Research Article

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Measuring Costs in the Fish Processing Industry and the Influence in Decision-Making

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Abstract

In this paper, we will focus on how to measure the cost of production in the meat processing industry in Albania. The implications of measuring the cost of production go beyond employees, companies, and investors directly invested in the industry. The cost of production not only impacts the internal parties of the enterprise but also the external parties. A country's economic, social, and environmental aspects are crucial for sustainable development. A country needs a production industry to stimulate innovation. Over the past two decades, Albania has shifted from a primarily rural society to one where most of the population lives in urban areas. This migration has driven rapid urbanization, a key demographic trend closely linked to changes in population structure. As a result, consumer trends have intensified, affecting the labor market, social policies, and economic development. (Sallaku et al., 2011). For countries such as ours, significant factors impacting demographic trends include employment (Todaro & Smith, 2020). In addition, the population will continue to increase consumer trends and the complexity of the meat production and processing sector (FAO, 2019). The meat production and processing industry in Albania is a sector that is not yet at the right pace of development, but it happens that we can talk about successful efforts in this field, at least in several areas of the country. We have attempted to focus the present paper on factors that influence the economic circumstances in Albania. This paper is based on indirect evidence of direct involvement in production elements, natural intestines processing for sausages, seasoned sausages, bacon, etc., in the industrial area of the city of Lezha.

Keywords: *Variable cost, total production costs, fixed costs, direct labor, etc*

1. Introduction

1.1 Purpose of the paper

The main purpose of this paper is to provide a real situation in which the processing industry of livestock products in Albania is located and especially that of the processing of certified product, in order to guarantee food safety for consumers.

Also, during the work, importance will be given to the way of calculating the cost of the finished product per unit of production, classifying the costs into variable costs and fixed costs. Further the total cost per unit of product and the cost structure will be calculated according to their behavior towards the total.

1.2 The methodology of the study

For this work, data collection will be done from official sources such as the Ministry of Agriculture, Food and Consumer Protection, INSTAT[1] and other primary data that will be collected by the enterprises of the livestock processing industry, through questionnaires and surveys.

Data processing will be done with statistical methods, which will measure the correlation between the quantities produced and fixed costs in total and per unit of production. During the analysis will be made a graphical presentation of processed data.

At the end of this paper will be given the conclusions and recommendations for the findings of the paper, in order to present the real situation in this industry to be of use for businesses, consumers and stakeholders.

1.3 Industry World production industry and role of production in development of an economy

Production is the process of turning materials or components into finished products that can be sold on the market (Kenton, 2023). All physical products are bought by stores, whether online or in local retail locations. Globally, the manufacturing sector is one of the most significant components of the economy (IBISWorld, 2023). Technology is now pushing economies toward service delivery rather than commodity production. However, a robust manufacturing sector remains a key indicator of a healthy economy (OECD, 2022).

Manufacturing industries encompass the processing of goods, materials, or substances into new products through physical, chemical, or mechanical transformations. Manufacturing typically involves plants, mills, or factories producing goods for public consumption, often using industrial machinery and equipment (Statista, 2023). While some materials, like baked goods or handmade crafts, are produced manually, others involve sophisticated processes, such as car manufacturing or electronics production.

Industries contributing to manufacturing include:

- Food
- Beverages
- Tobacco
- Textiles
- Clothing

[1] *INSTAT (http://www.instat.gov.al/)*

- Leather
- Pulp and paper
- Oil and coal
- Plastics and rubber
- Metals
- Machinery
- Computer and electronics
- Transport equipment
- Furniture

The manufacturing sector is a cornerstone of the U.S. economy, employing over 12 million people directly and millions more indirectly (National Association of Manufacturers [NAM], 2023). Manufacturing accounts for a significant portion of the gross domestic product (GDP) by producing goods that are essential for daily life. For example, manufacturers create value by transforming raw materials into finished products, such as turning rubber into car tires (Bureau of Economic Analysis [BEA], 2023).

The economy operates with the use of goods that we buy and use on a day-to-day basis, and the manufacturing industries produce these goods. Manufacturers create goods. The way these products are produced varies by company and by industry. However, most manufacturers produce goods for public consumption with industrial machinery and equipment. The act of manufacturing creates value—which means companies are able to charge a price for what they produce. A tire, for example, is not particularly valuable in and of itself. But once it is molded into a car tire, it is worth much more. Here, the manufacturing process that makes a tire can be turned into a required component of a car and thus adds value. Also, the economy relies on the environment by utilizing natural resources for production and generating waste in different forms. Studies suggest that if this pattern persists, it may lead to substantial climate change, the exhaustion of natural resources, and damage to the ecosystem (Prendi L., & Murrja, A, 2023).

Before the Industrial Revolution, most products were handmade, but advancements in technology have revolutionized production. Mass production techniques have increased efficiency, lowered costs, and made goods affordable to average consumers (Friedman & Smith, 2023). The process involved with mass production means that products can be created a lot faster and more accurately. This brings prices down and makes many consumer goods affordable, putting them within reach of the average citizen. This simple conveyor belt increased productivity threefold and revolutionized manufacturing. The progress in the computer of today has enabled mobile manufacturers to achieve more in much less time. Today, items can be produced in minutes rather than weeks, with automation improving speed and reducing errors (McKinsey & Company, 2023). Technology makes fabrication more efficient, faster, and cheaper year on year. Then again, it also eliminates those jobs on the assembly line so that skilled workers are left unemployed.

1.4 Product examples from industries:

Food production: The food production sector is the segment that converts food produced from agriculture or livestock to food products for consumption. It is often sold to a wholesaler or retailer who sells it to customers. Food products include baked goods, cereals, fruits and vegetables, and animal meat.

Manufacturing and distribution of tobacco products: There is something curious in that tobacco and beverages fall in the same manufacturing line. A beverage may be a non-alcoholic drink or an alcoholic drink produced from fermentation or distillation. Ice is also one of the manufactured beverages. Cigarettes, cigars, or other forms of tobacco products may be manufactured.

2. Industry in Albania

The following industries are developed in Albania:

1. Energy, which includes: the oil and natural gas industry, the coal industry and the electricity generation industry (World Bank, 2023).
2. Heavy industry, which includes: metallurgy, mechanical and chemical industries(OECD, 2022).
3. Paper wood industry and building materials (cement, brick, tile, etc.) (European Commission, 2023).
4. Light industry (textiles and leather-shoes) and food (flour, oil, beverages, etc.) (UNIDO, 2022).

These branches developed especially after the liberation of the country until 1990 when the industry was considered the most important branch of the Albanian economy (Institute of Statistics, 2023). In these years, this was the only region in Albania that was considered an industrial region. This meant that in the economic development of the region, the main weight of production was given by industry. But such a development could not continue after 1990, when the economy in Albania began to be privatized. The industry, especially the heavy industry, could not be privatized because its technology was undeveloped. (UNDP, 2023). Therefore, most of its buildings are now closed and destroyed. Meanwhile, new facilities have been set up, especially in the light and food industries, for the products of which the market needs (Albanian Development Fund, 2023).

The industry is spread almost all over the region, but at the same time, we distinguish between special industrial centers or areas within it. Thus, the area of Tirana - Durrës - Elbasan is considered as the most important industrial area in this region and in the whole of Albania(World Bank, 2023). In this area there are also the largest facilities of the most important branches of industry, such as the construction industry or machine repair (Tirana, Durres, Elbasan, Kavaja); ferrous and ferrochrome metallurgy (Elbasan); wood industry (Tirana and Elbasan); the construction materials industry in Tirana, Durrës, where cement is distinguished in Elbasan; the light and food industry, which is everywhere in this area, etc. (OECD, 2022). However, it should be noted that Albania experienced slower economic growth between 2010 and 2020 compared to the previous decade, while maintaining a high level of public debt (Hoda, N., Imeraj, J., & Hoda, H, 2023).

Another industrial area in this region is located in the southern part of the region, where the oil and natural gas industry has developed, such as the chemical one. The largest centers of the oil and gas industry are: Kuçova, Patosi, Ballshi, Visoka, Gorishti, etc. As for the chemical industry, Fieri is distinguished, among others, by the production of chemical fertilizers and acids (European Commission, 2023). In the whole northern part of the region, they are distinguished as industrial centers: Shkodra, for the production of wires, machinery, shoes, cigarettes, etc. Laçi, with the Chemical-Metallurgical factory and Fushe-Kruja for the production of cement (UNDP, 2023).[2]

3. Food Industry, Meeting Standards for Safety and Quality

Natural sausage casing is made from the intestines of the animal used and fashioned as an edible container for the many species the company puts in sausages. The intestines require you to offer more people for human purchases and you want to offer more opportunities for the provision of food and hygiene that apply to food of animal origin. The use of salt is an old technique; it was one of the first intestinal preserving agents, and a study was made trying to see if this older technique could reach today's microbiological needs. The results suggest that the salt employed for intestinal preservation possesses adequate antimicrobial properties to effectively keep bacterial contamination

[2] *AKBN – National Agency of Natural Resources, "National Energy Balance 2013"*

(excluding Clostridium spores) significantly below permissible thresholds (with water activity at 0.85 or lower) throughout a 30-day storage duration.[3]

4. HACCP Certification (HACCP)[4]

HACCP (Hazard Analysis and Critical Control Points) is a structured, science-based, and risk-focused method for recognizing, evaluating, and managing food safety risks. Food safety and hygiene regulations mandate that all individuals operating within the food industry implement and uphold hygiene protocols aligned with HACCP principles.

Principle 1 - Conduct a Risk Analysis
Principle 2 - Identification of Critical Control Points
Principle 3 - Establish Critical Limits
Principle 4- Monitoring Critical Control Points
Principle 5 - Imposition of Corrective Actions
Principle 6 - Verification
Principle 7 - Keeping Data[5]

HACCP applies to every stage of the food supply chain, including production, preparation, packaging, and distribution. The HACCP registration is directly associated with critical food safety directives that guarantee that the entities function smoothly while adhering to food safety acts as well as principles that are approved as HACCP guidelines.

Key Benefits:

- *Minimized risk of unsafe product manufacturing via well-implemented and controlled programs*
- *Internal and external reliability in your products, which is reflected in broader reliability towards partners and customers on a global scale*
- *Legal, statutory, and regulatory compliance*

4.1 HACCP and UNI 10854: 1999

Verification of compliance with the hygienic and health restrictions set by law for the agri-food sector.

Objective of UNI 10854: 1999 "Guidelines for the design and implementation of a self-monitoring system based on the HACCP method"[6], you have managed to prevent health risks in accordance with legal requirements (Decree 193/2007 and EC Regulation 852-853- 854/2004) and control of critical points in the production process.

Under food hygiene regulations in public establishments, food establishments must ensure the preparation of food is not spoiled so that, at the design stage, no food safety hazard is inadvertently introduced. It, therefore, is an action, systematic, known action to prevent foodborne illness. So, an interdisciplinary team characterizes the product and its production steps and explains its purpose of use.

CCP Decision Tree: A series of questions used to assess whether or not a control point is a CCP Control: (a) A process managing conditions of an operation to meet established criteria; (b) The condition of procedures being followed and criteria being met.

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[3] *Directions 178 - National Food Authority-Directions*
[4] *Risk Analysis and Critical Control Points, www.fda.gov*
[5] *https://www.tbi-al.com/sq/standartet-iso/certifikimi-haccp-analiza-e-rreziqeve-dhe-pikat-kritike-t%C3%AB-kontrollit-haccp*
[6] *Agricultural And Food Industry - Guidelineshttps://shop.standards.ie/EMEA/default.aspx*

Control Measure: A specific action (or actions) or activity (or activities) that can be used to prevent, eliminate, or reduce a significant hazard.

Control Point: A step where potential biological, chemical, or physical hazards can be controlled.

Criterion defined: A standard on which a judgment or decision can be based.

Critical Control Point (CCP): A step where control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Deviation: The non-fulfillment of a critical limit.[7]

5. Tree of Decisions for the Identification of the CCP[8]

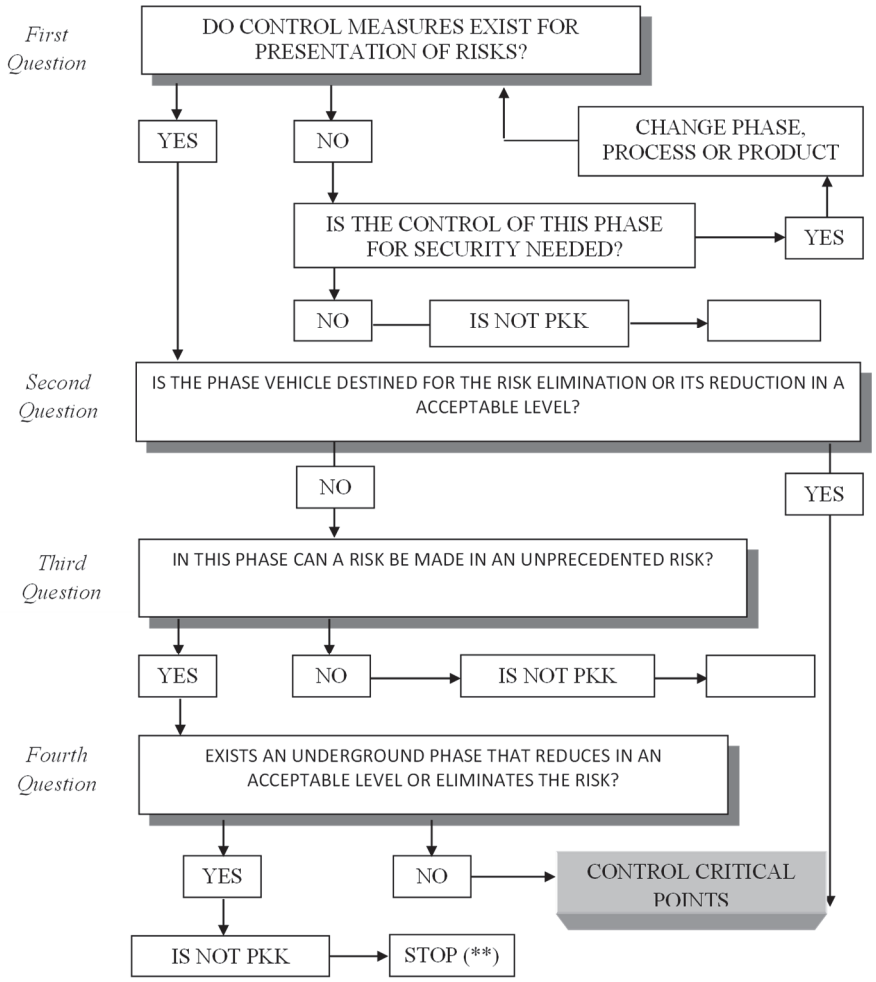


Figure 1:

[7] *https://www.fda.gov/food/hazard-analysis-critical-control-point-haccp/haccp-principles-application-guidelines*
[8] *CCP - Critical Control Point*

6. Mass Production/Continuous

Mass production refers to large-scale production based on market demand rather than customized systems production. It involves the production of standardized goods using machinery, assembly lines, and automation, which significantly increases output and reduces production time (Kenton, 2023). While mass production requires substantial energy and capital investment, it leads to higher and more repetitive commodity output, making it particularly efficient for high-volume products (ISO, 2022).

Mass production demands significant investments in technology and automation systems, which streamline production processes and reduce manual labor (OECD, 2023). In mass production systems, jobs are typically repetitive and often focused on quality assurance, as automation plays a vital role in all stages of the product life cycle (Friedman & Smith, 2023). Mass production is widely employed across various industries, including automobile production, food and beverages, chemicals, and fuel (World Bank, 2023).

The choice of production approach is influenced by product variety and customer expectations. For example, customized products are best produced using job production layouts, while standardized products are more efficiently produced through mass production (McKinsey & Company, 2023). Cost reduction, particularly in production, can be achieved through practices such as parts standardization and modular engineering, which increase efficiency and reduce waste (UNIDO, 2022).

It is important to note that no single production system fits all companies. Production and cost optimization are determined on a case-by-case basis, and businesses must assess their goals, strengths, and weaknesses to determine the most suitable production system (Alvarez & Williams, 2022).

6.1 Ordered (Custom)production

Specific production refers to a process where final products are created through distinct phases, typically organized as workstations and steps. At each stage, products are produced and adjusted based on factors such as color, material, or size (Jensen & Ryan, 2023). Custom production is particularly suitable for businesses that require a higher level of sequential income and job creation, but lack the capital necessary to implement mass production (Smith & Co., 2022). For new companies, custom production offers the flexibility to introduce new products into the market, providing an opportunity for innovation without the heavy upfront investment (World Bank, 2023).
One of the key advantages of custom production is its adaptability. If demand for a product is low, production can be stopped without significant financial losses, while a surge in demand allows the company to continue production (OECD, 2022). However, this flexibility can also pose challenges. The equipment used at each workstation may need to be modified and tested to accommodate different product variants, potentially raising the cost of production if not properly managed (UNIDO, 2023). If companies do not anticipate these issues, the costs may rise unpredictably, impacting the profitability of the business (Alvarez & Williams, 2023).

6.2 Cost calculation for a final product

The calculation of monthly costs is done according to the distribution of direct materials, direct labor and general production costs.

1. **Variable costs per unit = total variable costs / quantities thrown into the production**

process[9]

(as a variable cost I have received in total the monthly salary of the employees for all production processes, since it is not fixed and varies depending on the amount of work done and the work processes)

Variable cost per unit = 2,721,069 All / 36,659 batches = 74.23 All / unit

Table 1:

Employee expenses (administration salary + insurance)	1,066,509
General production costs	1,838,152
Taxes	153,304
Indirect fixed costs	721,336
Indirect variable costs	936,952
Maintenance costs	558,392
Different (Other Expenses)	204,515
Total	**5,479,159**

a. Total of general expenses ALL = 5,479,159
b. Total monthly quantities produced = 36,659 batches
c. Distribution coefficient per unit = Total Expenses/total monthly quantity produced[10]
d. Distribution coefficient = 5,479,159/36,659 = 149.46 All/unit
e. Quantities of production, coefficient of distribution

1. Baggeta Hans = 24,591 Batches * 149.46 All/ unit = 3,675,371 All (monthly expenses for the Hans product)
2. French Montone = 6,095 Batches * 146.46 All / unit = 910,959 All
3. Other products = 5973 Batches * 146. 5 All / unit = 875,044.5 All

Total cost per unit of product = Variable cost per unit + Total unit cost

Total cost per unit of product = 74.23 All / unit + 146.46 All / unit = 221 All / unit

1. Baggeta Hans = 24,591 * 221 All = 5,434,611 All

The weight that this product occupies in the total expenses = 543,411 All / 8,200,228 All = 66.27%

2. French Montone = 6,095 * 221 All = 1,346,995 All

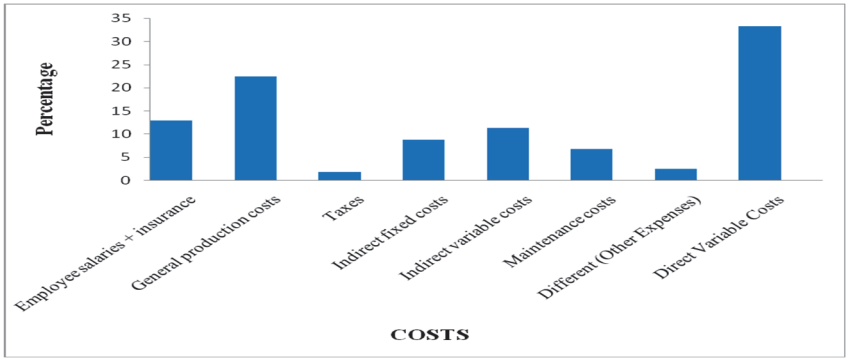
The weight that this product occupies in the total expenses = 1,346,995 All/ 8,200,228 All = 16.43%

3. Other products = 5,973 * 221 All = 1,320,033 All

The weight that this product occupies in the total expenses = 1,320,033 /8,200,228=16.1%

[9] *"Cost and management accounting" Fortuzi Shkëlqim, Durrës 2017*
[10] *"Cost and management accounting" Fortuzi Shkëlqim, Durrës 2017*

7. Distribution in Percent % of Each Expenditure to Total of General Expenses



Graph 1:

Total of general expenses = variable cost (direct labor) + total expenses = 2,721,069 + 5,479,159 = 8,200,228 All.

Table 2:

Employee expenses (administration salary + insurance)	1,066,509	13%
General production costs	1,838,152	22.4%
Taxes	153,304	1.86%
Indirect fixed costs	721,336	8.7%
Indirect variable costs	936,952	11.42%
Maintenance costs	558,392	6.8%
Different (Other Expenses)	204,515	2.49%
Direct Variable Costs	2,721,069	33.2%

1. Administration salary + insurances = 1,066,509/8,200,228 = 13%
   Administration salaries are fixed and do not depend on the level of production.
2. General production costs = 1838152/8200228 = 22.4%
   General production costs occupy 22.4% of total expenditures, including electricity, gas, water, generator oil, industrial waste transportation etc, which are necessary and variable depending on the monthly production, which depends on the quantity of raw material and workforce.
3. Taxes = 153,304/8,200,228 = 1.86%
   Taxes include profit tax and local taxes.
4. Indirect fixed costs = 721,336/8,200,228 = 8.79%
   Fixed costs include rental, machinery depreciation - equipment, car operating rental, telephone, internet.
5. Indirect variable costs = 936,952/8,200,228 = 11.42%
   Includes international and national transport costs, veterinary and origin certificates, physical control + parking + scales, customs service, etc., which depend on the number of exports and imports during the month as well as raw material collections from within the country.
6. Maintenance costs = 558,392 / 8,200,228=6.8%
   Maintenance costs, plumbing + electricity, machinery + equipment, environment, etc.
7. Different (Other Expenses) = 204,515 / 8,200,228=2.49%

Chancellery expenses, notarization of documents + financial consultancy + postal services.

8. Variable Costs (Direct Salary) = 2,721,069 / 8,200,228=33.2%
   The direct salary of the employees, which is directly related to the quantities produced, of each product for each customer depends on the monthly production, productivity of the employees and the requirements of the customers.

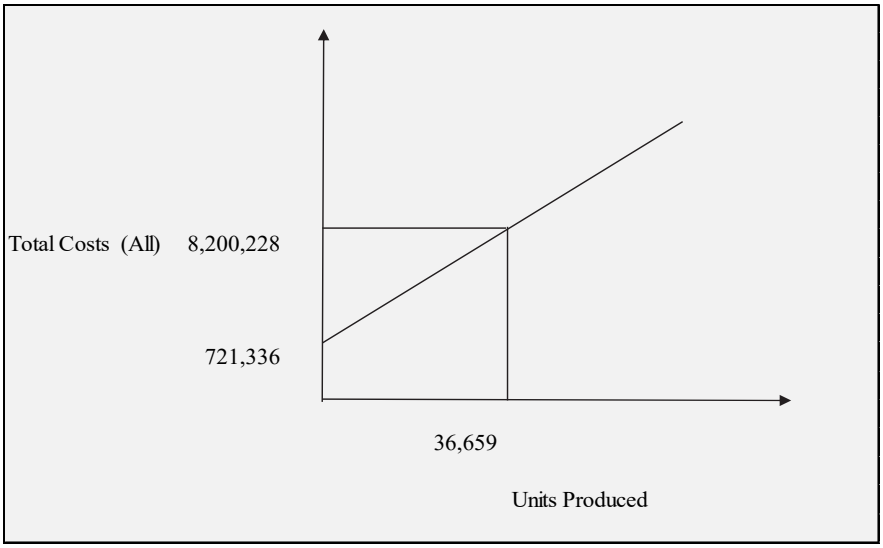


Figure 2:

The above graph represents the distribution of total costs for total units produced. Fixed costs are represented at the point where the straight line intercepts the y-axis. Variable unit costs are calculated at each point in the graph by taking the total costs, subtracting the fixed costs, and dividing the difference by the level of the corresponding activity on the x-axis. Hence, the total costs at the production level of 36,659 units is 8,200,228 All, and therefore the variable costs would be equal to 8,200,228 – 721,336 = 7,478,892 All. From this, the variable cost per unit = 7,478,892/36,659 = 204 All.

8. Conclusions

- Studying costs of production costs properly needs direct engagement in identifying work procedures and all the passages and workstations for the product.
- An ideal cost accountant identifies the problems in the company, leads through data, specifies the exact cause of the problem, and even advises the management to arrive at an overall solution.
- The actual costs incurred are measured against the budgeted or standard cost to see if any part of the business is spending more than expected.
- At INCA, cost systems for custom production provide useful information to manage profitability and set prices of products.
- Price is determined based on the cost-plus method during which you can recover the direct costs as well as part of the indirect costs and earn an acceptable profit margin.
- Effective cost management is the success index of an enterprise, its existence, and growth, as determinants of the success of the manufacturing business are

- Cost control allows the utilization of resources on material as well as machines in a cost-effective manner.
- It helps in planning for growth and expansion, as well as ensuring their successful execution.
- Decision making – offers a scientific study of facts and figures.
- Which assesses the project profitability under the given situation for making a proper decision for minimizing the risk factor involved in the project.
- Performance measurement – A firm's performance is measured by its financial results to a large extent, for its revenue is the largest component.
- The increasing risk decreases the value of the firm, while a declining firm value, if followed by increased profit, can enhance the firm's overall value.
- Therefore, risk and profitability are two essential components of a business concern, as noted, the financial decision affects the size of the profit flow or the profitability and risk of the firm.
- The decision on policy impacts risk and profitability.

9. Recommendations

- Monitoring work processes makes it possible to find opportunities for continuous improvement in each production unit.
- In the case of factual monitoring of INCA NORD FISH by affecting the various work processes, in this case we can find costs which would be in ideal conditions of product processing, because not always the real cost is as much as that in terms of a test that can be performed because since we are in a system in which it is operated mainly manually and not automatically there is the possibility of misuse.
- Specifically from the analyzes performed above, if for a certain product under the conditions of a daily test in continuous monitoring the amount of salt spent under normal conditions without being under monitoring is twice as high.
- Based on the analysis of these tests and by observing the relevant documents and the physical condition of the inventory, there were significant differences when we began to compare the calculated coefficients based on the costs sent by the production and what it should be.
- The greatest importance lies in raising the awareness of employees that everything they use in manufacturing has a certain cost and that everything costs money. After performing these analyzes, I got to know the responsible managers at their own expense and in most cases they were surprised.
- We can say that the importance of recognizing employees with indicators that they need to know, as in this case, getting to know their performance in production, is re-emphasized.
- This is not only the conversion of the raw material into a ready-made product but also how they manage the auxiliary materials.
- In these conditions, it is not just important to identify information but to provide ways to improve things, by setting new ways of controlling where they are lacking and by constantly monitoring the factors that affect costs.
- In conclusion, the key to the success of a manufacturing business cannot be achieved without following step by step how things work, finding ways to reduce resistance and applying change, and how they can be improved by maintaining profitability indicators.

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