

# Characterization of the Production Chain of the Craft Beer Produced in Western Region of Santa Catarina and Southwest of Paraná - Brazil

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**Abstract**— *Beer is an age-old alcoholic drink obtained as a product of the fermentation of the wort of malted grain (barley), with the addition or not of other cereals or sources of sugars, called adjuncts, and the addition of hops, using yeast for the fermentation process. The production of special beers in microbreweries has increased significantly in recent years, making it an important business opportunity. In this context, the objective of this study was to characterize the production chain of craft beers produced in the western regions of the state of Santa Catarina and the southwest of the state of Paraná. In addition, this work sought to present the number of beer producers, grouping them by produced volume and determining the types and characteristics of the beers, the origin and the volumes of the raw material or adjuncts used in the processes and the business model. To this end, a survey instrument was developed and applied to 14 microbreweries installed in these two regions. The obtained results revealed that the production of these units vary by up to 300,000 liters of beer per month. They rely on a few partners, most exist for more than 5 years, and the owners are mostly young people of up to 44 years of age. The beer types produced are mostly Pilsen, IPA and Weiss, which rely for up to 90% on imported raw materials, making all the difference in specialty beers. As such, it can be concluded that this production chain seems to be simple, but long, starting with the purchases of raw materials and suppliers, followed by the entire production process, to then be distributed and sold to the final consumers.*

**Keywords**— *Drinks, inputs, production chain, beers.*

## I. INTRODUCTION

Beer is an age-old alcoholic drink obtained as a product of the fermentation of the wort of malted grain (barley), with the addition or not of other cereals or sources of sugars, called adjuncts, and the addition of hops, using

yeast for the fermentation process (Tschope, 2001; Rehm; Reed, 1983).

For many centuries, the production of beer on a small scale was sufficient to meet the entire demand, which resulted in a great variety of good-quality beers. However, the wide diffusion and acceptance of this drink throughout its history has led beer to become one of the most popular drinks, being consumed on all five continents in countries of different climates and cultures. Currently, the global brewing market is characterized by large-scale production to meet the high demand for the product, leading to the generation of large quantities of waste.

The brewing industry is one of the engines of the economy in several Brazilian cities, both in those where barley is grown as main activity and in those where the plants, distribution centers and the entire network are located that form this important segment of the national market. This market contributes about 1% to Brazil's GDP (Sindicerv, 2017).

In an industry characterized by market concentration, microbreweries have been emerging regionally. It is estimated that Brazil has around 200 microbreweries. Most of them are located in the South and Southeast regions, but the activity is becoming popular in other regions of the country.

Most microbreweries comply with the German Beer Purity law 111 in order to offer a beverage to the market that has been prepared with special characteristics, instead of competing on price with the brands of large companies. The increasing income of the population has been an important factor for the migration of consumers toward more expensive products. Because of their limited distribution radius, however, these manufacturers usually only meet the demand of the municipality where they are installed (Franceschini, 2006).

Santa Catarina, in particular, has a great beer producing tradition due to the German colonization, since the Germans are considered the fathers of modern beer - the beer produced with wort from barley malt and a grain basis - (Santos, 1985). And there are plenty of microbreweries having success in this ascending market in places like Blumenau, Pomerode, Indaial, Joinville, Gaspar and the western region of the state, with a concentration in the region of Chapecó, among other cities with German colonization.

The beer production chain has manufacturing as its central link, with the supply of inputs in the upstream and the consumption and/or the distribution of the finished product until the point of sale in the downstream. This segment sets a range of activities in motion, from the research, farming (barley, wheat), processing and marketing of inputs and raw materials to the delivery of the product to the consumer in the commercial establishments (Cervbrasil, 2018).

With respect to the inputs used in the manufacturing of beer, it is important to highlight that Brazil has water and is one of the largest agricultural producers in the world, including of cereals. The breweries can therefore count with ample supply of raw materials, with the large firms being able to negotiate prices and payment deadlines. However, part of the ingredients used in the processing of beer is imported, including the barley, yeast and hops, which are *commodities* with prices determined in the international markets. Exchange rate and import tariffs are therefore of influence on the sector in the country (Tschope, 2001; Araujo, 2016).

The segment uses suppliers for packaging, i.e., aluminum cans and glass bottles. When the companies don't produce their own packages, labels and lids, however, they have bargaining power with their suppliers, making purchases through electronic bids and exclusive contracts with suppliers. The small breweries, in turn, are generally price takers (Donato, 2018).

This study therefore seeks to analyze the conditions for the competitive performance of this chain regarding the condition of the existing production structure and taking systemic assumptions as reference. Its development seeks to further understanding in the field of competitiveness. As a reference, it focuses on the production chain of craft beers, taking its strategic, structural and competitive aspects into account, characterizing, analyzing and presenting proposals for policies and actions that contribute to improving its competitive performance.

## II. MATERIALS AND METHODS

The methodology for the identification and exploration of demands by studying the production chain is founded on the systems approach, technological forecasting and

market segmentation principles. The benchmarks for gauging performance are efficiency, sustainability, quality and equity (Batalha, 1997). The propositions of Farina and Zylbersztajn (1992) were adopted in this study, with the term production chain of beer representing the set of components involved in the production of raw materials and inputs, industrialization and commercialization to meet the demands of the population and ensure the survival and development of the system itself.

The first contact with the actors of the chain was made through a telephone conversation, and an interview and/or visit was scheduled with those that agreed for an interview. A questionnaire was developed and sent to a sample of companies, which were considered representative and strategic, in order to shed light on situations and processes because of the intrinsic limitations and also the closed nature of some questions and their answers.

### 2.1 Profile of beer producers

The profile of the beer producer was gathered through the application of a questionnaire. In order to obtain the data, a sample of 15 craft beer producers distributed in the western region of Santa Catarina and Paraná State was taken. Due to the geographical spread of the producing companies, emails and phone calls were used as strategies to apply the questionnaires. Some properties were visited and the questionnaire was then applied *'in situ'*.

### 2.2. Data analysis

The data analysis was composed of a qualitative and a quantitative step, in addition to a third step merging the results of the previous steps. The raw data was interpreted in the qualitative step, reaching a set of variables for each question and company. During the systematization of the work, some information was gathered on production (number and characterization of craft beer producers, number of producing units and volume produced) and marketing (channels, volumes and prices).

## III. RESULTS AND DISCUSSION

### 3.1 Overview of the craft beer market

The craft beers from Brazilian microbreweries have gained ever more space on the shelves of supermarkets, (physical and virtual) specialized stores and in food services (bars and restaurants). According to the Brazilian Association of Beverages (*Associação Brasileira de Bebidas*, ABRABE, 2018), microbreweries are mostly characterized by the production of small quantities of beer, developed with special ingredients, a greater quantity of malt per hectometer and in family micro-industries. Consequently, the products offered by this type of business are commonly called "premium beers" or

"special beers", meeting consumer demand for special beverages. The craft beer market is growing rapidly and represents a business opportunity. Like any investment, however, caution is needed with craft brewery deployment projects.

The craft beer market is in full expansion and, gradually, a brewing revolution is taking place in Brazil. Every day, new craft beverages are created to meet a growing public thirst for new tastes. Lighter and more refreshing or with a more bitter, pure malt taste or with the use of wheat, the craft breweries are a true vocation of the state.

The state of Santa Catarina has today 50 brands of beer, which together produce more than a million liters per month, according to a survey from the Association of Craft Breweries of Santa Catarina (*Associação das Cervejarias Artesanais de Santa Catarina*, ACASC, 2018). The growth of the market of craft beers in Santa Catarina between 2013 and 2018 can also be observed through the doubling of the number of brands. 28 new businesses started during this period.

The craft beer sector has continued growing in recent years, especially in 2017 and 2018. In the past nine months, the number of independent craft breweries in operation in Brazil jumped from 679 to 835. The comparison between the data from December 2017 and September 2018 was carried out by the Ministry of Agriculture, Livestock and Food Supply (MAPA). The growth of the period is 23%. There are 169,681 registered products by these breweries.

According to MAPA (2018), the number of craft breweries in activity is uncertain. As the body authorizing the operation of these enterprises, the Ministry of Agriculture makes no distinction between the size of the companies. At the end of 2017, there were 679 breweries registered in the ministry - a number 37.7% higher than the 493 recorded in 2016. As for the regional market, the south of Brazil has the largest number of breweries with 369 companies, followed by the east (328), northeast (61), midwest (51) and north (26) of Brazil.

Among the states, Rio Grande do Sul occupies first place in both the number (179) and density of breweries. With respect to the amount of businesses of this type, São Paulo occupies second place (144), followed by Minas Gerais (112), Santa Catarina (102), Paraná (88), Rio de Janeiro (56), Goiás (25), Pernambuco (18), Espírito Santo (16) and Mato Grosso (12).

### 3.2 Microbreweries in Santa Catarina and Paraná

Of the 190 breweries installed in the state of Paraná and Santa Catarina, 14 are microbreweries located in the western region of Santa Catarina and in the Southwest of Paraná, with eight and six craft breweries, respectively.

These 14 companies were studied in order to characterize the production chain of this type of company.

The results obtained showed that the production of these units (Figure 3) varies between 1,000 and 300,000 liters of beer per month, with 3.6% producing up to 1,000 liters of beer, 39.45% up to 10,000, 39.50% up to 150,000, 8.6% up to 100,000, and 8.85% up to 300,000 liters. This shows that the largest volume is concentrated in breweries that produce between 50,000 to 100.00 liters per month. This data can be seen in figure 1.

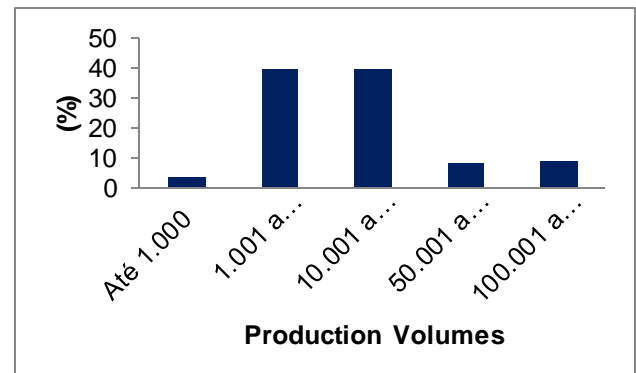


Fig. 1: Production capacity in liters of beer of the units evaluated.

These companies are managed by their owners, with 65.5% having 1 to 2 partners, 22% having 3 to 4 partners, 7% having just one partner and 2% having more than 4 partners.

Of the partners owning these companies, 57.5% have completed higher education, 17% have a graduate's degree, 3.5% have a PhD, 10.5% have a complete secondary education, 2.5% have a technical education and 8.5% have an incomplete higher education.

69% of the owners were 44 years old or younger, which makes the population investing in this type of business young. The other 31% are over 44 years of age. This characteristic may be associated to the fact of the companies being family businesses.

Despite the current growing demand for craft beers from regional microbreweries, some of them are very recent while others have been on the market for some time, with most breweries in the regions under study operating for more than 5 years, totaling 47% of the existing microbreweries. Over the years, new breweries have been established, with currently 53% of companies having up to 4 years of operations. Of these, 16% have less than 1 year of activity.

In the microbreweries where the research was conducted, it was found that the most commonly used filling containers were kegs, with 46.5%, followed by kegs and bottles, with 29%, kegs, bottles and cans, with 11%, kegs,

bottles and growlers, with 6%, and finally 7.5% using only bottles.

There are several styles of craft beers, and in general these microbreweries produce different styles in order to meet the different tastes of beer consumers.

With regard to the types of beers, one can see that the IPA style is one of the most well-known styles. It has more body with more accentuated malt and hops and a herbaceous and earthy profile, which gives it a floral aroma and fruity flavor. This style of beer is produced by 77.5% of microbreweries.

The most well-known style of beer Pilsen, which is a type of lager that follows the German Purity law, composed of only four ingredients: water, yeast, hops and barley malt. It has a golden color and is translucent and light. This beer is produced by 60% of microbreweries.

Another very well-known and appreciated style is the Weiss beer, a wheat beer that has a mild aroma of clove and banana, low quantity hops and a color ranging from a strong and lively yellow to a golden brown. This beer is produced by 55.5% of the companies.

These are the styles produced in larger numbers by the microbreweries under study, which also produce several

Table 1: Origins of the raw material used in the production chain of craft beers.

Raw Material	National (%)	Imported (%)
Hops	22.5	77.5
Malt	45.2	57.5
Yeast	24.8	75.2
Sugars	65.6	34.4
Bottles	48.9	51.1
Carboys	76.8	23.2
Kegs	21.1	78.9
Lids	64.3	35.7
Additives/Clarifiers	18.9	81.1
Flocculators	76.7	23.3
Carbonation	15.7	84.3
Beer Adjuncts	54.1	45.9

### 3.4 Distribution channels and marketing

In general, the companies under study have similar distribution structures. 49.7% of the beer produced is sold by own bars maintained in annexes to the production units, 18.6% is sold in supermarkets, 12.5% in convenience stores or, according to Araujo (2016), in self-service establishments, and 13% in parties and events. This data can be seen in table 2.

According to the methodology used by Nielsen (2018), beer sales channels can be classified into three groups:

1. Bar (local consumption): commercial establishments equipped for the supply of beer to be consumed at the

other styles, some resembling those already cited with respect to flavor and others being very distinct.

### 3.3 Acquisition of raw material

The raw material used (Table 1) in the production process of beers by the microbreweries have basically two sources: domestic and imported. Standing out among the national supplies are the packaging for filling, the sugars, the lids of the packaging and the flocculators.

Among the imported raw materials, we find additives and clarifiers, with 81.1%, the priming/carbonation, with 84.3%, the kegs, with 78.9%, the hops, with 77.5%, the yeast, with 75.2%, and the malt, with 57.5%. It should be stressed that the malt is the main raw material used in the production of beer with the greatest impact on its cost of production. In Brazil, only a small part of demand is produced internally by local malt houses, the remainder is imported from countries that have surplus production.

The raw material is the great differential of special beers and also a great challenge, because big industries absorb national barley production and small businesses need to import it. Almost 90% of the raw material for special beers is imported.

point of sale, such as bars, snack bars, restaurants and nightclubs. In these places, the beer is chilled for immediate consumption (cold market);

Table 2: Main distribution and sales channels of the produced beer

Location	(%)
Own bar	49.7
Supermarkets	18.6
Convenience stores	12.5
Parties	8.0
Events	5.0
Other	6.2

2. Traditional: points of sale, such as bakeries, grocery stores and markets, where there is the presence of a vendor to assist in the purchase and the product is not consumed on the spot;

3. Self-service: establishments that have at least one cash register and that allow the consumer to serve himself without the presence of the seller (basically, supermarkets and hypermarkets).

### 3.5 Representation of the craft beer production chain

Figure 2 shows the production chain of the craft beer produced by the microbreweries with their organizational and institutional environments and their main components and flows.

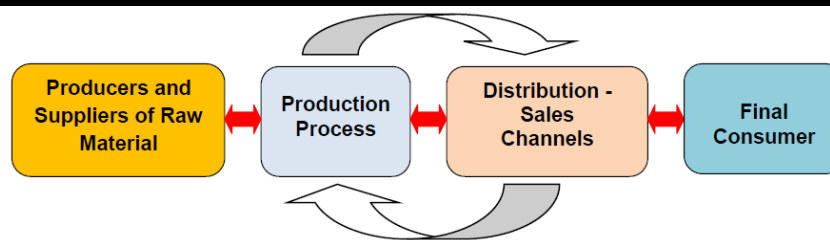


Fig. 2: Characteristics of the Craft Beer Production Chain

The starting point in the identification of the beer production chain, in its linear form, is established by the links with the suppliers of raw materials, which are: barley, hops, yeast, glass packaging, aluminum cans, among other items described in item 3.3.

The intermediate and final components of the chain are characterized by the beer producers, with their production process, passing through the distribution channels, as described in items 3.2, 3.3 and 3.4, and ending up with the final consumers.

#### IV. CONCLUSIONS

With this study, the conclusion can be drawn that the regions under study have 14 companies with microbrewery characteristics that can be classified as craft beer producers. These breweries have few partners, most between 1 and 2, and these partner-owners are mostly young with up to 44 years of age, with most of them having concluded higher education.

One can also conclude that 50% of the surveyed breweries already exist for more than 5 years and also that new breweries are increasingly emerging to meet the demand of a public that appreciates this world of craft beers. The most-produced styles are the popular Pilsen, the IPA, which is very appreciated by the brewers, the Weiss (wheat beers), the APA and the lagers.

The supplies for production are of national and international origin, with the imports generally being additives and clarifiers; this raw material makes all the difference for the specialty beers. The distribution and sales is done mostly in own bars, but also goes through supermarkets and parties.

Finally, this production chain seems to be simple, but long, starting with the purchases of raw materials and suppliers, followed by the entire production process, to then be distributed and sold to the final consumers.

#### ACKNOWLEDGEMENTS

We are especially grateful for the funding program for Research Projects and Granting of Scholarships for University Scholarships in the state of Santa Catarina – UNIEDU - and of the Universidade Comunitária da Região de Chapecó – UNOCHAPECO – Brazil.

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