | 540  | 432 | 0.23      | 0.13 | 1.63       | 0.00        | 1.63        | 0.29      | 1.92       | 0.19   | 2.11        |
| 240g            | 1.28      | 1.28     | 540  | 432 | 0.23      | 0.13 | 1.63       | 0.00        | 1.63        | 0.29      | 1.92       | 0.19   | 2.11        |
| 270g            | 1.28      | 1.28     | 560  | 448 | 0.22      | 0.12 | 1.62       | 0.00        | 1.62        | 0.29      | 1.91       | 0.19   | 2.10        |
| 300g            | 1.28      | 1.28     | 560  | 448 | 0.22      | 0.12 | 1.62       | 0.00        | 1.62        | 0.29      | 1.91       | 0.19   | 2.10        |
| 300g nestandard | 1.28      | 1.28     | 448  | 358 | 0.27      | 0.15 | 1.70       | 0.00        | 1.70        | 0.31      | 2.01       | 0.20   | 2.21        |
| 350g            | 1.28      | 1.28     | 600  | 480 | 0.20      | 0.11 | 1.59       | 0.00        | 1.59        | 0.29      | 1.88       | 0.19   | 2.07        |
| 400g            | 1.28      | 1.28     | 600  | 480 | 0.20      | 0.11 | 1.59       | 0.00        | 1.59        | 0.29      | 1.88       | 0.19   | 2.07        |
| Nota            |           |          |      |     |           |      |            |             |             |           |            |        |             |

Pentru latimi nestandard(2-2.30) se diminueaza productivitatea intre 5-30%

Table 7-Termoflex+BEX- standard items cost sheet

Source: own processing

The table above provides a detailed breakdown of the costs associated with different product alternatives, with varying weights and specifications:

1. Total materials: The total materials remain constant at 1.28 EUR for each product variant, regardless of weight. This means that the cost of materials used is the same for each product, suggesting the use of balanced quantities of raw materials.
2. Density differences: Although the total amount of material is the same, the different weights reflect different product densities. This implies that products with higher weights are denser and may have different applications depending on customer requirements.
3. Impact on machine operation: Although the total amount of material is the same, the different weights reflect different product densities. This implies that products with higher weights are denser and may have different applications depending on customer requirements.
4. Impact on machine operation: The machine cost per hour and labor cost per hour fluctuate depending on the product's weight. Products with higher weights may require more production time and machine adjustments, therefore influencing the cost per unit. Technical productivity, evaluated at 80%, indicates the efficiency of the production process. Differences in productivity are due to the adaptation of the production line to the different product specifications.
5. Final productivity: Final productivity varies depending on the product's weight. Products with lower weights have higher productivity due to smaller volumes and shorter processing times. For non-standard products, productivity may decrease by 5-30%, reflecting the complexity and additional time required for the adjustments and configurations necessary for the production of these items.
6. Direct costs: Direct costs include raw materials, machine costs, and labor. These are directly proportional to the number of units produced and the time required for production.
7. Indirect costs: Indirect costs are calculated as 18% of the total direct cost. These include administrative expenses, maintenance, and other support costs necessary for the operation of the production line.
8. Profit: Profit is calculated as 10% of the total cost, added to the projected final price to ensure the product's financial sustainability.

In the production process of TermoFlex + BEX items, it is essential to understand the impact of non-standard dimensions on productivity. Specifically, for products with non-standard widths of 2-2.30 meters, a reduction in productivity between 5% and 30% is detected.

Non-standard widths require additional machine adjustments to conform to the specified dimensions. These modifications involve extra time and technical expertise, which reduces the effective production time.

Some equipment and molds used in the production process may require changes or adjustments to adapt to new dimensions. This process adds an extra layer of complexity and consumes time.

The initial setup for non-standard widths may be more complex and time-consuming compared to standard products. This reduces the total time available for effective production.

During production, unplanned stops for additional modifications and troubleshooting may occur, consequently affecting productivity.

Non-standard widths may lead to less efficient use of materials, generating waste and requiring constant recalibration of material flow.

Resources may be used less efficiently in the production of non-standard widths, leading to a decrease in overall productivity.

The productivity reduction of 5% to 30% for non-standard widths reflects the complexity and variability of production processes. This reduction is significant for efficient production planning and for changing performance expectations.

To better explain the impact of non-standard dimensions on production costs, we will also analyze a specific item with defects, namely the TermoFlex + BEX 200g 1.5m product with defects (see Table 8).

| Termoflex+BEX 200gr,1.5 m defect |          |               |             |             |
|----------------------------------|----------|---------------|-------------|-------------|
|                                  | quantity | price<br>euro | cost euro   | %           |
| Bico                             | 0.2      | 1.4           | 0.28        | 14%         |
| do best                          | 0.1      | 1.06          | 0.11        | 5%          |
| kospol                           | 0.1      | 1.1           | 0.11        | 5%          |
| do best                          | 0.4      | 1.06          | 0.42        | 21%         |
| cavo svepol                      | 0.1      | 1.15          | 0.12        | 6%          |
| Clients defect                   | 0.1      | 0.55          | 0.06        |             |
| losses 2%                        |          |               | 0.02        | 1%          |
| Cardboard tube 1,5               | 0.08     | 0.2           | 0.02        | 1%          |
| SAC 118                          | 0.08     | 0.95          | 0.08        | 4%          |
| <b>total material costs</b>      |          |               | <b>1.20</b> | <b>60%</b>  |
| productivity ef                  | 550      |               |             | 0%          |
| ef.teh.                          | 80       |               |             | 0%          |
| productivity                     | 440      |               |             | 0%          |
| Machine cost/hour                | 97.53    |               | 0.22        | 11%         |
| labor/hour                       | 54.12    |               | 0.12        | 6%          |
| <b>Processing cost</b>           |          |               | <b>1.55</b> | <b>77%</b>  |
| indirect 18%                     |          |               | 0.28        | 14%         |
| <b>Total complete cost</b>       |          |               | <b>1.83</b> | <b>91%</b>  |
| profit                           | 10       |               | 0.18        | 9%          |
| <b>total price</b>               |          |               | <b>2.01</b> | <b>100%</b> |

Table 8-Termoflex+BEX 200 gr 1.5 m defective item

Source: own processing

The materials used in the production of Termoflex+BEX represent 56% of the total product cost. Key components, such as Bico, Do Best, Kospol, and Cavo Svepol, significantly contribute to the total costs.

Faulty items from customers and losses (2%) are included in the total material calculation, highlighting the importance of efficiently managing defects and losses to minimize costs.

The machine cost per hour is 135 EUR, and the labor cost per hour is 65 EUR, resulting in direct costs of 14% and 7% of the total cost, respectively.

Process costs represent 77% of the total cost, including material and direct production costs.

Indirect costs are calculated at 18% of the total production costs, adding an important component for covering the general and administrative expenses necessary to support the production process.

The profit is set at 10% of the total cost, ensuring a sustainable profit margin for the company.

The final projected price for the Termoflex+BEX product is 2.15 EUR, reflecting the total costs and profit margin.

### Step 7: Difference Between Standard and Defective Products

Next, we will analyze the cost differences and the importance of efficiently managing defects in the production process (see Table 9).

| Standard products                                                                                                                                      | Defective products                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The total material costs are 1.28 EUR, representing 56% of the total product cost.                                                                     | The total material costs are slightly lower, at 1.20 EUR, but include the cost of defects and losses. This indicates efficient management of defects.               |
| The machine cost per hour is 97.53 EUR, and the labor cost per hour is 54.12 EUR.                                                                      | The machine cost per hour increases to 135 EUR, and the labor cost per hour to 65 EUR, reflecting the complexity and additional time required for managing defects. |
| Both alternatives have indirect costs of 18% of the total cost, covering the administrative and support expenses necessary for the production process. |                                                                                                                                                                     |
| The profit is 0.19 EUR, and the final price is 2.11 EUR.                                                                                               | The profit is 0.20 EUR, and the final price is 2.15 EUR, reflecting the additional costs involved due to defects.                                                   |
| Material costs: 56%                                                                                                                                    | Material costs: 56%                                                                                                                                                 |
| Machine costs/hour: 11%                                                                                                                                | Machine costs/hour: 14%                                                                                                                                             |
| Labor/hour: 6%                                                                                                                                         | Labor/hour: 7%                                                                                                                                                      |
| Indirect costs: 14%                                                                                                                                    | Indirect costs: 14%                                                                                                                                                 |
| Profit: 9%                                                                                                                                             | Profit: 9%                                                                                                                                                          |
| Total: 100%                                                                                                                                            | Total: 100%                                                                                                                                                         |

Table 9-Differences between standard and defective products

Source: own processing

The comparative study between the standard product and the defective one highlights the significant impact of defects on production costs and, implicitly, on profitability. Any company needs to recognize these differences and efficiently manage defects to maintain market competitiveness and ensure financial sustainability. The detailed cost sheet is a valuable tool in this context, providing a solid basis for making strategic decisions in production and financial management.

## CONCLUSION

This paper has analyzed in detail the implementation of the Activity-Based Costing (ABC) method at I.M.P. ROMANIA INDUSTRIAL CO S.A. through a theoretical and practical approach, based on actual data from the 2022 balance sheet.

The ABC method has proven to be an efficient and precise tool for allocating indirect costs, providing a clear view of how resources are spent on various activities and products.

The implementation of the ABC method has brought numerous advantages to the company, including:

- Accuracy in cost allocation: Unlike traditional methods, the ABC method allows for a more precise allocation of indirect costs based on causal relationships between activities and resource utilization. This has led to a more accurate representation of real costs and the profitability of each product.
- Process optimization: Identifying non-value-adding activities has allowed for process and resource optimization, contributing to improved operational efficiency.
- Informed decision-making: The detailed information obtained through the ABC method has been crucial for making well-informed strategic decisions, contributing to cost reduction and increased profitability.

The comparative analysis between standard and defective products has highlighted the impact of defects on production costs. Effective defect management is crucial for maintaining competitiveness and profitability. Products with defects showed a significant increase in costs, emphasizing the need for strict quality control measures and production process optimization.

For non-standard products with widths between 2 and 2.30 meters, a reduction in productivity of 5% to 30% was detected. This is due to the additional adjustments required for machines and the extra time for initial setup and managing unexpected technical issues. As a result, non-standard dimensions imply less efficient use of materials, generating losses and requiring constant recalibration of material flow.

The cost sheet for the TermoFlex + BEX 200g 1.5m product, presented in this paper, details the direct and indirect costs associated with manufacturing this product. It provides a solid basis for establishing the final price and ensuring product profitability.

To maximize the benefits of the ABC method, the following is recommended:

- Continuous cost monitoring: It is essential to constantly monitor the costs associated with each activity to find and eliminate non-value-adding activities.
- Process optimization: Continuous optimization of production processes is recommended to reduce defects and increase operational efficiency.
- Strict quality control measures: To minimize the impact of defects on costs, rigorous quality control is necessary during the production process.

In conclusion, the implementation of the ABC method at I.M.P. ROMANIA INDUSTRIAL CO S.A. has demonstrated its ability to provide accurate cost allocation, optimize processes, and significantly contribute to improving economic performance and market competitiveness.

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