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FEASIBILITY ANALYSIS FOR CRAFT BEER PRODUCTION IN THE STATE OF SANTA CATARINA. AIMING FOR A COST COMPARISON BETWEEN PRODUCING YOUR OWN PRODUCT OR OUTSOURCING PRODUCTION

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ABSTRACT

The growing demand for quality beer by Brazilians has been bringing as a consequence the expansion of the craft beer production market. Innovation and quality are key factors to win over consumers who are increasingly demanding, looking for differentiated products. In this sense, the present research consists of a case study of a microbrewery located in Florianópolis/SC, which sought opportunities to expand production, which initially produced its own and migrated to outsourced production. This case study consists of comparing the methods of own and outsourced production, in order to analyze the best cost-benefit, considering the direct and indirect costs as a starting point to compare both methods, through the analysis of production costs and define which method has the best cost-benefit, as well as which should be adopted by the brewery. As a result, there is an average cost per liter manufactured for the company's own production of R$ 5.11 (five reais and eleven cents) and through the outsourced company an average cost per liter manufactured of R$ 5.39 (five reais and thirty-nine cents), with a difference of R$ 0.24 (twenty-four cents) per liter manufactured. To set up the factory, with a production capacity of 6,000 (six thousand) liters per month, a total amount of R$ 300,000.00 (three hundred thousand reis) was disbursed, while in the outsourced plant, there is no production limit. Today the brewery is selling an average of 10,000 (ten thousand) liters per month, that is, 4,000 (four thousand) liters more than through its own production. To produce at the outsourcer, it is enough to pay the average industrialization fee, of R$ 4.00 (four reais) per liter manufactured and plus the average cost of raw material of R$ 1.39 (one real and thirty-nine cents). Thus, analyzing all the data collected, it was seen that due to the limitations of own production and the high cost of setting up the factory, the cost-benefit of outsourcing production is better and more viable for the craft beer producer in Santa Catarina.

Keywords: Cost Analysis. Outsourcing. Own production. Microbrewery.

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INTRODUCTION

Brazilians have a true passion for beer, and the beverage is widely consumed from north to south of the country (Marcusso, 2022). According to the Kirin Holdings Company report, published in December 2022, Brazil stands out as the third largest consumer of beer in the world, with a total consumption of 14,550 (fourteen thousand five hundred and fifty) million kiloliters in 2021 and an average of 69.7 (sixty-nine point seven porento) liters per person (Cano, 2022). In addition, Brazil is responsible for 7.8% of world beer consumption, which reached 189 (one hundred and eighty-nine) million kiloliters in 2021, representing an increase of 4% compared to the previous year (Valor Econômico, 2023).

The diversity of brands and styles in the Brazilian market reflects the breadth of consumption, reaching different audiences and different price ranges (Marcusso, 2022). This scenario not only moves the economy, but also awakens in many enthusiasts the desire to undertake in the sector (Khron, 2017). More and more people see the beer market as an opportunity to turn their passion into a profitable business (Troian, 2020).

This expansion has been particularly notable in the craft beer segment, where innovation and quality are key factors to win over the consumer (Oliveira, 2024). The increasingly demanding consumer is looking for differentiated products, which has stimulated the development of new flavors and artisanal production methods (Matos, 2011). According to the Ministry of Agriculture in Brazil, in a study published in July 2023, the brewery market has been growing, driven by the growing demand for more elaborate beverages, has seen a significant increase in the number of microbreweries, which focus on the consumer experience and offer unique products, aimed at different market niches.

According to the Escola Superior de Cerveja e Malte, in Santa Catarina (2024) the brewing tradition is deeply rooted, influenced by German immigrants who brought their expertise in beer production and consumption. The local beer culture, focused on artisanal and high-quality products, is mainly concentrated in the Metropolitan Region of Vale do Itajaí, especially in the city of Blumenau, which is home to several factories and is home to Oktoberfest, the largest beer event in Latin America. Since its first edition in 1984, the party has grown exponentially and, in 2023, attracted an audience of 454,285 (four hundred and fifty-four thousand two hundred and eighty-five) people (Blumenau City Hall, 2023). The event is a showcase for the region's beer industry, attracting tourists and fostering local commerce, while reinforcing the culture of production and consumption of craft beer in the state.

The artisanal production scene in Brazil has been expanding rapidly. According to the 1st Census of Brazilian Independent Breweries of 2019, carried out by the Brazilian

Association of Craft Breweries in partnership with SEBRAE (SEBRAE/SC, 2019), 70% of craft breweries were created between 2015 and 2019. The state of Santa Catarina is among the states with the highest number of craft breweries, with 78 (seventy-eight) registered establishments (SEBRAE/SC, 2019). The survey also revealed that 72.73% of craft breweries produce their own beer, while 27.27% outsource production, delivering their recipes and inputs to specialized factories, which operate on a large scale.

According to a survey carried out by the Brazilian Ministry of Agriculture, published in the article Anuário da Cerveja in 2023, the beer market continues to grow and is part of a global trend of valuing local and superior quality products, but it also reflects a change in Brazilian consumer behavior. More and more people are willing to pay a little more for beers that offer a differentiated sensory experience, whether in terms of flavor, aroma, or production techniques (Rodrigues, 2024).

As a result, from 2022 to 2023 there was an increase of 11.6% due to this growth, being a sector that cannot be underestimated, generating more than 42,000 (forty-two thousand) jobs directly. The Southeast region holds 57.8% of direct jobs, followed by the Northeast and South regions with 16.8% and 14.7%, respectively. Next we have the Midwest with 7.1% and the North region with only 3.7%, according to the Brazilian Ministry of Agriculture, published in the article Anuário da Cerveja em 2023.

Technology has played an important role in the modernization of production, so Ultragaz in São Paulo has invested in studies and dissemination of the importance of investing in technology and in control and automation in manufacturing processes. Equipment that uses Liquefied Petroleum Gas (LPG) as an energy source optimizes costs. Breweries that invest in automation and digitalization of processes are able to reduce waste and increase efficiency. (Vairo, *et al*, 2021; Silveira, *et al*, 2021; Akira, *et al*, 2021; Paquier, *et al*, 2021; Trench, *et al*, 2021; Coisse, *et al*, 2021; Raposo, *et al*, 2021; Pereira, *et al*, 2021).

Given the growth of the craft beer market in Santa Catarina, microbreweries face the strategic decision between producing in-house or outsourcing production according to (Machado, *et al*, 2022; Ceretta, et al, 2022; Deus e Oliveira 2021; Menezes Filho; Silva; Castelo, 2020). Which of the two options offers the best cost-benefit considering direct and indirect costs, quality, operational flexibility, and the ability to serve the market competitively?

Thus, this article aims to analyze the best cost-benefit considering direct and indirect costs, quality, operational flexibility and ability to serve the market competitively between own and outsourced production in a given brewery in Florianópolis/SC, comparing two

moments of the company, in the period from 2019 to 2020, where the brewery produced its own and in the period from 2023 to 2024, where production took place in an outsourced way.

To analyze the economic viability of craft beer production in a given company in Santa Catarina, comparing the costs and benefits of own production versus outsourcing, in order to identify the most advantageous alternative for microbreweries. Through the specific objectives: (i) Identify the direct and indirect costs involved in the own production and outsourcing of craft beer. (ii) highlight the impact of these alternatives on the quality of the final product (iii) Provide subsidies for microbreweries in Santa Catarina to make strategic decisions about their operation.

Craft beer production has grown significantly in Santa Catarina, driven both by increased consumption and by the desire of entrepreneurs to enter this market (Machado, *et al*, 2022; Ceretta, *et al*, 2022; God; Oliveira, 2021; Menezes Filho, Silva; Castelo, 2020). The decision between producing in-house or outsourcing becomes a strategic decision for the success of new breweries, as it involves aspects of cost, quality and operational management (Pôrto Jr; Macedo, 2023; Rusak, 2022). This study is relevant to understanding the economic and strategic implications of these two options, providing an in-depth analysis that can guide new ventures to maximize their efficiency and competitiveness in the market (Fagundes, 2023). The region of Santa Catarina, in particular, stands out for its strong brewing culture and the continuous growth of the sector, making this analysis even more pertinent (Jacques, 2020).

The microbrewery in this article illustrates this dynamic well. In its first two years, the brewery produced its own 6,000 (six thousand) liters of craft beer per month, fully assuming the production and operating costs. In 2021, the company chose to outsource production to a specialized factory, expanding its capacity and making its operation more flexible. This change resulted in a significant restructuring of operating costs and greater efficiency in the use of the company's resources, allowing production to be adjusted according to demand without infrastructure limitations, information captured through an interview with the owner of the company that will be the object of study in this article.

To perform this comparative analysis of costs between own and outsourced production, the absorption costing method will be used, which appropriates all production costs to the manufactured products. This method is the only one accepted by Brazilian accounting legislation and by the Federal Revenue Service for calculating costs, as it complies with the principles of accrual and confrontation (Fagundes, 2023; Jacques, 2020; Martins, 2010). According to Martins, "Absorption Costing consists of the appropriation of all

production costs to the manufactured goods, and only the production costs; all expenses related to the production effort are distributed to all products or services made" (Martins, 2010).

Comparative analysis seeks to identify which production model offers the best cost-benefit ratio (Fagundes, 2023; Jacques, 2020). Factors such as direct and indirect costs will be considered, as well as aspects such as quality control, operational flexibility, and the ability to serve the market competitively (Machado, *et al*, 2022; Ceretta, *et al*, 2022; Deus e Oliveira, 2021; Menezes Filho; Silva; Castelo, 2020). In this way, the study provides important subsidies for entrepreneurs who wish to evaluate the economic advantages of internal production versus outsourcing, in a market as dynamic as that of craft beers in Santa Catarina.

THEORETICAL FOUNDATION

The theoretical foundation aims to review literature and academic concepts previously studied for the elaboration of this study. Previous readings of previous studies are carried out in order to seek an understanding of the methods that are used in this research. We will highlight some methods and definitions of costing, a cost method defined for research, based on Law No. 6,404, of December 15, 1976, which defines and accepts as the ideal costing method in Brazil.

Definition that fits accounting principles and financial statements. In addition, we will highlight other themes that we consider relevant to conceptualize the research.

COST ACCOUNTING

Costs have a broad meaning, and may represent, in the present study, the Cost of Goods (barrel of draft beer, bottled beer, etc.), the Cost of Services Rendered in a service company (cleaning, maintenance, auditing, fees, etc.) and the Manufacturing Cost of a product such as draft beer (barley, malt, hops, etc.). In this article, we will work on the cost of manufacturing, which we can define as follows: It comprises the sum of all expenses with materials, labor and general manufacturing expenses applied in the manufacture of other material goods (Barbel, 2017).

According to Eliseu Martins (2010), Cost Accounting has two most relevant functions, aid to Control and decision-making. The mission of the control aid is to establish standards, budgets and forms of forecasting and subsequently to monitor and observe what happened based on the strategies outlined by the Control.

Regarding the second point, decision-making has the function of obtaining relevant data and values, which relate to short and long-term consequences. Through this data, it is possible to analyze and decide which direction the company should take, thus being able to cut products, manage sales prices, purchase options and even production, thus being able to decide if it is more beneficial to produce and outsource production depending on the results achieved, according to Eliseu Martins (2010).

To better understand cost accounting, it is necessary to understand the most used terminologies, their characteristics and differences, for this we go to the terminologies defined by Eliseu Martins (2010): (i) Expenses can be represented by the purchase of a product or service, which consequently generates an outflow of resources from the company, a disbursement, represented in most cases by an outflow of money; (ii) Costs are the disbursements made by the company for the purpose of acquisition to produce a good or service used in the production of other goods or services; (iii) Expenses are goods or services consumed during production, which are related to the company's core activity, whether these expenses are direct or indirect, in order to generate revenues; (iv) Losses are the goods or services consumed that are related to the product to be produced and are wasted during production, whether these losses are voluntary or not. It is at this point that Control can act and make decisions, thinking about reducing losses.

As mentioned earlier, to understand costs, it is first necessary to understand the terminologies used and their divisions. Costs are usually divided between Direct Costs and Indirect Costs, this division is directly related to the end activity carried out by the company, and can be related as follows: Direct Costs are those that are directly related to the company's product or service, that is, to produce beer, it is mandatory to use water, malt, hops and barley, These inputs are directly related to the core activity, so they are considered direct production costs. Regarding Indirect Costs, they are part of the general context of the product or service offered by the company, but it is not directly related, we can exemplify through the rent to establish the factory. This rented shed is essential to carry out the activities, but it is not directly linked to the cost of the product, so it is considered indirect cost of production. Within Direct and Indirect Cost, there are two branches, which are classified as fixed costs and variable costs (Martins, 2010).

Fixed Costs are those that will exist regardless of the volume of production, or even if there is no production, in a given month or year. Variable Costs, on the other hand, have a direct reaction with the volume of production, the more you produce, the more raw material is consumed, consequently the higher the variable cost (Martins, 2010).

These nomenclatures are directly related to the absorption costing method, defined for us to work on in this case study.

Absorption costing method

Costing means Cost Appropriation, however, there are several types of costing, such as Absorption Costing, Variable Costing, ABC, RKVV, among others. Each costing method has particular characteristics and requirements (Martins, 2010).

The method used in this case study will be the Absorption Costing method. This method is the only one accepted by the Brazilian tax authorities for calculating costs officially (Law No. 6,404, of December 15, 1976).

Absorption Costing is a method that originates from the application of accounting principles accepted by legislation. This method consists of appropriating all costs related to the product to be prepared and the production of the company's activity. It lists all expenses related to the production effort and distributes them to all products and services (Martins, 2010).

They are not exactly accounting principles, but methodologies derived from these principles, which are adopted by Cost Accounting. Therefore, this criterion is adopted by Financial Accounting, thus used for the preparation of the Balance Sheet and Income Statement, it is a method officially adopted by several countries (Martins, 2010).

Advantages and disadvantages of absorption costing

As previously described, Absorption Costing is the only method that can be used in Brazil for the purpose of calculating the cost of manufacturing, as determined by the Income Tax legislation (Berbel, 2017).

The Absorption Costing method has advantages and disadvantages, through the reading of Martins (2010) and Barbel (2017) we can conclude some of these advantages and disadvantages, we will point out below.

Absorption Costing is accepted by the Brazilian standard, not by chance. It follows accounting principles and is a required method for preparing financial statements. By including all production costs in its calculations, both fixed and variable costs, this method offers a complete view of production for administrators (Fagundes, 2023; Jacques, 2020; Martins, 2010).

It is an old method and widely used among companies and tax authorities, as it is a widely used and widespread method, it becomes an easier method to implement in large companies (Martins, 2010).

Finally, absorption costing allows fixed costs to be included in the cost of products, so that the company can define its own criteria for segregation between costs and expenses (Martins, 2010).

Regarding the points of disadvantage, we have the following: (i) Due to the encompassing of all production costs, the method becomes more complex, especially when there are different products or even production lines (Barbel, 2017); (ii) As a result of fixed costs being apportioned among the products, there may be a distortion between the real values of each product; (iii) the cost per absorption ends up hiding some inefficiencies in the calculation, due to the grouping of costs, a consequence of the fixed costs being diluted among the products (Martins, 2010).

TRANSACTION COST THEORY

The Transaction Cost Theory was a theory developed from studies by Ronald Henry Coase, a British economist, author of the book "The Nature of the Firm" in 1937. This theory, developed by Williamson in 1985, is called the Transaction Cost Theory. This theory helps in the choice of organizational governance strategies that aim to generate greater efficiency in the firm's resources. According to Coase (1937), an organization tends to expand from the moment that the costs of organizing a new transaction become equal to the costs of performing the same function through an exchange in the market. This thought of Coase's explains the fact that it is not always more beneficial to produce your products in-house, sometimes it is better to outsource production (Coase, 1930, apud Williamson, 1985, apud Lodi, 2017).

CRAFT BEER PRODUCTION

The artisanal production process follows the Reinheitsgebot Law known as the law of beer purity, enacted in Germany in 1516 by Duke William IX. It consists of using water, malt and hops (Silva, et al, 2016; Leite, et al, 2016; Paula, et al, 2016). As in Brazil the only official method for accounting purposes accepted for calculating Income Tax is the Absorption Costing method, the differences between the calculation standard in companies are in the way each company uses to allocate its costs (Martins, 2010).

Production costs are divided into Direct Cost and Indirect Cost, and can be classified as variable costs and fixed costs. Through the conclusion of Martins (2010), we analyzed the costs related to production and divided them into two segments.

Direct Cost is divided between the basic ingredients: Malt, hops, yeast, LPG, water, electricity and CO2, these vary on a proportional scale according to the amount produced throughout the production process Deus e Oliveira (2021).

Indirect Cost: Labor and transportation/fuel vouchers, chemical professionals who sign the recipe, waste removal, environmental licenses and depreciation (Rotolo, 2015).

Own production

The process of own production, which is our goal in the case study, is similar to the craft brewery process, but does not strictly follow the German purity law, because in it, correction salts and yeast are added, thus changing the recipe originating in Germany. The variation takes place according to the taste of the brewmaster, thus being able to have some specifications according to the taste of the producer (Deus and Oliveira, 2021; Rotolo, 2015).

Direct Cost is divided as follows: Raw material, LPG, electricity and CO2, this classification is based on the conclusions of Eliseu Martins, 2010 who classifies Direct Costs, as costs that are directly related to the product being produced (Deus and Oliveira, 2021; Rotolo, 2015).

Indirect Cost: Labor and transportation or fuel vouchers, chemists who sign the recipe, waste removal, environmental licenses, equipment maintenance, warehouse rental, depreciation, this classification is based on studies by Eliseu Martins, 2010 that classifies Indirect Cost as costs that are related to production, but not directly to the product (Deus e Oliveira, 2021; Rotolo, 2015).

Outsourced production

The difference between artisanal production and outsourced/industrial production is in the scale on which the productions are made, craft beer is defined by small-scale production, while large-scale outsourced beer is defined by large-scale production. Another difference between the two production models is the autonomy to create new recipes, something very present in artisanal production, unlike outsourced/industrial production, which must follow a certain recipe (Calabria, et al, 2023; Saugo, et al, 2023; Silva, et al, 2023; Vissoto, et al, 2023; Foralosso, et al, 2023).

PREVIOUS RESEARCH

Chart 1 below presents a summary of relevant studies on the craft beer market in Brazil. Each research contributes with different views on the sector, exploring everything

from socio-technical agency to consumer behavior and innovation strategies. These studies provide comprehensive dynamics that shape the craft beer market, highlighting objectives, results, and methodologies used by each author. The compilation of this information facilitates comparative analysis and allows a more in-depth view of the practices, consumer preferences, and innovations present in the sector.

Based on the problem and the objective of the research – which aims to analyze the economic viability of craft beer production in Santa Catarina, comparing the costs and benefits of production and outsourcing – two studies stand out for their relevance and alignment with the theme. Machado's (2023) work explores sociotechnical agency in the craft beer market, focusing on production-related practices, such as the choice of inputs, sales channels, and product quality. These elements are directly pertinent to the analysis of direct and indirect costs, as they affect both the cost of self-production and the competitiveness of craft beer in the market. By addressing the differentiation compared to mass beers, the study also contributes to understanding how quality control and operational flexibility can impact the economic viability of microbreweries.

Chart 1: Previous Surveys

Authors (Year)	Research Objective	Results	Methodology Used
Machado, Thomé, Leitão, Carvalho, (2023)	Understand the socio-technical agency in the craft beer market based on its practices.	Four classes of practices were identified: inputs and quality, sales channels, event style and harmonization; actors seek differentiation from mass beers.	Qualitative research with multiple case studies in the craft beer market in the Federal District.
Ceretta, Vargas, Froemming, Günther, K. Costa, (2022)	Identify craft beer consumption habits and preferences to assist managers in decision making.	Predominant consumption by men with high income, usually at home, accompanied by friends or partners.	Applied, quantitative research, using the Survey method with bivariate analysis and a sample of 183 consumers from RS.
Menezes Filho, Silva, Castelo, (2020)	Define identity profiles of craft beer consumers based on their consumption practices.	Five identity profiles were identified: Beginner, Adventurer, Beer Evangelist, Expert, and Beerchato.	This is an exploratory qualitative study with 55 interviews and observations in the city of Fortaleza, Ceará.
God, Oliveira, (2021)	To identify the contribution of craft breweries to the theory of cooperative innovation in the Rio de Janeiro market.	The beer coworking model facilitates product development and the expansion of the craft beer market.	Bibliographic and documentary research, in-depth interviews and survey. Qualitative analysis and descriptive statistics.

Source: Survey Data

On the other hand, the work of Deus and Oliveira (2021) provides an interesting perspective on outsourcing through the concept of beer coworking and cooperative innovation. This study analyzes how breweries that do not have their own infrastructure can

use the space of other breweries for production, thus reducing fixed and operating costs. This model is essential for assessing the cost-effectiveness of outsourcing, as it allows microbreweries to focus on strategic areas, such as marketing and distribution, while outsourcing production. The approach to cooperative innovation and partnerships also offers insights into how outsourcing can increase the competitive capacity and flexibility of microbreweries.

Therefore, both studies address important factors for the comparison between own production and outsourcing, such as cost reduction, operational flexibility and the ability to serve the market competitively, making them highly relevant for the economic feasibility analysis proposed in the research.

METHODOLOGY

The present research work is characterized as a case study of a microbrewery located in Florianópolis/SC. The case study was done in person, in conversation with the owner of the company, in which he provided information about his own and outsourced production, comparing the two moments of the company, in the period from 2019 to 2020, where the brewery produced its own and in the period from 2023 to 2024, where production took place outsourced, presenting documents with the objective of making the desired comparison.

The present study regarding the level is exploratory, since it seeks to bring greater familiarity with the problem through the description of certain characteristics of a given population. As for the nature of the research, it is applied, as the objective is to generate knowledge for practical application, directed to the solution of specific knowledge.

The present research is qualitative, as it will analyze data, that is, in the present work the data between the years 2019-2020, 2023-2024, of a microbrewery in Florianópolis/SC will be analyzed. The qualitative methodology is an exploratory structure, with an interpretative focus on the subjectivities adjacent to the object analyzed (MARCONI; LAKATOS, 2008).

As for the instruments used, the research is characterized as a case, documentary and bibliographic study. Bibliographic due to its development based on bibliographic means that deal with the theme under study, especially doctrines and scientific articles. It is a case study because it was carried out through an interview, financial spreadsheets and documents made available by the company's representative. Yin (2001, p. 21) states that "one can find case studies even in economics, in which the structure of a particular industry,

or the economy of a city or region, can be investigated through the use of a case study project".

The interview was carried out based on the objective of this research, involving an area of the microbrewery, questions about the cost of production, such as gas, water, raw material, energy of the craft beer production process and the cost of outsourcing production.

In this way, we spreadsheetd the information according to the Absorption Costing method, so that we could better organize the information and left it in accordance with the relevant legislation. Therefore, we separate the two moments of the company, the first moment in its own production format and the next moment, with the costs pertinent to the outsourced production format.

PRESENTATION AND DISCUSSION OF RESULTS

In this chapter, the analysis of the brewery's production process in two distinct moments will be addressed, between the years 2019 and 2020, where the brewery produced its own and in the period from 2023 to 2024 where production was outsourced. In addition, the data collected through interviews with the owner will be analyzed, in order to meet the objectives proposed in the work, compare two different production methods, aiming to conclude which method is more effective in terms of costs for the company.

The company was founded in 2018, putting a teenage dream into practice. The founder says that the idea of founding a brewery was born from the experience of working with beer, at events with a friend. This friend is the son of a brewmaster originally from Rio Grande do Sul, who established his base in Florianópolis, along with the creation of his brewery in the 1990s.

In this way, his passion for the art of creating beer began, still in his home kitchen, in an amateur and curious way he began to try to create his own recipe, among several tests, successes and errors. The adventure of creating a recipe began to take shape until the idea of founding a microbrewery came up. From this moment on, the plan begins to be put into practice, with the help of family members who were already entrepreneurs and who accepted to become partners in the artisanal company and started to invest. According to the owner, the initial investment was estimated at R$ 300,000.00 (three hundred thousand reais), being divided between adaptations in the space that was rented, labor for execution and equipment.

Thus, in 2018 the craft beer factory was set up , with a monthly production capacity of up to 6,000 (six thousand) liters of draft beer per month. This production was all carried

out by the company's founder, from the purchase of inputs to the final bottling process in the 30 (thirty) and 50 (fifty) liter barrels.

The partnership lasted a little over a year, until the founder decided to go it alone, changing the company's name and, finally, constituting in mid-2018, the brewery that continues to this day in Florianópolis/SC.

Over the years, it was seen that the production process was quite challenging to be managed by just one person and sporadically by a family member who provided support. This challenge has only grown over the years with the great acceptance of the consumer public. Production increased month by month until it reached the limit of the production capacity of the small factory and thus expansion was necessary.

It is at this moment that the idea of outsourcing production arises. The idea was born from events and conversations with other craft beer producers, who went through the same production demand situation that the company was going through.

In this way, we separated the company into two moments so that we could better organize the data and compare them, and thus analyze which production method is more viable for beer production.

PRESENTATION OF DATA

The data were classified and tabulated using the Absorption Costing method. Thus, divided between direct and indirect costs, as determined by the method.

Direct Costs are expenses that are directly linked to the product being made. These expenses can be materials, labor and general manufacturing costs applied to the product. They are called direct costs because they are easily related to the product (Barbel, 2017).

In this way, the following direct costs in the production of draft beer were identified:

The raw material is composed of malt, hops and yeast, these costs are appropriated during the production process, as these are directly related to the product. The consumption of these are varied according to production, so they vary proportionally.

Liquefied petroleum gas, also known as LPG, is used to heat the boilers and this steam produced goes to the pans to show and boil.

To produce draft beer, the calculation made by the producer to provide the amount of water consumed in the production process is 02 (two) liters of water for 01 (one) liter of draft beer produced. However, the consumption of water in the factory is much higher, because the consumption goes beyond manufacturing, a lot of water is used to sanitize the equipment for the following productions, reaching a proportion of every 01 (one) liter of draft beer manufactured, 06 (six) times liters of water are used to sanitize the factory.

As the factory was established in a region where it was not of high quality, correction salts were used to leave the water in ideal conditions. The monthly energy consumption was more related to the production activity, as it is a great need for refrigeration for the fermentation and maturation process to take place. Finally, CO2 is added in the barreling process, thus entering the direct cost.

Indirect Costs are costs that are not directly linked to the product, but are part of the company's process, such as labor, chemicals and advice, waste removal fee, licenses, rent, depreciation of production equipment and others.

The most relevant indirect costs in the factory are the salaries of the employees, fuel for travel, the fee of the chemical responsible, which is a requirement for the manufacturing process and the payment of the chemical advice fee was also made.

Water consumption was apportioned between production and cleaning. According to information from the producer, water consumption goes beyond manufacturing, a lot of water is used to sanitize the equipment for the following productions, reaching a proportion of every 01 (one) liter of draft beer manufactured, 06 (six) times more than a liter of water is used to sanitize the factory.

The cost of removing waste was not accounted for, since it was donated to a small animal producer who did not charge for the removal.

Finally, there were the costs of renting the factory and depreciating the equipment used for production.

Manufacturing in own production

According to the owner, the factory had autonomy to manufacture 6,000 (six thousand) liters of draft beer per month, but the mashing process was limited to 300 (three hundred) liters per production (mashing is the term used in the manufacturing environment, which means the amount of production per cycle).

Below we have the tables that represent the values of Direct Costs (Table 1) and Indirect Costs (Table 2) related to the manufacture of draft beer between the years 2019 and 2020.

Table 1: Direct Costs related to the manufacture of draft beer between the years 2019 and 2020

Descrição C. Direto	Brassagem - 300 Litros		Ciclo Mensal - 6.000 Litros		Custo por Litro	
Matéria Prima	R$	942,90	R$	9.358,00	R$	1,56
GLP	R$	450,00	R$	9.000,00	R$	1,50
Água	R$	37,50	R$	750,00	R$	0,13
CO2	R$	150,00	R$	3.000,00	R$	0,50
Energia	R$	31,50	R$	630,00	R$	0,11
Total	R$	1.611,90	R$	22.738,00	R$	3,79

Source: Prepared by the authors based on company data (2024).

By separating Direct and Indirect Costs, at first we can verify the numbers found in the costs directly related to the production of chopand, reaching a total average value of direct cost for the manufacture of each liter of draft beer in the amount of R$ 3.79 (three reais and seventy-nine cents) per liter manufactured.

It is important to highlight that the composition of the value of the raw material cannot be measured in a directly proportional way between 300 (three hundred) liters to 6,000 (six thousand) liters. This is because almost all the products consumed from the manufacture can follow a basic proportion metric except for yeast, as it is sold in closed packages of 500g (five hundred grams) with a cost of R$ 500.00 (five hundred reais) per package, but to manufacture 300 (three hundred) liters of draft beer, 50g (fifty grams) of yeast are used. This same package yields around 10,000 (ten thousand) liters. If we were to calculate the value of the raw material in proportion, it would be as follows: 300 (three hundred) liters is equal to the cost of R$ 942.90 (nine hundred and forty-two reais and ninety cents) in proportion to the 6,000 (six thousand) liters per month, closing at R$ 18,858.00 (eighteen thousand eight hundred and fifty-eight reais), bringing a large disproportion to the average cost of production. The correct calculation is to make the equivalence ratio between 300 (three hundred) liters and 6,000 (six thousand) liters without the cost of the yeast package and after that add it, getting as follows, R$ 442.90 (four hundred and forty-two reais and ninety cents) the cost of raw material related to the production of 300 (three hundred) liters and R$ 8,858.00 (eight thousand eight hundred and fifty-eight reais) the equivalent of 6,000 (six thousand) liters, then, finally, adding the value of R$ 500.00 (five hundred reais) of the yeast package, closing a total value of raw material to manufacture 6,000 (six thousand) liters of draft beer at R$ 9,358.00 (nine thousand three hundred and fifty-eight reais).

In this way, we have an average cost of raw material for the manufacture of 1 liter of draft beer at R$ 1.56 (one real and fifty-six cents). Finally, as previously mentioned, the average direct cost per liter of draft beer manufactured is R$ 3.79 (three reais and seventy-nine cents).

Next, we will analyze Table 2 related to the Indirect Costs of own manufacturing.

Table 2: Indirect Costs related to the manufacture of draft beer between the years 2019 and 2020

Descrição C. Indireto	Brassagem - 300 Litros	Ciclo Mensal - 6.000 Litros	Custo por Litro
Mão de obra e Combus	R$ 174,00	R$ 3.480,00	-
Quimicos e conselho	R$ 30,00	R$ 600,00	-
Retirada de resíduos	-	-	-
Licenças e alvarás	R$ 7,50	R$ 150,00	-
Manutenção de Equipar	R$ 16,75	R$ 335,00	-
Aluguel	R$ 90,00	R$ 1.800,00	-
Depreciação	R$ 77,10	R$ 1.542,00	-
Total	R$ 395,35	R$ 7.907,00	R$ 1,32

Source: Prepared by the authors based on company data (2024).

At this moment, we check in the table the Indirect Costs of own manufacturing, through an apportionment in two moments, using the average manufacturing metric which is 300 (three hundred) liters per Brewhouse and the mental medical manufacturing of 6,000 (six thousand) liters of draft beer per month, in this way, being able to verify the monthly manufacturing costs, reaching an average value per liter of Direct Costs in the amount of R$ 1.32 (one real and thirty-two cents).

Table 3: Final cost in the own production process

Produção Própria		
Descrição C. Direto	Custo por Litro	
Matéria Prima	R$	1,56
GLP	R$	1,50
Água	R$	0,13
CO2	R$	0,50
Energia	R$	0,11
Descrição C. Indireto Total	R$	1,32
Custo Total	**R$**	**5,11**

Source: Prepared by the authors based on company data (2024).

By means of a basic account, adding the values of the Direct and Indirect Costs, we can conclude the final value of the manufacturing costs per liter produced, which are R$ 3.79 (three reais and seventy-nine cents) plus R$ 1.32 (one real and thirty-two cents), then closing at the cost value of R$ 5.11 (five reais and eleven cents) per liter manufactured, as observed in Table 1 and Table 2.

The depreciation was calculated from the acquisition value of the equipment acquired for the assembly of the factory in its initial period, consisting of tanks, glycol bank, kitchen, barrel washer, cold room, reaching a total amount of R$ 185,000.00 (one hundred and eighty-five thousand reais) estimating an average depreciation per year of 10%, we have the value of R$ 18,500.00 (eighteen thousand five hundred reais) per year and a monthly depreciation of R$ 1,542.00 (one thousand five hundred and forty-two reais).

Outsourced Manufacturing

In the following table, we have the average costs related to the monthly manufacturing process, between the years 2023 and 2024, after outsourcing the draft beer manufacturing process.

It is possible to verify that the monthly demand has increased, going from 6,000 (six thousand) liters per month, when it was in own production, reaching an average monthly demand of 10,000 (ten thousand) liters. Through this previous comparison it is possible to verify an advantage between the two manufacturing processes, since the previous process was limited to a capacity of 6,000 (six thousand) liters per month. After outsourcing the manufacture of draft beer, the capacity reaches 10,000 (ten thousand) liters, in this way it was possible to increase the demand for monthly delivery.

Table 4: Final cost in the outsourced process

Custos com a Tercerizada	Custo para fabricar 10.000 Litros		Custo por Litro	
Fermento	R$	500,00	R$	0,05
Malte Pilsen	R$	10.500,00	R$	1,05
Malte Viena	R$	1.800,00	R$	0,18
Lupulo	R$	700,00	R$	0,07
Custo Industrialização	R$	40.000,00	R$	4,00
Total	R$	53.500,00	R$	5,35

Source: Prepared by the authors based on company data (2024).

After outsourcing the manufacturing process, it is possible to see the biggest difference between cost division. Unlike the own production process (Table 1 on page 11 and Table 2 on page 12), there are no longer Direct and Indirect Costs, now we only have Manufacturing Costs, where we have the costs of inputs highlighted, as the company supplies the inputs to the manufacturer. This process of supplying inputs is essential for the quality and revenue of the draft beer to remain exactly the same as required by the owner, as the inputs are always the same. The biggest difference is in the Industrialization Cost, which is the amount charged by the outsourced company to manufacture the draft beer, reaching the average value per liter of R$ 4.00 (four reais) on average and we do not have the depreciation of the factory's products.

Finally, we arrive at the final cost in the outsourced process, reaching the value of R$ 5.35 (five reais and thirty-five cents) per liter produced.

ANALYSIS OF RESULTS

Here we have Table 3 and Table 4 of production in a summarized way in both moments, first being the own production and followed by the outsourced production.

It is possible to verify a difference in values between both, with an average cost per liter of R$ 5.11 (five reais and eleven cents) for own production and R$ 5.35 (five reais and thirty-five cents) for outsourced production, a difference of R$ 0.24 (twenty-four cents) per liter.

In fact, speaking of production cost values, it is more advantageous to produce draft beer in our own way, with our own labor, if we were to disregard external factors. Such as the capital disbursed to set up the factory and to start production, which reached a value of R$ 300,000.00 (three hundred thousand reais), in addition to the fact that it is necessary to employ people to handle the production, being at least 02 employees, considering that the owner reports that he spent more than 14 hours a day inside the factory to produce the 6,000 (six thousand) liters monthly.

In the analysis of the results obtained in comparison with the literature, we can verify that the current study seeks a practical and financial approach to the production of craft beer, exploring the impacts of the change from the production model of own to outsourced production in the specific context of a brewery.

While previous research, such as that by Machado et al. (2023), focused on socio-technical agency and differentiating practices in the craft beer market (such as quality of inputs and harmonization events), the current study advances by investigating the costs and financial efficiency of these production methods. Thus, while Machado et al. (2023) address the impact of practice and differentiation on the consumer market, the current study contributes by focusing on financial and operational efficiency strategies, aspects that have been little addressed in the literature in previous studies.

In the case of Ceretta et al. (2022), the analysis of consumption and preferences helps managers to understand the craft beer consumer market. Although the current study does not explore consumption behavior directly, it complements the understanding of the internal operation by investigating the impact of the choice of the production model on costs, a factor that can influence price decisions and market positioning.

The research by Menezes Filho et al. (2020) and Deus & Oliveira (2021) focuses more on consumer behavior and collaborative innovation, respectively. While these studies contribute to the understanding of preferences and strategic collaborations in the sector, the current study offers a financial and management analysis of the operation, which differs by exploring the direct and indirect costs involved in the process of production and industrialization of draft beer, areas still little explored in the same depth in the comparative studies.

In this way, the current research partially aligns with previous studies by addressing sector-specific practices and challenges, but advances by including a detailed analysis of costs and the financial impacts of production choices, something that other studies have not yet explored with the same focus and depth.

In addition, based on Williamson's Transaction Cost Theory, which he developed in 1985 from studies of Coase's book "The nature of the firm" from 1937, we can conclude that an organization tends to evolve and expand the market based on analysis of results that prove the cost-benefit of producing internally may not be as advantageous as outsourcing its production in view of the results of the analyses and their Conclusions.

CONCLUSION

This work seeks to clarify some problem situations that can be experienced by entrepreneurs in the brewing industry in Brazil, with a main focus on the state of Santa Catarina, as it is a work directed to a microbrewery established in Florianópolis/SC.

In view of the scenario of expansion of entrepreneurship in the brewing industry in Santa Catarina, and for knowing an entrepreneur in the area, I aroused the curiosity to understand the difficulties that the beer producer goes through to undertake and produce, in order to solve problems faced until then.

Because they produce their own recipes in an artisanal way, a problem to be faced may be in making the decision between producing their own product or outsourcing their production, from this doubt, the entrepreneur needs to decide which is the best cost-benefit for his company, this doubt must be resolved from analysis of his production costs to verify which is the best option in terms of values.

From these problems, we immersed ourselves in the case study, because this company used both methods. First the company produced through its own factory, then chose to outsource production, so we compared the two processes at different time intervals, in order to conclude which is the best cost-benefit for the entrepreneur.

The microbrewery in this study provided data for analysis purposes, real data, obtained through a survey with the entrepreneur, in this way we explored the data provided and analyzed it.

We collected the data provided and sought to compare them, in this way we verified that to adapt the space to the necessary standards of a factory structure and acquire the necessary equipment to start production activities, around R$ 300,000.00 (three hundred thousand reais) were spent. This amount is divided between the acquisition of equipment, adaptations in the space rented by the company to host the factory and bricklayer labor.

With the acquisition of equipment to produce alone, R$185,000.00 (one hundred and eighty-five thousand reais) were disbursed, equipment that had a large annual depreciation, reaching a value of R$18,500.00 (eighteen thousand and five hundred reais). In addition, a limitation in production capacity that reached 6,000 (six thousand) liters of draft beer produced per month for the microbrewery.

The company contracted to produce has a monthly production limit of 500,000 (five hundred thousand) liters of draft beer per month, with no limitation on orders from its customers, as long as they are within production capacity.

Today the company's production capacity is much higher than its monthly demand, it is estimated that the monthly demand is at 30% of capacity, equivalent to 150,000 (one hundred and fifty thousand) liters of draft beer produced per month. The company in this case study hires services on a monthly basis, an average of 10,000 (ten thousand) liters per month, that is, 4,000 (four thousand) liters more than it could produce in its old facility.

Regarding the comparison of monthly costs in each of the processes, we obtained the following numbers:

Analyzing the costs of own production between the years 2019 and 2020, we obtained an average value of R$30,645.00 (thirty thousand six hundred and forty-five reais) for the production of 6,000 (six thousand) liters per month, a value calculated through Absorption Costing. Of the total amount, we have the following figures: R$ 22,738.00 (twenty-two thousand seven hundred and thirty-eight reais) are the direct costs and R$ 7,907.00 (seven thousand nine hundred and seven reais) the indirect costs. Through these values, we obtained the value of the cost per liter produced in the factory, when the production was owned, reaching an average of R$ 5.11 (five reais and eleven) for each liter manufactured.

Analyzing the costs of outsourcing production between the years 2023 and 2024, we obtained an average value of R$ 53,500.00 (fifty-three thousand five hundred reais) for the production of 10,000 (ten thousand) liters per month, a value calculated through Absorption Costing. Of the total amount, we have the following figures, R$ 40,000.00 (forty thousand reais) referring to the Cost per Industrialization, the amount charged by the outsourced company to manufacture the draft beer, with an average Industrialization Cost per liter manufactured in the amount of R$ 4.00 (four reais), in addition to the costs with the inputs for the manufacture of the draft beer. The cost of raw materials is borne by the entrepreneur, as the responsibility for purchasing the inputs is his, who chooses the inputs according to his preference, so as not to alter the final flavor of the product. To manufacture 10,000 (ten thousand) liters of draft beer, the average total cost of raw material is R$

13,500.00 (thirteen thousand five hundred reais), and the average cost of raw material per liter manufactured is around R$ 1.35 (one real and thirty-five cents). Finally, we arrive at the final value of the Average Cost of the draft beer manufactured, being R$ 4.00 (four reais) referring to the Cost of industrialization and another R$ 1.35 (one real and thirty-five cents) of Raw Material Cost, totaling an average cost per liter manufactured of R$ 5.35 (five reais and thirty-five cents).

Analyzing the two average costs for each liter of draft beer manufactured, we have the following values, R$ 5.11 (five reais and eleven cents) for the company's own production and R$ 5.35 (five reais and thirty-five cents) for the cost through the outsourced company. Thus, we can see a difference between the values of R$ 0.24 (twenty-four cents) for each liter manufactured.

Although there is a difference between the two types of production, with own production being more beneficial in relation to the average cost for each draft beer manufactured, it is at this point that we have to take into account the theory developed by Williamson in 1985, known as the Transaction Cost Theory, this theory helps in choosing possible strategies for decision making. These strategies lead a firm to rethink its methods, deciding to outsource its processes instead of maintaining its own production, and should be thought of beyond the values of the cost per product manufactured.

The entrepreneur must take into account the fact that to set up a factory and using the case study as an example, R$ 300,000.00 (three hundred thousand reais) were initially spent, being R$ 185,000.00 (one hundred and eighty-five thousand reais) only for the acquisition of equipment, which limited production to 6,000 (six thousand) liters of draft beer manufactured per month, and the outsourced company does not limit the monthly production, with no expenses with employees, depreciation, equipment maintenance, etc. The only cost with the outsourced company is the cost of industrialization.

Thus, we can conclude that due to the high initial costs for setting up the factory, its limitations for large-scale production and the low difference between values, in the amount of R$ 0.24 (twenty-four cents) difference between the two production methods, we conclude that the cost-benefit of outsourcing the manufacture of draft beer is more advantageous than producing it, Taking into account not only the value of the liter manufactured, but a whole context of purchasing equipment, expenses with electricity, energy, products for production, equipment maintenance, etc.

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