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Title:

Application of manufacturing strategy principles in adapting craft brewers for sustainable growth in the South African beer industry

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A research report submitted to the Faculty of Engineering and the Built Environment, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Masters in Engineering.

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Abstract

There is noticeable change in types of beers preferred by consumers in markets previously thought as mature and saturated both globally and in the South African context.

Although the market has been dominated by big players with massive capitalisation and resources such as Anheuser-Busch Inbev (ABInbev), Heineken plc, and others, in-roads into the beer market by much smaller players are observed. These are the craft brewers that are apparently growing, seemingly emboldened by success in penetrating the established market previously thought to be mature and saturated, and managing to retain market share.

Being SMMEs, standing up against the more resourceful and hostile competitors and holding their own requires agility and resilience. Even more skill at devising and employing appropriate strategy is required by craft brewers to grow their brands.

The study investigates the growth and impact of craft brewers in an FMCG environment and the implication for manufacturing strategy development in providing an appropriate response to the developments. Understanding the strategy used by craft brewers to survive and thrive is valuable to big players that are considering how best to respond to this threat of their dominance in the market.

Data was collected using a face to face administered questionnaire and the sampling method applied was a convenience sampling given the constraints on time and resources available with a large population covering the drinking population in South Africa and the geographic vastness of the craft breweries.

In the examined cases of five craft breweries in South Africa, application of manufacturing strategy framework were evident to an extent, however, these were not organised and not sufficiently deliberate to be made out as specific patterns of decisions to improve the manufacturing process and sustaining the performance. For most of these breweries the core manufacturing strategy constructs such as quality, cost, flexibility and reliability were not well addressed and this was evident in the responses given by the consumers in their interaction with craft beers. A manufacturing strategy framework sourced from the literature was used to demonstrate each brewery's priorities and recommendations made of areas of focus for the craft brewers.

Declaration

I, Gaolebalwe Ramorula, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Engineering in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Gaolebalwe Ramorula

Signed at 65 Park Lane, Sandown, Sandton, Johannesburg

On the 23rd day of May 2017

Acknowledgements

I am indebted for much of my personal and academic accomplishment to my friends and colleagues. I would like to especially thank Richard de Koning who was instrumental in presenting the opportunity to be engaging myself in these studies. Thank you to my supervisor, Dr Bruno Emwanu, who has kept me focussed on delivering this study.

The study would have not materialised without the time of all the respondents especially the owners of the craft breweries.

Last but not least I wish to thank my family. Thank you to my loving and understanding wife, Nthabiseng Ramorula, for all the support and encouragement to complete this research. Thank you to my dear mother, Boitumelo Ramorula, who remains the symbol of excellence and for being my role model.

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List of Acronyms

ABInBev - Anheuser-Busch InBev SA/NV is a multinational beverage and brewing company with global headquarters in Leuven, Belgium.

FMCG – Fast Moving Consumer Goods

GDP – Gross Domestic Product: is one of the primary indicators used to gauge the health of a country's economy

NGO – Non-government organization is a non-profit organisation that operates independently of governments and funded privately

SAB – South African Breweries Limited (A South African subsidiary of the ABInBev group)

SKU – Stock Keeping Unit

SMME – Small, Micro and Medium Enterprises

SPC – Statistical Process Control

TQM – Total Quality Management

WHO – World Health Organisation

CHAPTER 1 INTRODUCTION

1.1. Purpose of the study

The purpose of this research is to establish through manufacturing strategy principles how the craft brewers formulate strategies for sustainable growth. This is an exploratory research in which the phenomenon of craft brewing growth within mature brewing markets is studied. The key issues and variables to be considered are the strategic component of craft brewers and commercial brewers in a constantly changing business environment.

1.2. Context of the study

In a modern, customer centric business environment, focus is often on the product that is delivered to the final consumer. There are many economic and brand benefits that can be realised through the consideration of product differentiation, specifically in the fast moving consumer goods sector (Daud, 2013). This is especially true in the beer industry where there has been a noticeable change in the types of beer that are preferred by the consumers in markets that were previously thought to be saturated and mature.

The growth of craft beer in recent years is largely attributable to consumer changing tastes, which have led consumers across the world to seek out a more localized diverse selection of beer instead of the widely known and readily available types of commercial beer that are the offering of large scale corporate brewers (Paniagua, et al, 2015). These craft breweries are perceived to be producing a more diverse, higher-quality beer than the traditional mass-produced products that are manufactured by the commercial brewing giants of the world such as SABMiller plc, Heineken and others (Carpenter, 2015). Craft brewing continues to take market share away from traditional non-craft brewers in recent years (Banda, et al, 2015). In addition, the beer industry in South Africa has experienced a major shift given how the economic environment has changed post the 1994 democracy vote (Naumann, 2005). The social situation in South Africa increasingly showed more people earning a higher living and therefore opening the market for migrating to “premium” products (Nattrass, 2014). Craft beer is marketed as a premium offering and perhaps the growth of this part of sector is in line with the changing socio-economic landscape of the region. This will be investigated in the study and what the apparent changes mean to “mainstream beers” offered by commercial brewers.

The beer business has consistently shown that it is a high volume, low margins industry as is the same within the FMCG sector that it belongs to (Malhotra, 2014). This presents a high cost barrier to entry for any prospective craft brewer and high operational costs in organisational business model. To negate this problem, the larger commercial brewers apply economies of scale whereby they have gone ahead and looked at mergers and acquisitions as a strategy to develop even more “economies of

scale" that gives the benefit of mass production, bargaining power and geographical reach to get to the most remote markets. They sell high quantities of beer to be able to reduce the costs associated with production and manufacturing. This is currently not widely available to craft brewers as they are confined to producing small batches of products and sell to a much localised market. This however, may not be a perceived weakness, as it is the attribute that allows craft brewers to diversify the portfolio and produce beers that are very specific in style and have a broad offering in contrast to the highly inflexible mass production of large scale breweries.

1.3. Research motivation

Given that craft breweries are in essence Small Business Enterprises (SMEs), this study will provide guidance to prospective craft brewers and those that are already established in the craft brewing industry by providing some principles on what elements of strategy should be in hand during this phase of market growth for craft beer. The natural goal of a business entity is long term survival and the ability to produce profitable and economically worthwhile outputs, which for manufacturing firms can be addressed by an appropriate manufacturing strategy. Slack and Lewis (2011) summarise manufacturing strategy as "the total set of decisions that shape the long term capabilities of an organisation's operation and how they contribute to the overall business strategy". Businesses can thus reconcile market requirements with their operations resources to determine key activities they must complete to realise the strategy that will assist in achieving the overall goal.

The study will further analyse whether there is scope within the industry for co-existence with the larger commercial brewers in South Africa such as South African Breweries Ltd (SAB) and Heineken or whether this will create a highly competitive environment in a bid to capture the same market. This will be done by investigating whether the growth in craft brewing is due to conventional beer consumers defecting to the new taste and styles of beer offered by craft brewers or is due to a genuine and sustainable growth in the overall beer market in South Africa. SAB's strategy towards the growth of craft breweries is particularly important as it will shape the future of the beer industry in South Africa given its dominance of the market share. However, the strategy of SAB towards growth of craft breweries is outside the scope of this study and will not be included in this study.

1.4. Problem statement

Craft brewers are apparently growing, seemingly emboldened by success in penetrating the established market previously thought to be mature and saturated, and managing to retain market share. However, the sustainability of their growth is questionable given that little or no strategies seem to be in place to survive and remain sustainable. Being SMEs, standing up against the more resourced and hostile competitors and holding their own requires agility and resilience as the big

players react to the threat. Even more important, skill at devising and employing appropriate strategy is required of small players to grow their brands in the hostile environment. There is need to investigate the growth and impact of craft brewers in the highly competitive FMCG environment, what significance this has for corporate brewers as this will determine the level of reaction craft brewers can expected, and the implication for craft brewers using manufacturing strategy to achieve sustainability.

1.5. Research Question

How are beer consumers reacting to the phenomenon of craft brewing in South Africa in a sector that is largely dominated by highly resourceful corporate giants like SAB Ltd. and what manufacturing strategies, if any, are in place to guide the smaller craft brewers to operate sustainably and retain and grow market share?

1.6. Objectives

The following are the objectives of the study:

1. To establish whether craft brewers have developed any long term strategy to make a sustainable effort of growing market share in the beer and beverage sector.
2. To apply a conceptual manufacturing strategy framework sourced from the literature in guiding the craft brewing sector in adapting their positions through formulating an appropriate manufacturing strategy that will ensure they remain competitive and are able to grow sustainably in the long term.

1.7. Assumptions

The study assumes that the literature published on craft brewing across the world applies to the South African context, as it is assumed that all craft brewers are trying to achieve the same thing with their products.

CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

This chapter reviews previous research on craft brewing emerging within the liquor industry, as well as, issues that are related to this phenomenon of craft beer consumption in South Africa. The purpose of this review is to link the connection between the craft brewing and the main exploratory objective of the study of manufacturing strategy. The chapter introduces the reader to a brief history and origins of craft brewing in general and in the South African context. The chapter also tracks the development of studies in the area of manufacturing strategy in relation to small, medium and micro sized enterprises (SMMEs). The literature review cover variables related to development of manufacturing strategy. As the current study is exploring the craft beer consumption phenomenon in South Africa, this chapter will review studies that explore craft brewing patterns amongst different cultural groups given the history of the country.

2.2. Background Information

2.2.1. South African alcoholic beverage industry

The liquor industry in South Africa is to a large extent dominated by the beer sector, ahead of wine and spirits sectors as shown in Figure 2-1 and Figure 2-2. While the beer sector has performed well in recent years in terms of volume growth and profit generation, it is increasingly being challenged by other sectors for a share of consumers' disposable income. For instance, there is threat from the wine sector of South Africa which produces some of the world's most well-known wines and competes relatively well in the home market. The growth of the wine sector has seen South Africa being ranked 7th largest producer of wine in the world having produced 959 million litres of which only 395 million litres were consumed locally (Froud, 2015).

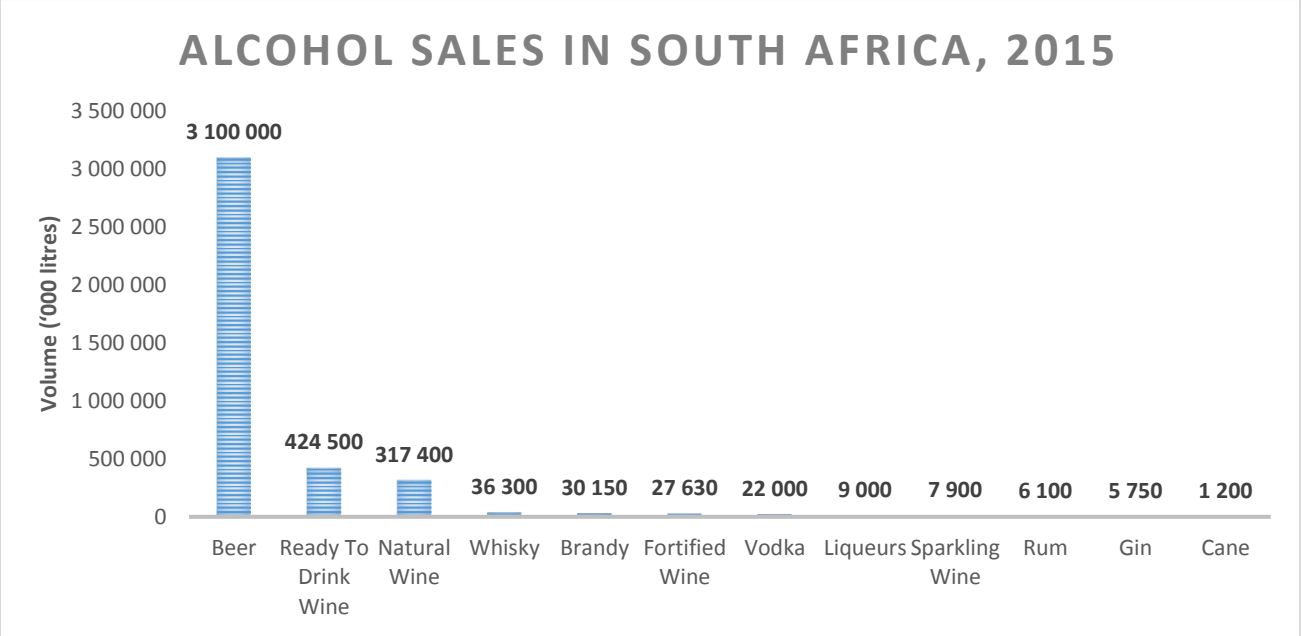

Figure 2-1: Alcohol sales by volume in South Africa by type of consumption (Writer, 2016).

On the other hand, government has made it a key objective to reduce the widespread abuse of alcohol, and related social and medical consequences which are perceived to be negative to the South African society (Morojele, et al, 2013). According to the world health organisation (WHO), South Africa's per capita consumption of pure litres of alcohol is 11 of which 48% is attributable to beer only (WHO, 2014). This compares with 6.13 globally and thus places South Africa on the higher side of the global average.

2.2.2. Market share of liquor categories

Market share in any given economic sector or industry is widely recognised as a measure of the competitiveness of an entity within that sector. It is measured as a percentage of products sold by one entity out of all products sold in the same sector. In terms of volume market share, the department of trade and industry completed an analysis that shows in the period from 2006 to 2011, beer constitutes just below 80% of the market of the liquor consumed in South Africa of which SAB's share alone of the beer market is approximately 90% (DTI, 2011).

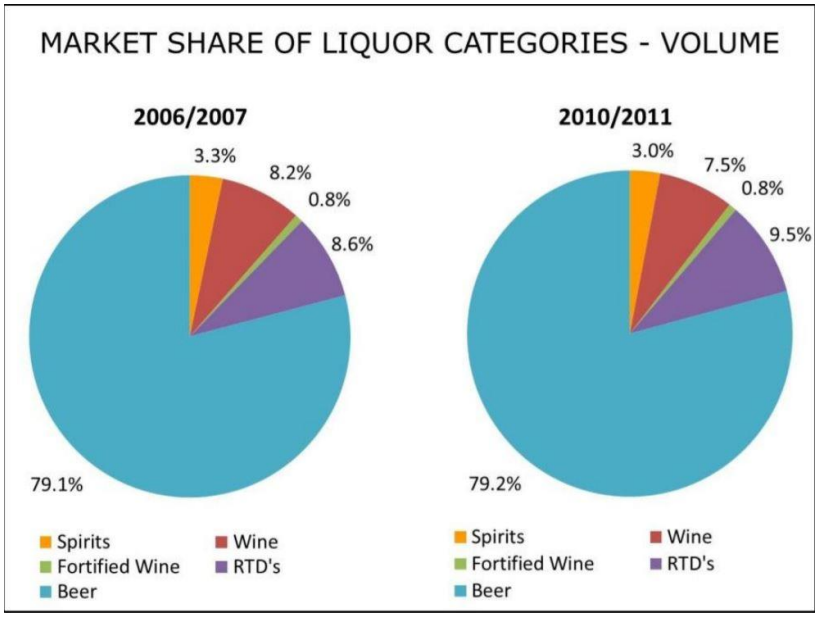

Figure 2-2: Market share of the liquor industry by category (DTI, 2011)

The remaining 20% of the liquor industry is shared by ready-to-drink spirit (RTDs) coolers at 9.5%, wine at 8.2%, spirit at 3.0% and fortified wine at 0.8% of the volume market share. The study also showed the relative maturity of the industry with little movement of the split amongst the different liquor categories in the five year period. There is a reported decline in the consumption of wine and spirits in the period studied while RTDs showed some gains in the market share. In recent years, beer total volume has increased by 1.5% compared to the overall growth in total liquor consumption of 2.0% per year and bearing in mind that the population growth in South Africa has grown at a rate of over 2.0% per annum, this means that the per capita consumption of liquor has overall declined (Holtzkampf, 2014).

The South African craft beer scene growing from a relatively small base compared with other markets reported an estimated 30 per cent growth in 2015, followed by an accelerated 35 per cent growth in 2016 and estimates of as much as 18 million litres of craft beer by the end of 2017 (Palmer, 2017). Given the high rates of growth in craft beer, one can infer that craft beers are gaining market share from conventional beer market where large corporates like ABInbev and Heineken are operating.

2.2.3. Craft brewing in South Africa

The history of craft brewing and its origins is varied across the world but appears to have evolved as a result of the amalgamation of corporate brewers that resulted in what can be described as a standard offering and diminishing variety of traditional beer taste and the birth of home brewing by passionate consumers (Brewers Association, 2016). The home brewers' experience was such that they could replicate or brew beers that were not readily available and thus offer beer styles with traditions

from foreign places. The quality of these beers improved significantly over time and this was followed by their popularity from those who were seeking more from their drink than just a beer (Warner, 2010). In South Africa where the apartheid regime prevented the majority of the population to legally consume alcohol until the dawn of democracy, the illegal brewing and trading of alcohol remained suppressed and thus no major inroads into beer brewing were made (Banda, et al, 2015). This gave rise to the large contingency of "shebeens" across the country where traditional alcohol could be made and sold. These however were never made part of the formal sector. In the formal sector, SAB continued to dominate the brewing industry with very little competition.

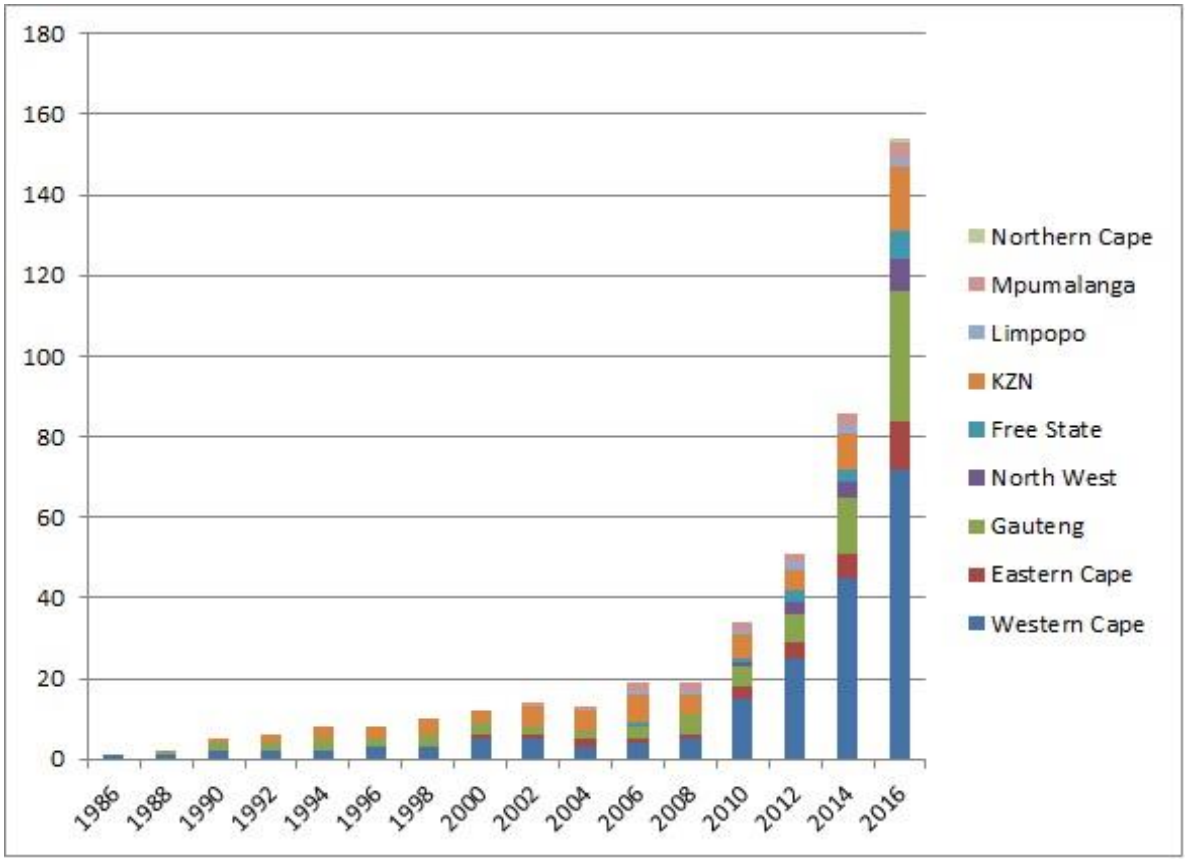

Figure 2-3: Growth of craft breweries in South Africa over the years (brewmistress.co.za, 2016).

Figure 2-3 clearly shows that the majority of the breweries built are in the Western Cape province of South Africa followed by the Gauteng Province. This is also in line with the fact that these two provinces are the biggest contributors to the national GDP and are home to the biggest population in South Africa. The average monthly output for a South African craft brewery is 10250 litres per month and while some breweries produce way more and others produce even less, but this figure is fairly low, with business economics suggesting that 12000 - 15000 litres per month is the bare minimum for a production facility to break even (brewmistress.co.za, 2016).

2.2.4. The beer industry in South Africa

The beer industry in South Africa is largely dominated by South African Breweries Ltd (SAB) which is a subsidiary of ABInBev NA/SA (formerly SABMiller plc) that is headquartered in Brussels, Belgium. The company operates seven breweries and forty depots in South Africa with an annual brewing capacity of 3.1 billion litres while its portfolio of beer brands meets the needs of a wide range of consumers and includes five of the country's top six most popular beer brands – namely Carling Black Label, Hansa Pilsener, Castle Lager, Castle Lite and Castle Milk Stout (South African Breweries, 2016). The second largest commercial brewer in South Africa is a consortium which is shared between Namibian Breweries and Heineken plc which until late 2014 was known as Brandhouse Ltd. Brandhouse is a South African joint venture of Diageo, one of the world's largest premium alcohol beverage company, Heineken International, the third largest brewer in the world and Namibia Breweries Limited, one of the leading beverage manufacturing companies in Southern Africa (Brandhouse Beverages Ltd, 2016).

The beer market share between SAB and Brandhouse is estimated to be 99% of which SAB owns at least 90%. The rest of the share is owned by other imported beers and the local craft breweries.

2.3. Craft breweries as SMMEs

SMMEs are defined differently across different countries due to how they respond to diverse national and local government challenges and circumstances in their respective countries. According to the National Small Business Act 102 of 1996 of South Africa, SMMEs are categorised into five stages of development: (1) survivalist, (2) micro, (3) very small, (4) small and (5) medium-sized enterprises (Malefane, 2013).

South Africa's SMMEs like their counterparts globally play an important role in the nation ranging from alleviation of poverty to absorbing the labour force and giving the country international urge at competing. It is estimated that, in South Africa, SMMEs make up 91% of formalised businesses, providing employment to about 60% of the labour force and their total economic output accounts for roughly 34% of GDP (The Banking Association SA, 2016).

As organisations, SMMEs are met with challenges that hinder daily business operation activities as well as medium to long term growth aspirations due to a variety of factors. There are many initiatives carried out by government, NGOs and the private sector to render services that serve to support the SMMEs. Of these, general education and training, especially in 'business skills,' emerge as the most prominent areas where support is offered, while more specific needs such as legislation around SMME start-ups, have received little attention by both public and private support institutions (Berry, et al , 2002).

For a craft brewery as an SMME to survive and continue to grow and be sustainable as a business the issue of finance and funding is crucial, both in the long term and in the short term, thus the actions taken must be aligned with its ability to provide sufficient return on investment (Grunde, et al, 2014). Noting the role of SMMEs to the economy as given above, it is expected that SMMEs such as craft breweries have a positive impact on the local economy as failure to survive financially mean that the positive impacts could turn into negative ones, such as people losing their jobs. It becomes evident that considerations in the economy are integral to the existence of a craft brewery. Considering the significant potential of craft breweries as SMME to contribute positively to the economy in general, their well-being is of utmost importance and thus development of strategies to enhance their growth is crucial.

2.4. Sustainability in SMMEs

Matters such as the rising costs of doing business, linked with the scarcity of resources show that any business must generally be in agreement with the principles of sustainability. As a consequence a shift has emerged in developed societies away from the traditional industrial model, in which environmental activity in a business were seen only as a cost, natural resources were viewed as freely available goods and the social implications of industrial activities were at best an afterthought (Seidel, et al, 2006). This means that sustainability may be a requirement in achieving a competitive edge and remaining relevant in the market. Despite the positive roles and contributions made by SMMEs to national economies and the global economy in general, they still have an alarming failure rate and therefore not sustainable (Mthabela , 2015). In his study on sustainability of SMMEs, Baleseng (2015) found the largest contributor to the failure of SMMEs is the lack of financial support, poor managerial skills and/or experience in executing the business objectives through strategies, marketing and financial skills. It is out of the scope of this study to investigate the financial support and other reasons but rather to focus on strategies.

The management skill is required to apply the correct strategies to become competitive and sustainable. Siddique, et al, (2016, p 3) suggests identified problems in the process of strategy formulation and implementation include; “misunderstanding of the strategy, poorly documented strategy, lack of commitment to the strategy, lack of communication, insufficient time allocation, unaligned organizational systems and resources, poor coordination and sharing of responsibilities, poor reward system, competing activities, a lack of strategic thinking and implementation skills in middle management, poor cultural and structural alignment and other uncontrollable environmental variables”. All these failures are generally related to weak management role in this process and inadequate capabilities of both managers and employees. When these issues are addressed, sustainability can be achieved in SMMEs.

2.5. Manufacturing Strategy in SMMEs

2.5.1. SMMEs

According to the National Small Business Act of 1996, small, medium and micro enterprises (SMMEs) can be classified as such according to a number of criteria. These include number of employees, annual turnover and gross asset value. Micro enterprises are those that generally have lower than 5 employees in total, an annual turnover of less than R150 000 and gross value assets worth less than R100 000. For a small enterprise, the number of employees is up to 50, annual turnover is less than R5 million and total gross assets value is lower than R2 million. A medium enterprise has employees up to 200 employees, turnover at up to R10 million annually and total asset value at R5 million. Given the highly specialised equipment for the production of beer, the barriers to entry for SMMEs from a capital investment point of view is very high and requires high value net worth in terms of assets for the business.

2.5.2. Manufacturing strategy

Manufacturing strategy is summarised as the total set of decisions that shape the long term capabilities of an organisation's operation and how they contribute to the overall business strategy. This is done through reconciling operations resources with market requirements to determine key activities that must be completed to realise the strategy (Slack & Lewis, 2011). Quantifiable strategic objectives that indicate the "end state" that the organisation hopes to achieve by addressing what it deems to be the opportunities available in the market and the challenges in achieving its objectives are put together. When these have been put together some strategic intents are laid down to drive a path of achieving these objectives through work programmes and control measures which are put in place to monitor progress against timelines (Mburu & Thuo, 2015). There must therefore be an alignment between the overall business strategy and the more specific manufacturing strategy. To achieve this level of alignment, the manufacturing strategy's main objectives must not only be based on developing capabilities in the areas such as cost, quality, reliability, and flexibility, but must have an overarching purpose of realising long term increasing market share and profitability (Ulusoy, 2003).

The process of formulating organisation strategy requires extensive knowledge of all the forces that play a role within that specific industry. As a result, any organisational strategy that one develops must include gaining a thorough understanding of the external environment that the organisation is operating in .The current status of the brewing industry in South Africa can be assessed using Porters' five forces approach. While Porter's Five Forces model is a simple but powerful tool for understanding

where power lies in a business situation and hence which forces are in play (Bayode & Adebola, 2012). This model is used to focus on the overall business strategy and not the manufacturing strategies which undertakes to look at developing capabilities in fulfilling performance objectives for manufacturing that may include one or more of the following objectives, namely, quality, cost, flexibility and reliability of the organisation. These performance objectives are considered next.

2.5.3. Manufacturing strategy frameworks

2.5.3.1. The Framework

A framework consists of the selected theories that underlines the thinking with regards to how one understands the topic which in this case is manufacturing strategy, as well as the concepts and definitions from that theory that are relevant to the topic (Grant & Osanloo, 2014). The most common manufacturing strategy framework consists of how strategy is made and the constituents of a manufacturing strategy as shown in Figure 2-4.

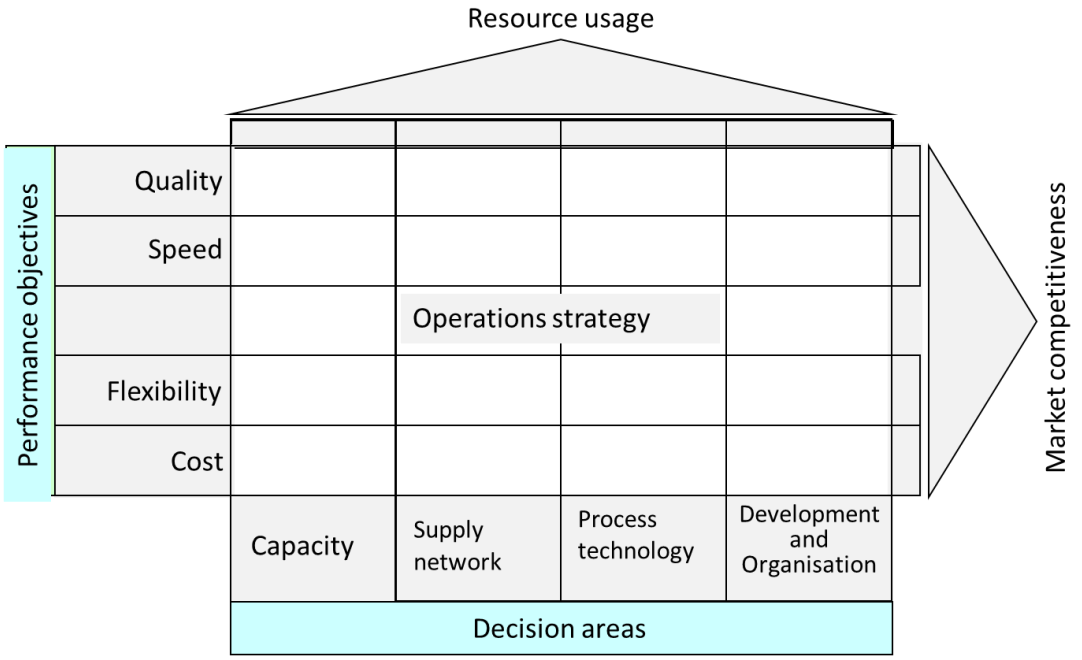

Figure 2-4: Manufacturing strategy theoretical framework (Slack & Lewis, 2011).

The concepts and constituents of the manufacturing strategy as presented in Figure 2-4 are explained in the following subsections. Evidence of manufacturing strategy will be presented when a firm deliberately has a total pattern of decisions on all the interlinked constructs to improve operations and sustainability.

2.5.3.2. Quality

Quality means consistently producing goods and services that meet customer or consumer expectations (Chandrupatla, 2000). The concept of quality in manufacturing strategy focuses on internal perspective that represent measures that are useful for the internal monitoring and management of the manufacturing process while the external facing ones are measures apparent to and evaluated by the customers (Hallgren, 2007). A quality management system is easily identifiable as the structure, procedures, processes and resources decided upon to implement and sustain quality control and thus quality assurance. The quality objective can be achieved by deliberate interventions to put process in place for error-free products or services that fulfil customer requirements (Alli, 2004). To achieve this, the organisation must manage a set of skilled workforce with adequate job specifications, proper technologies employed to provide consistency in repetitions, and effective communication across the entire business (Arizon, 2010). For example, in the context of brewery operations, 'beer taste and appearance' can be a quality performance factor that is easily judged by the final consumer.

The management of quality has become the lifeline of any business and as a result a range of tools that have proved successful for many businesses are available for use. For instance, statistical process control (SPC) is a method used extensively for quality control in which process statistics are generated and employed to predict quality trends in a manufacturing environment. Another tool that has been widely employed is total quality management (TQM) which is defined as a "continuous quest for excellence by creating the right skills and attitudes in people to make prevention of defects possible and satisfy customers/users totally at all times" (Lakhe & Mohanty, 1994). These tools are not only meant to improve the quality of products a firm produces but also to have long lasting sustainable quality outputs. These are however only part of quality control. Quality control is focused on fulfilling quality requirements as it encompasses the operational techniques and activities undertaken within the quality assurance system to verify that the requirements for quality are fulfilled (Manghani, 2011). Quality assurance, on the other hand, is focused on providing confidence that quality requirements are fulfilled and includes all the planned and systemic actions that are established to ensure that activities are performed and the data are generated, documented and reported as required (Manghani, 2011).

Quality assurance in a manufacturing firm is the overarching system. A quality assurance system is easily identifiable as the structure, procedures, processes and resources needed to implement and sustain quality control and thus quality assurance. The system description starts with a statement of need describing the problem or opportunity that it will addresses and the results expected (Wilson, 2012). The description should discuss what the system must accomplish to be considered successful

and its capacity to effect change when used and how it fits into the larger business priorities from a strategy point of view.

2.5.3.3. Cost

Cost effectiveness is about the consideration of decisions and finding alternatives in which both their costs and consequences are taken into account in a systematic way (Levin, 1995). Minimising manufacturing costs is associated with overall improved margins and an opportunity to build larger profits. To achieve a cost effective production environment, an organisation has to develop good relationships with its suppliers from a supply chain perspective (Ambe, 2012). Management also has to balance a plethora of variables such as the quantity of labour, state of technology to be employed avoiding waste and others. For instance, in the context of a large commercial brewery operation, the organisation strives to produce beer at the lowest cost per unit by reducing waste of raw materials and using even less of these raw materials for each unit of beer produced.

2.5.3.4. Flexibility

Flexibility in manufacturing is the ability to interchange the sequencing of manufacturing operations with minimal delays (Parker & Wirth, 1998). Manufacturing operations that are deemed flexible are able to utilize this trait as an adaptive response to unpredictable market conditions (Gupta, 1989). In the brewing industry for instance, flexibility is required to respond to changes in the market requirements such as, a sudden increase in volume of beer requirements due to unscheduled sporting event where a large number of people are expected to be consuming beer. The use of manufacturing flexibility as a strategic objective, the relationship flexibility has with environmental uncertainty, the use of taxonomies as a vehicle for furthering understanding of the types of flexibility, the nature of flexibility, and its measurement forms an important part of the overall manufacturing strategy of the an organisation (Beach, et al , 2000).

2.5.3.5. Reliability

The improvement of manufacturing organisations' operational efficiency has become a necessity for increasing margins and for long-term organisation success. In the context of manufacturing strategy, reliability refers to the manufacturing firm's capability to deliver customer requirements the right quantities and quality products at the right location when the customer demands such a product (Awwad, et al, 2013). The brewing industry is regarded as a make to stock industry instead of the make to order and such a complexity to an already fragile perishable product requires deliberate interventions to ensure that the beers are available to the customer at quality (Soman, 2005). The reliability of keeping up with demand for breweries is a function of many variables, the systems in place must identify the most unreliable parts of a manufacturing process and suggest the most

efficient ways for the improvement of reliability (Kostina, et al, 2012). In a conventional brewery, decisions that must be made with regards to the reliability of manufacturing systems relate to the reduction in variability of raw materials which may affect quality, processing times and parameters and storage conditions on the route to market.

2.5.3.6. Strategic Decision Areas

2.5.3.6.1. Brewery Capacities

2.5.3.6.1.1. Location of the manufacturing firm

Breweries are demand driven operations where large proportions of the volume of beer they produce are distributed as perishable goods. As a result, the distribution costs of a brewery tend to account for a large proportion of the costs of running such a business. In a distribution system for a perishable product, the supply to various locations in a particular geographic region is often optimised by coordination from a regional centre (Federgruen, et al, 1986). In order to decrease the costs associated with distribution, it is important for the manufacturing plants to be located in population centres. These decisions are made early on in the planning phase of building a brewery to define the ideal location. Locations of demand driven operations are chosen primarily in proximity to labour, transportation and technology while meeting procurement/distribution requirements of the firm (Henderson & McNamara, 2000). Manufacturing firms also need to consider the proximity to the supply of water, electricity, waste streams and supply of raw materials which may affect the quality and costs of the operations and products. The location of a brewery in general forms part of a strategic decision that forms part of the overall manufacturing strategy (Chen, et al, 2014).

2.5.3.6.1.2. Capacity of the manufacturing firm

Capacity decisions for any brewery are highly interconnected with the quantity of beer that is able to produce and the flexibility that it is able to do it at. It is determined by the equipment and human capital that is currently employed by the firm (Julka, et al, 2007). In a conventional manufacturing operation, important capacity decisions include how to deal with cyclical demand that is inherent in the beverage sector, whether to add capacity in anticipation of forecasted market conditions and how to use capacity to improve the economies of scale of the organisation (Fine & Hax, 1984). This is to be investigated at craft brewery level.

2.5.3.6.2. Process Technology

A brewery like any manufacturing system is an input-output system in which manufacturing resources such as raw materials and energy are transformed into products. One way by which breweries adapt to the environmental dynamics is the engagement in manufacturing process technology. Employing the correct technology in manufacturing can result in reduced operations cost, improved quality of

products and flexibility (Schrettle, 2013). There is a requirement for manufacturing firms to adapt production processes to the latest technological trends and developments and adapt to environmental dynamics including short product life cycles, growing product complexity, and rapid advances in technologies by continuously engaging in manufacturing process innovation (Lee, 1996). There have been major developments in the industry in recent times which include refrigeration and pasteurization to preserve the beer quality, with today's advances having to do with brewery equipment and quality control. Most large commercial breweries are built with stainless steel material of construction for equipment in direct contact with the beer and have advanced heating and cooling systems. In a brewing environment, the employment of process technology will enhance other manufacturing strategy objectives such as cost, quality and reliability. The extent of sophistication of the process technology largely depends on the ability of the firm to invest capital to realise the benefits. Such resources are generally not available to firms on a small scale such as craft brewers in contrast with larger corporations that can invest heavily in process technology to automate tasks and realise benefits associated with the investment. As equipment becomes more specialized, it also becomes more expensive. Further, upgrades may be necessary in order to maintain competitive advantage; however, a reasonable return on investment may be more difficult to achieve for the smaller and less resourceful craft brewers (Pontinen, 2011).

2.5.3.6.3. Organisational Structure

In order to achieve its goals, organisations group similar tasks into departments. Departments are then linked to form the organizational structure which is the formal configuration between individuals and groups of individuals regarding the allocation of tasks, responsibilities and authority within the organization (Lunenburg, 2012). The degree of decentralization and "divisionalization" of the organisation affects the allocation of decision-making responsibilities among department managers, whereas the relative use of cost and profit centres within a business unit affects the allocation among business unit managers and functional manufacturing managers (Fine & Hax, 1984). All the factors that can impact on the designing of the organisational structure should be well analysed and decisions made as part of strategy formulations to make them fit for purpose for that particular organisation (Fadeyi, 2015). McMillan (2001) states that there is a strong link between organisational structure and the size of the organisation's facilities, process technologies employed, operating environment and culture. It follows that the organisation structure that is in place in craft breweries should be informed by variables it affects and compliments as part of its overall manufacturing strategy.

2.5.3.6.4. Vertical integration considerations

According to Perry (1989), "a firm can be described as vertically integrated if it encompasses two single output production process in which the entire output of the upstream process is employed as part or

all of the quantity of one intermediate input into the downstream process; or the entire quantity of one intermediate input into the downstream process is obtained from part or all of the output of the upstream process". The decision to vertically integrate involves the replacement of a supply network function over which the brewery managers have limited control of internally (Fine & Hax, 1984). In doing so, that function then forms part of the responsibility of the managers in the firm. In the context of craft brewing, vertical integration may sometimes not be considered due to resource constraint but there may be a few areas available where the outputs of the craft brewery are partially employed in the downstream distribution or supply chain network that is managed by the craft brewery organisation. For instance, craft breweries may have an advantage of moving only a small quantity of beer within a relatively limited population centre, so that the decision to integrate this part of the process into the brewery organisation is well within their capability. In a study conducted in the United Kingdom, over 80% of the craft brewers sold all their beer within a 65 kilometre radius of the brewery (Cabras, 2016). In the same study, it was also found that around one in five craft breweries had either acquired or leased at least one pub for the sale of beer produced from that craft brewery. It appears therefore that craft brewers are open to the acquisitions of the pubs or restaurants where their beers are sold. When considered as part of the overall manufacturing strategy, the decision to vertically integrate may be an important one for craft brewers to remain competitive and other avenues of vertical integration may be possible to explore.

2.5.3.7. Suppliers and Vendors Management

Manufacturing strategy requires the organisation to have a thorough analysis of key inputs that make up operation strategy that in the end will drive the daily activities of the business. One of the important aspects for an organisation in the fast moving consumer goods sector is the management of its supply chain which then feeds into how it carries out its daily tasks guided by the overall manufacturing strategy. Supply chain management is defined as, "active management of supply chain activities to maximize customer value and achieve a sustainable competitive advantage (Handfield, 2011)". Enarsson (2009) puts it as, "the management of upstream and downstream relationships with suppliers, vendors and customers to deliver superior customer value at less cost to the supply chain as a whole". In supply chain management, the coordination of production, inventory, location, transportation and information among the participants in a supply chain to achieve the best integration of processes is critical (Croxton, et al, 2001). Patterns of decisions that are to be considered by management is the cost and quality that each of these stakeholders will bring to the organization. These decisions are especially critical to smaller manufacturing firms like craft breweries being SMMEs with limited resources and so must consider the risks and benefits of a strategy of vertical integration

to their firms whether it leads to competitiveness. This consideration may yield answers of whether this is an option to be pursued or if it is not available at all given the resources required.

2.5.3.8. The theoretical framework applied to breweries

The theoretical framework presented shows the elements of manufacturing strategy to be considered in a manufacturing firm. It is however not plausible for all of these elements to be made priority for the success of craft breweries given the limited resources available to implement. The framework can be used by manufacturing firms to assist in quickly determining which objectives are to be prioritised to improve operations. Figure 2-5 shows how the conceptual framework is applied in the commercial brewing industry to identify immediate objectives for improved brewing based on the successes of companies such as SAB.

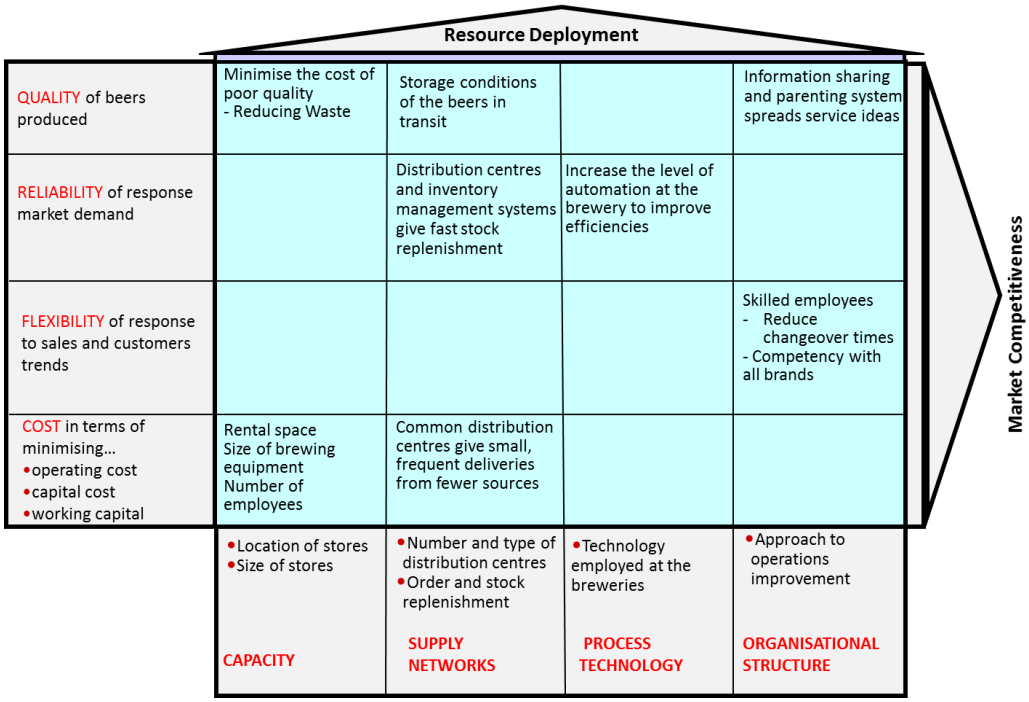

Figure 2-5: Manufacturing strategy framework applied to breweries (adopted from Slack & Lewis, 2011)

2.5.3.8.1. Resource deployment

Manufacturing strategy is executed at different levels of an organisation and depending on the size of that organisation, this can involve one person or many others. In the case of craft breweries, this execution will be carried out by very few people. The 'resource-based' view of strategy will identify which resources may lead to sustainable competitive advantages in the areas of quality, cost, flexibility and reliability and how those resources may either be acquired or developed internally (Almeida-Costa & Dierickx, 1998).

2.5.3.8.2. Market Competitiveness

The pursuit of market competitiveness requires choosing which resources to develop within the firm and how to accumulate them. Firms have to decide how to deploy their unique resources in order to fully realize their potential rents (Kanagal, 2003). The consideration of the different deployment alternatives requires firms to fully exploit the potential rents associated with their valuable assets.

2.6. External constraints in implementing manufacturing strategy

The interaction of organisations with various stakeholders may constrain the implementation of manufacturing strategy. Stakeholders refer to individuals or groups both inside and the outside organisation that can affect or get affected by a business's daily activities. Stakeholders' identification then becomes important in modern organisation given the global and local interconnectedness of doing business.

The socio-economic climate that prevails in South Africa affects craft brewers. A key consideration in craft brewing strategy's success is that of alcohol abuse by consumers in South Africa that has been identified to be amongst the worst globally. It has been widely debated and documented that government's intention is to ban alcohol advertising and also limit sales at identified times and locations to combat the effect of alcohol abuse (Govender, 2013). While a complete ban is unlikely, such a law would institute strict regulations. The rationale for the restriction is that government is concerned about the misperception such sponsorship and advertising may cause leading to the abuse of alcohol, and the beliefs that crimes associated with alcohol abuse would be reduced by such a restriction.

Separately, it was debated at the department of trade and industry's conference that alcohol age limit should be raised from 18 years old to 21 years old (The DTI, 2012). If implemented, this would take away a vast majority of the new market that the industry as a whole serves each year. The rationale of this move is that if an individual starts consuming alcohol early, it takes about six to eighteen months to become addicted, while if delayed, it can take about five years (The DTI, 2012). In essence, the later a person is introduced to the use of alcohol, the less likely they are to experience issues with alcohol and the addictions that are associated with it. It has also been suggested that most illegal substance users start with the abuse of alcohol (Roche, 2004).

While there are comprehensive moral reasons for businesses to develop and maintain long-term collaborative stakeholder relationships, there is equally a strong a business case for sustainability through collaborative stakeholder relationship, especially in the modern day business operations. In this regard it is noted that the financial success of some socially responsible companies is directly linked to their level of engagement with stakeholder management and collaboration (Svendsen,

1999). For these reasons, organisations require for their manufacturing strategy to deliberately address relationship of the firm with its key stakeholders that have a direct bearing on the manufacturing performance. There is however a consideration within the overall corporate strategy for relationship marketing strategy within their overall marketing plan which is out of the scope for this study and will thus not be included.

2.7. Conclusion of the literature review

The review of literature in this chapter has focussed largely on understanding the business environment of the alcoholic beverage industry in general and also how brewing organisations in South Africa compete within this sector. At the micro level, the phenomenon of craft beer growth across the already matured beer production have been noted. At the macro level, the effect of the craft beer growth on the larger commercial brewers has also been noted. Certain important concepts, such as manufacturing strategy constructs, have been introduced and used to explain, qualitatively, certain aspects of potential craft brewery sustainability into the future as SMMEs.

To assess the application of manufacturing strategy by craft breweries for competitiveness, it is therefore necessary to analyse the usage of manufacturing strategy constructs such as quality assurance, usage of process technology, decisions of capacities of facilities, organisational structures and supplier and vendor management. The total pattern of decisions on all of these constructs will indicate the usage of manufacturing strategy to drive effectiveness of the production facilities. This chapter has reviewed the literature and provided a basis for investigating the usage of manufacturing strategy in selected craft breweries in South Africa.

CHAPTER 3 RESEARCH METHODOLOGY

3.1. Research methodology/paradigm

The chosen method of study includes descriptive and quantitative approach to answer the exploratory research question. The purpose of the approach is to interrogate data obtained to be able to answer the research question.

The research design is important because it communicates information about key features of the study which can differ for qualitative, quantitative, and mixed methods (Harwell, 2012). For the research question, the mixed method approach is selected which incorporates both quantitative and qualitative analysis of data. It has been shown that the fundamental principle of mixed methods research is that multiple kinds of data can be collected with different strategies and methods in ways that reflect complementary strengths and non-overlapping weaknesses, allowing a mixed methods study to provide insights not possible when only qualitative or quantitative data are collected (Dawson, 2002). The strength of the qualitative method component in this particular case being that craft brewers may tend to have their story that have a similar timeline which would not necessarily be elicited by quantitative method component. Also, to understand in-depth whether craft brewing has had an impact on commercial brewing would require some understating of several indicating variables that can be objectively measured by quantitative analysis.

3.2. Research Design

3.2.1. Semi-structured Surveys

3.2.1.1. Consumer Surveys

Given that the important contribution to this research is the actual consumer, the study intends to complete a survey on consumers that indulge in the experience of craft brewing. The outcome of this will be to understand the timeline of when they were introduced to craft beers, and further seek to understand whether this is only an experience they are seeking or they could permanently stay as consumers of craft beers. Another concept to interrogate with the survey is whether the consumer's changing taste is a reduction to the overall commercial beer market or whether this is a change from one beer to the other and thereby reducing the market share of the commercial beers.

A survey using a semi-structured questionnaire was selected to obtain this knowledge as similar questions can be posed to consumers that form part of the population sample while still allowing more information to be provided (Harrell & Bradley, 2009). This approach gives the responded the opportunity to indicate their understanding of the phenomenon happening within the brewing

industry which can then be analysed. If structured interviews were used instead, they would be highly limiting in obtaining this information.

The aim is to analyse data from the interviews and determine whether there has been significant impact to the commercial beer industry as a result of the growth in the craft brewing.

3.2.1.2. Craft Brewery Managers Surveys

Surveys have also been shown to be appropriate for scenarios that investigate a large variety of factors and relationships and how they influence each other, or in a scenario where no basic fundamentals exist to show which factors and relationships are more important, and when in the timeline of the development these can be directly observed (Fidel, 1984). In the context of the research question, the emphasis of this phenomenon can also be described within its real world context by the collection of data in its natural state as opposed to more structured collection and analysis of data (Bromley, 1986).

The application of a case study will develop an in-depth analysis of how these breweries are currently operated and with what strategy in place, if any. The timeline of events as captured by these case studies will also validate all claimed craft beer growth in South Africa and future prospects of growth based on quantitative analysis of production data. The elements of manufacturing strategy that are adopted by the brewing industry will be studied and recommendations made to make it feasible and sustainable for independent brewers to brew, market and sell their diverse beer brands and return a profit.

Observer's bias on the topic is identified as a major contributor to the reliability of the case study method and this is argued widely in the literature (Fidel, 1984). To avoid this bias, all information gathered from the case study will be cross checked against each other. An independent observer will be invited to check against such bias.

3.3. Population and sampling

3.3.1. Population

A minimum of 400 respondents to the survey were targeted as individuals who indulge in beers. These individuals were selected conveniently in Gauteng, Western Cape and Kwa-Zulu Natal cities and formed part of the sample that represented the population. The population itself comprises South African alcohol consumers over the age of 18. It is suggested in the literature that where the population exceeds 1 million individuals, a sample of over 380 will be sufficient to draw reliable conclusions (Sekaran, 2003).

At least four (4) craft breweries owners or managers were approached to complete the survey. The required permission from the said owners was sourced accordingly for participation.

3.3.2. Sample and sampling technique

The target population is relatively large and the exact number is not known. As such, it is defined as all alcohol consuming adults in South Africa. The general aim of all sampling methods or techniques is to obtain a sample that is representative of the target population. When this is done correctly, the information derived from the sample survey is similar to the information that would be derived if a census of the target population was completed. Convenience sampling was used because questionnaires were distributed to consumers that were found at a specific location. Sampling units were selected by virtue of being at a specific place at a specific time where the surveyor had been located. The surveyor was during the course of data collection placed at different premises of alcohol sale and consumption areas where the target population was most likely to come. These consumers were then approached for participation. This method has some shortcomings in that not every South African alcohol consumer has an equal chance of being selected for participation in the study. The advantage of such an approach is that it will save time and other resources that are not available.

3.4. The research instrument

For this research, written questionnaires were used as a data collection instrument. The questions and other prompts were used to gather information from respondents about what they know, what they have experienced, their attitude towards a specific topic and a whole host of other matters. The questionnaire was administered to the respondents by directly handing them out to them and waiting while they are being completed. A copy of the questionnaire is presented in the appendix.

3.5. Procedure for data collection

Participants for the survey were selected by virtue of being at a specific place at a specific time where the researcher was located. The researcher moved to different premises of alcohol sale and consumption areas where the target population was most likely to come. These consumers were informally approached for participation. Administering of the written questionnaires was done by presenting the tool to respondents that were approached for participation face to face. The responses were written down and filled into the questionnaire.

Similarly for the responding craft brewery owners, the questions were presented directly to individuals interviewed face to face at a time chosen by them. The response to the questions were captured by the researcher into a workbook for analysing later.

3.6. Data analysis and interpretation

3.6.1. Data Partitioning

Measurement is a tool by which data generated by the research may be inspected, analysed and interpreted so that understanding the meaning that is embedded within the data is simplified (Ormrod & Leedy, 2010). As a start, samples may be stratified to capture and represent certain segments of the target population in a manner that can be easily analysed. This was done through categorising respondents demographically.

3.6.2. Ordinal data vs Nominal data

Given that a vast majority of surveys involve questions that require respondents to answer based on scaling, ordinal data will be generated.

As the study aims to use both qualitative and quantitative data collection methods, it means that the analysis tools will require both sets of data to be recorded correctly for analysis. The examination of qualitative research requires one to look for and understand the big picture presented by the data that describes the phenomenon being studied. It is noted that in conducting qualitative research, data is analysed continually throughout the study, from conceptualization through the entire data collection phase and into the interpretation and writing phases (van Gog & Paas, 2006).

In this case, nominal measurement which divides data into discrete categories that can be compared with one another will be applied.

3.7. Validity and reliability

3.7.1. Validity

Validity is defined as the extent to which the measurement instrument measures what it is intended to measure (Ormrod & Leedy, 2010). In any research, there is an extent to which bias or error can be introduced into the study in various forms. In light of this and to ensure as much freedom from researcher or subject bias as possible, an evaluation study must be internally valid so that attributions about the behaviour of or changes in the dependent variable can be confidently asserted to be due to the independent variable and not bias or internal validity design defects (Dennishale, 2016).

Total Survey Error (TSE) = Coverage Error + Sampling Error + Nonresponse Error + Measurement Error

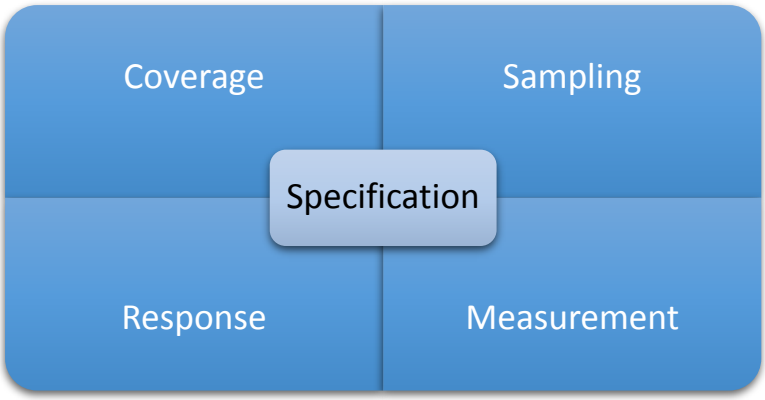

Figure 3-1: Cornerstones of survey research (de Leeuw, et al, 2008)

3.7.2. Non Response Error

Whatever the circumstances of any survey, it is bound to have a level of nonresponse which in turn might affect the true reflection or any inferences made from the sample surveyed to the entire population. There is a plethora of reasons why nonresponses to a survey exist; de Leeuw, et al 2008 summarises the most common reasons which include: failure of the data collector to locate/identify the sample unit, failure to make contact with the sample unit, refusal of the sample unit to participate, inability of the sample unit to participate (e.g. ill health, absence, etc.), inability of the data collector and sample unit to communicate (e.g. language barriers), accidental loss of the data/ questionnaire.

It must be also noted that many other specific reasons may apply to any other particular survey specific to the topic of research or type of research that is being undertaken. In this study, to limit the influence of nonresponse to this survey, a method of flow samples was applied where sampling and collecting of data occurs simultaneously from a mobile population that is defined by time and location. Any error that is introduced by such non-response must be quantified and where possible adjusted for in the final results.

3.7.3. Sampling Error

Sampling is the process of selecting a suitably sized sample that is representative part of a population for the purpose of learning about its parameters or characteristics (Mugo, 2002). Bias may occur through selection of the individual participants that are made part of the research. Selection bias is generally caused by preferential exclusion of samples from the data for various reasons relating to logistics, available resources for the study and other limitations that exist (Bareinboim & Pearl, 2012). Sampling bias may thus render the data that has been collected through research instruments inaccurate or misrepresenting the population. When this is identified the differences between respondents in the sample selected for the study and in the target population must be reported.

In this study, the selection of the survey participants for owners of craft breweries is based on availability and the willingness to participate in the study. Such a selection may thus not represent the entire population of potential craft brewers. It is however not the intention of the study to represent the entire population of potential craft brewers but to understand the phenomenon of craft brewing growth shared from the perspective of owners. Any similarities in the feedback from the owners interviewed may indicate that a relation exists but this cannot be extended to all craft brewers.

3.7.4. Measurement errors

Errors of measurement arise when a conceptual framework that presumes that the variable or characteristic of the population being measured is invariant over some conditions of observation is adopted (Kane, 2010). For this type of study, the main strategy for controlling measurement error is by increasing the number of observations which will ensure that the reported characteristics or variables are close to the true value. It must therefore be noted in the discussion of the results that any inference from a particular observed score, based on a sample of observations to a conclusion about a general disposition, is an inductive inference from the sample to the domain of observations from which the sample is drawn which in turn carries some risk of uncertainty of having error (Kane, 2010).

3.7.5. Coverage error

In most research where population variables or characteristics are the subject of the study, sample surveys are employed to obtain information about a large population by examining only a small fraction of that population. This is because it is not always feasible to include the entire population as it renders the scope of the research unreasonably large. While methods and techniques are available to ensure that the sample that is analysed is thoroughly representative of the entire population, coverage error is inherent when some elements of the population are not included in the survey. Coverage error is introduced when units in the population of study are not afforded the opportunity to be part of the research by design (Lepkowski , 2002). This failure of the sampling design to include eligible population in the study can be reduced through the use of multiple frames including face to face surveys and emailed surveys. During the survey design, when elements of the population are specifically excluded by virtue of their geographic reach or for any other reason, it must be explicitly discussed in the results how this may have affected the outcome of the research.

3.8. Ethics Clearance

The study will collect data from participants in their personal capacity and as such require them to divulge information that they may deem personal. As such, it is a requirements to ensure that such information is protected. It is necessary to obtain informed consent from all participants. Ethical

clearance that guides how this information is to be protected and how consent from participants will be sort has been obtained from the University of the Witwatersrand, Johannesburg. A copy of the ethical clearance is attached in the appendix of this paper.

CHAPTER 4 PRESENTATION OF RESULTS

4.1. Introduction

The results of this study are presented in two main sections followed by a summary. The first section of the chapter presents the response from the consumer questionnaire. This begins by the socio-demographics study of the sample of respondents and a presentation of trends of craft beers and commercial lager beers in comparison in the market place. This part will also present results in relation to respondents' perception on craft beer quality, cost, accessibility and flexibility which all form manufacturing strategy paradigms. The second section of this chapter is where the results from the craft brewery managers are presented. This part will first address the demographics of the craft breweries that responded and then present results in relation with descriptions of brewery facilities, capacities, state of process technologies employed, quality assurance and organisational structure decisions.

4.2. PART I: Craft Beer Consumer Questionnaire Results

4.2.1. Non-response error

In total, six hundred and eighty eight (688) participants were approached to answer the questionnaire as part of the survey. However, only four hundred and fourteen responses were usable for the purpose of the research. Those that were deemed to be unusable included where participants declined to participate in the research after being asked to participate and those where participants partially completed the questionnaire and opted to stop participation before all the answers were obtained. In order to reach a minimum number of 380 participants as per the requirements from the methodology, the number of consumers interviewed were increased. The usable responses thus constituted 60.2% response rate which met this criteria.

4.2.2. Demographic profile of respondents

The research personnel characteristics of respondents have an important role to play in expressing and giving the responses about the topic of interest. Characteristics such as age, occupation status, gender and residential location must be studied and any relation to the responses presented together.

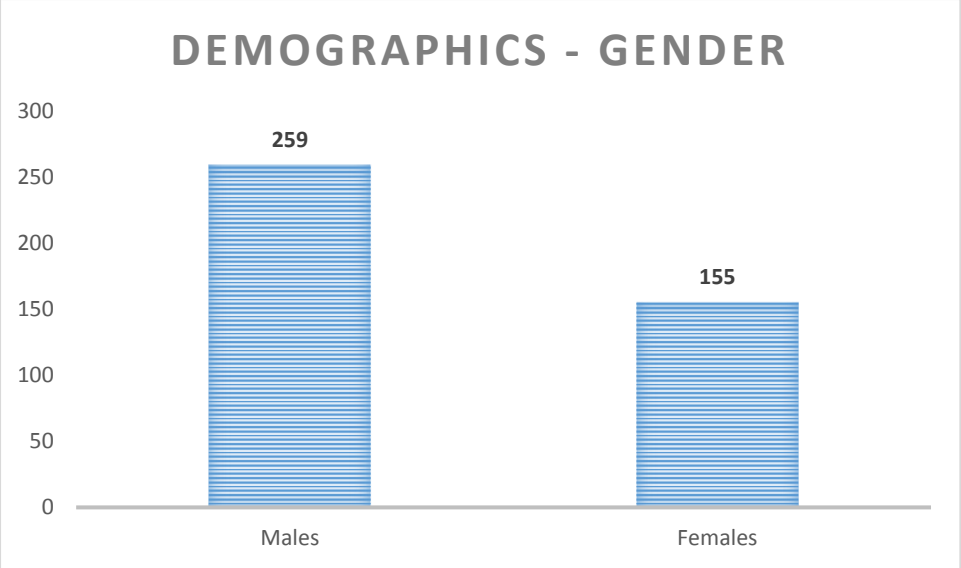

Figure 4-1: Classification of respondents by gender

The result indicate that the majority of consumers sampled are males. This is in line with the study that indicates that gender differences in alcohol consumption remain universal in that when it comes to gender and alcohol consumption, men drink more alcohol that women and also drink higher volume of alcohol in comparison (Wilsnack, et al, 2009). The fact that there were more male respondents than females is in line as to these expectations. In all, 62.6% of the respondents were males and 37.4% of the balance represented females. In comparison, the craft beer consumer in the United States of America comprises of almost 70% males, which similarly represents a large proportion of the consumer of craft beer as being males (Brooks, 2011). Based on the gender proportion in the sample, it is anticipated that a meaningful responses to the research will be obtained.

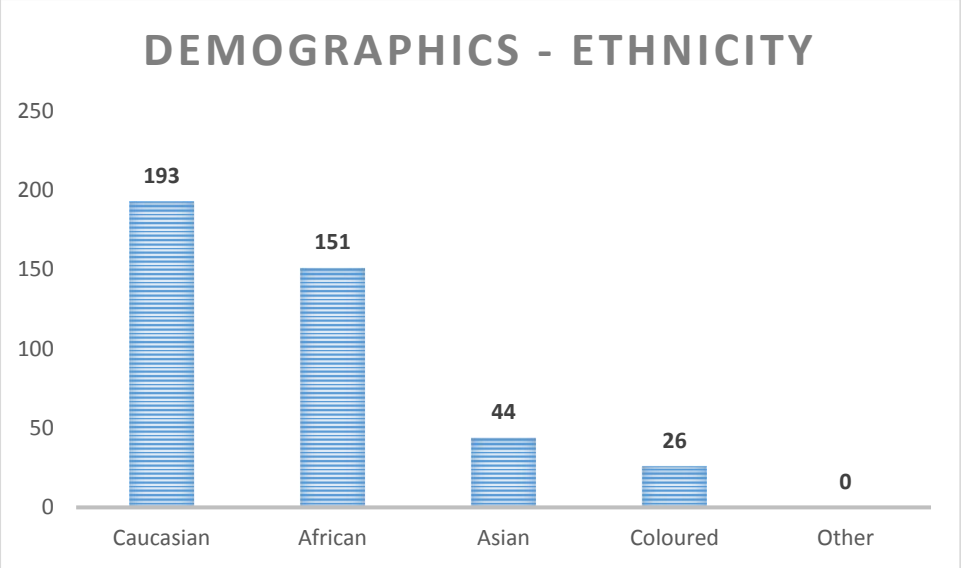

Figure 4-2: Classification of respondents by ethnic groups

In this survey, the participants were represented largely by Caucasians (46.6%), followed by Africans (36.5%), then Asians (10.6%) and Coloureds (6.3%). Owing to the diversity of the South African population from an ethnicity perspective, it was considered appropriate to ascertain the racial classification of respondents given the well documented behaviour and spending patterns of the different racial groups. The relationship of social class is further determined by participation in the economy. Research on social determinants of alcohol drinking patterns has emphasized several factors, among them social class, gender and ethnicity (Almeida-Filho, 2004).

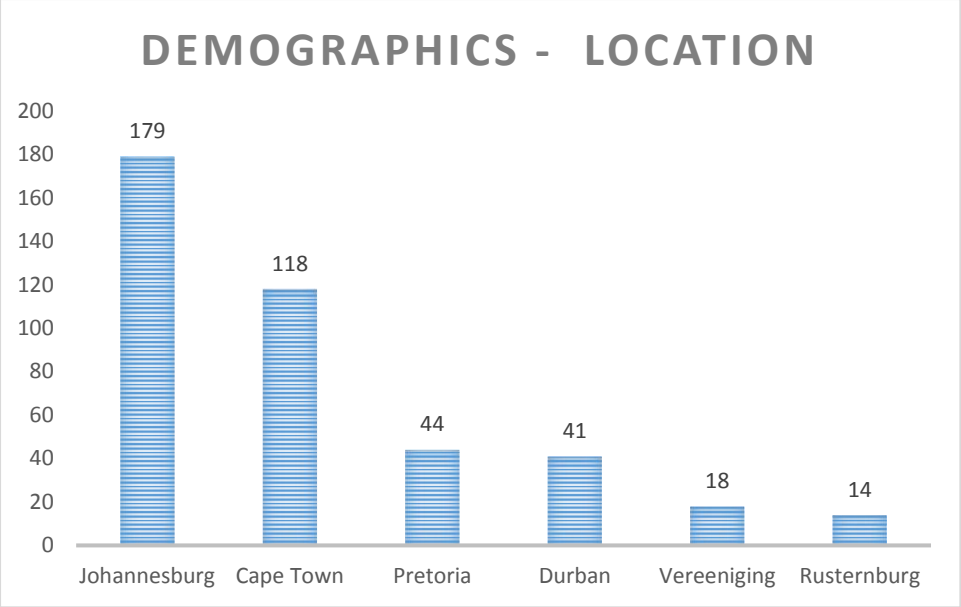

Figure 4-3: Geographic placement of respondents

Several cities in South Africa were visited for the purpose of evaluating beer consumers from different locations. The majority of respondents from the consumer survey were based in Johannesburg. Cape Town had the second largest base of respondents for this study and other cities contributed to some extent. Factors contributing to the geographic phenomenon of beer consumption are not always easily determined or accurately measured. As such, the researcher determined it necessary to get an extent of geographic reach.

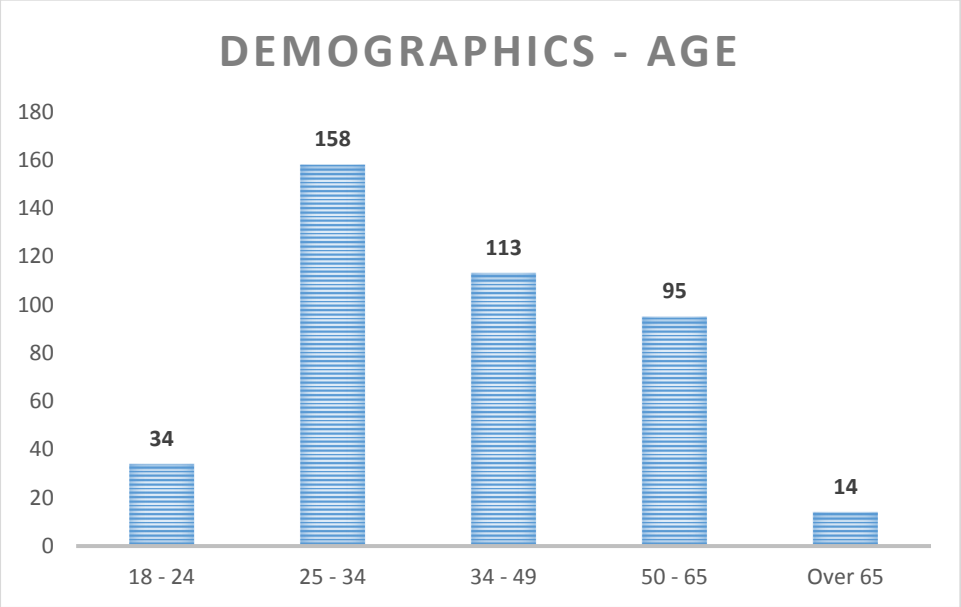

Figure 4-4: Age distribution of respondents

The majority of respondents are in the age group 25 to 34 years and 34 to 49 years. Compared to the literature this is in line with age groups that consume craft beer the most since the literature shows that the 35-44 age group represents the largest percentage of craft beer consumers at approximately 25%, followed by the 25-34 year-olds at 24.3% while the slightly older demographic of 45-54 year-olds is only a bit lower still at 21.7% and the age group of 21 – 25 represent the smallest at about 6% (Brooks, 2011). The study indicates that craft breweries are enjoyed by a wide age group. The respondents to this research extensively cover the age groups that consume craft beer the most.

4.2.3. Craft beer in market assessment

The respondents were queried on how often they participate in consumption of alcoholic beverages on a weekly basis.

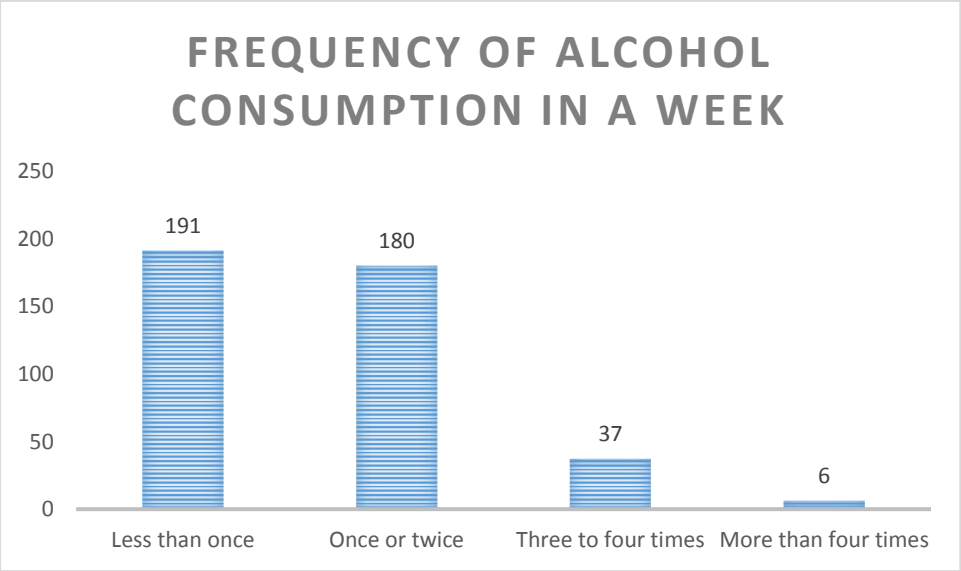

Figure 4-5: Frequency of alcohol consumption by respondents on a weekly basis

In their response, 46.1% of the respondents indicated that they engaged in alcoholic beverages on average less than once a week. 43.5% of the respondents indicated that they consumed on average once or twice per week. Only 8.9% of the respondents consumed on average three to four times a week and 1.4% drinking more than four times a week.

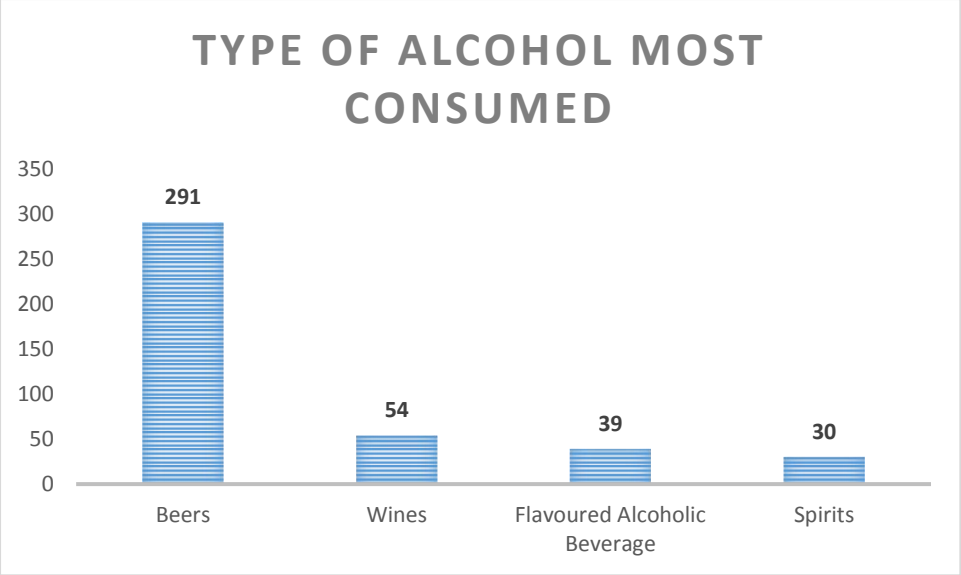

Figure 4-6: Type of alcoholic beverage most consumed by respondents

The results, as presented in Figure 4-6, reveal that the majority (70.3%) of respondents consumed beer as the type of alcohol most consumed. This was followed by wines (13%), flavoured alcoholic beverages (9.4%) and spirits (7.2%).

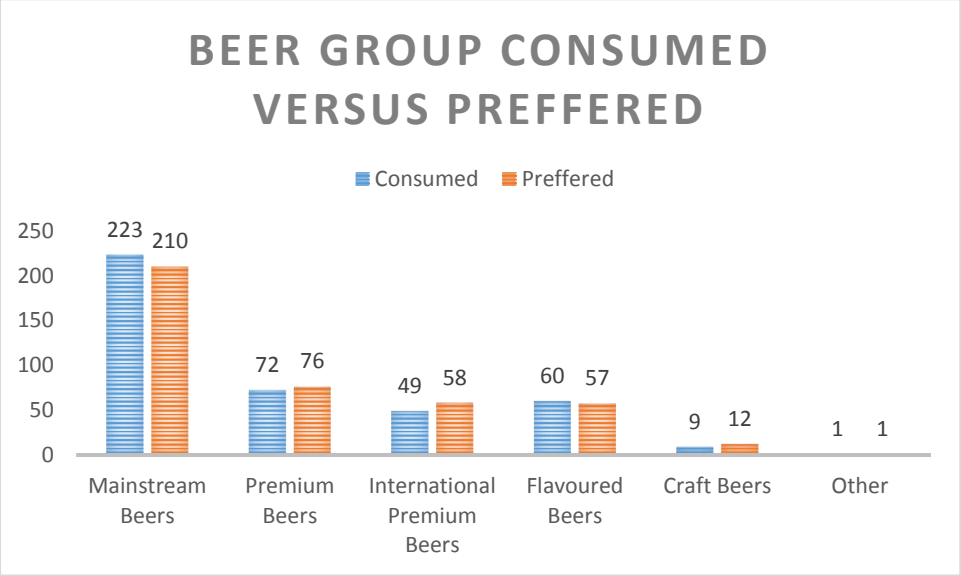

Figure 4-7: Beer groups consumed by respondents and their general preference

The respondents were asked to compare their current beer consumption patterns with those that they actually prefer. This is because what an individual prefers may not be available to that consumer because of accessibility, cost or other variables. The results show that preference and the actual consumption patterns were relatively matched across all beer types. Overall, only nine (9)

respondents or 2.2% of the sample population consumed craft beers more than any other beer. More importantly, only 2.9% of the respondents preferred craft beer as the beverage of choice. More than half of the respondents at 53.9% consume mainstream brands more than other beers while the preference rate for the mainstream brands is at 50.7%. Branding establishes the basis by which different types of beers are positioned in a competitive environment. As such, when the consumers purchase a particular type of beer it may enable them not only to achieve maximum value as they deem equivalent to the money spent on that purchase, but also to define their personalities through that particular beer's symbolic meaning.

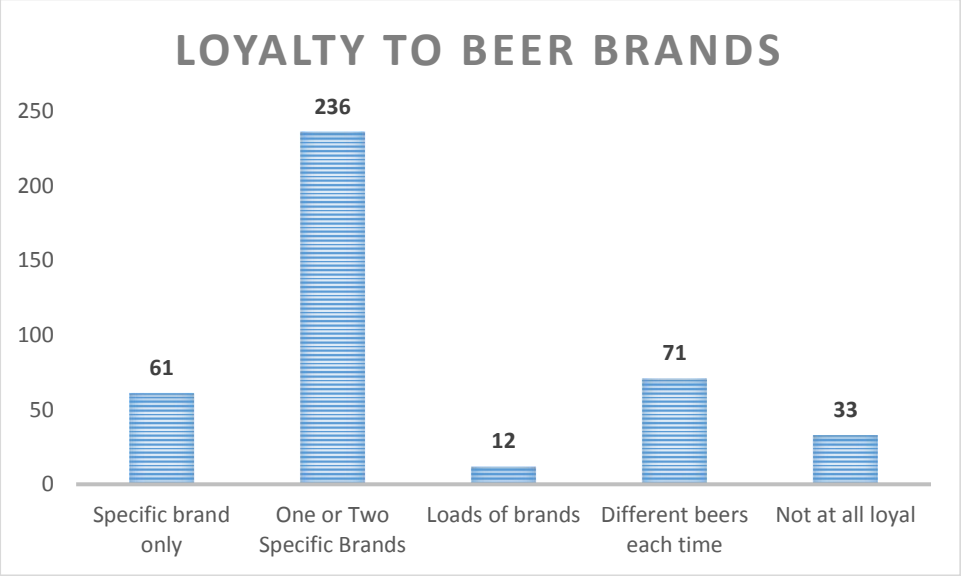

Figure 4-8: Level of loyalty that respondents are to beer brands.

The repeated purchasing patterns of one particular beer by one consumer was the question posed with 61 respondents (14.8%) claiming to only consuming a single brand at the current time. About 236 respondents (57.1%) indicated that they are more likely to consume only one or two specific beer brands. The remainder of the respondents being approximately 28%, claimed that they have no standard repeated beer purchasing patterns and will most likely consume any beer type at any given time. In the process of purchasing beer, consumers are not only considerate of the price they will pay for a specific beer brand or quality of that brand, but also other variables that determine, when all is put together, what the consumer perceives as the value and benefit that will be realised from that beer.

4.2.4. Craft beer comparison

The participants were asked to compare craft beers with other normal beers on a few characteristics that could be linked to other beers of their choice. The following set of results compares on characteristics such as; perceived quality, unit price and accessibility in their geographic area.

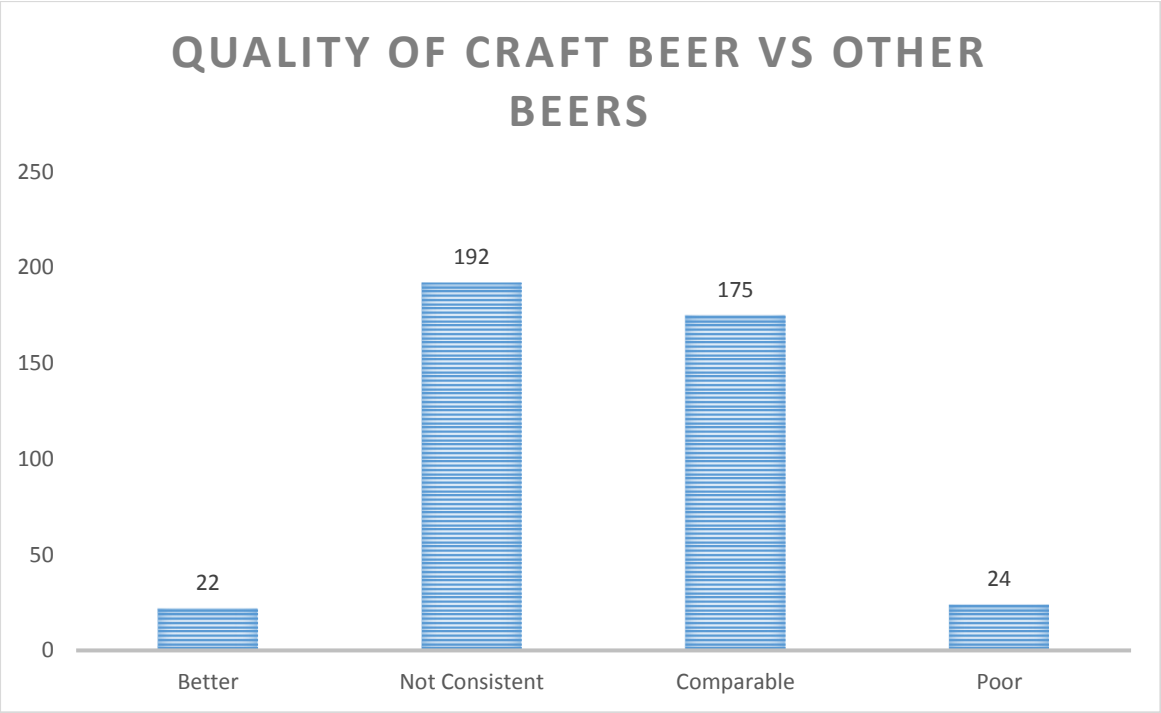

Figure 4-9: Perceptions of respondents on the quality of craft beers compared to other beers.

Here, participants were asked to compare according to their own understanding of quality, the difference between craft beer and other beers. They were not requested to define what they understand to be quality of beer due to the fact that beer quality is a plethora of measured characteristics including traits such as appearance, aroma, flavour, odour and texture all of which are understood differently by different consumers (Giacalone, et al, 2016). The response showed that 46.4% (192 of the respondents) thought that the quality of craft beers is not consistent compared with other beers, while 5.8% (24 of the respondents) responded that craft beers have a poorer quality in comparison to other beers. On the other hand, 42.3% (or 175 respondents) thought that the craft beer quality was comparable to that of other beers and 5.3% (or 22 respondents) saying that craft beer quality is better in comparison with other beers.

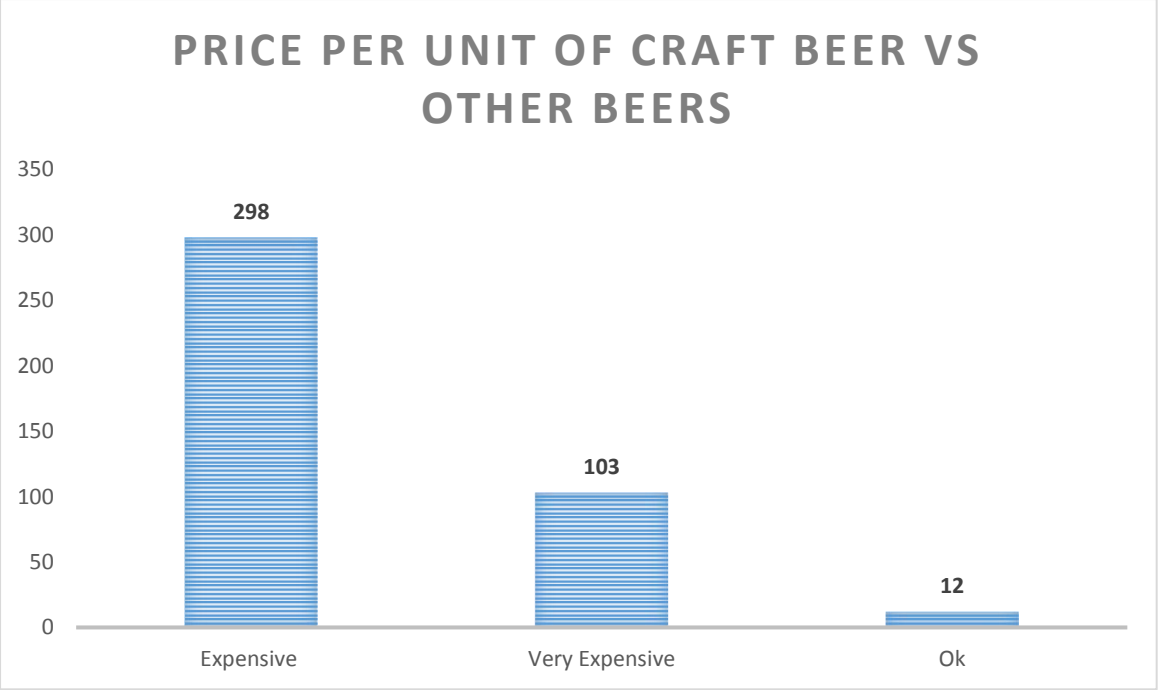

Figure 4-10: Rating by respondents of craft beer in terms of price per unit

Here respondents were asked to compare the price of craft beer with that of other beers they have consumed. The responses showed that 24.9% (or 103 respondents) thought that craft beer was "very expensive" while 72.0% thought that craft beer was "expensive" compared to other beers. Only 2.9% (or 12 respondents) thought that craft beer was comparable with other beers when it comes to price per unit.

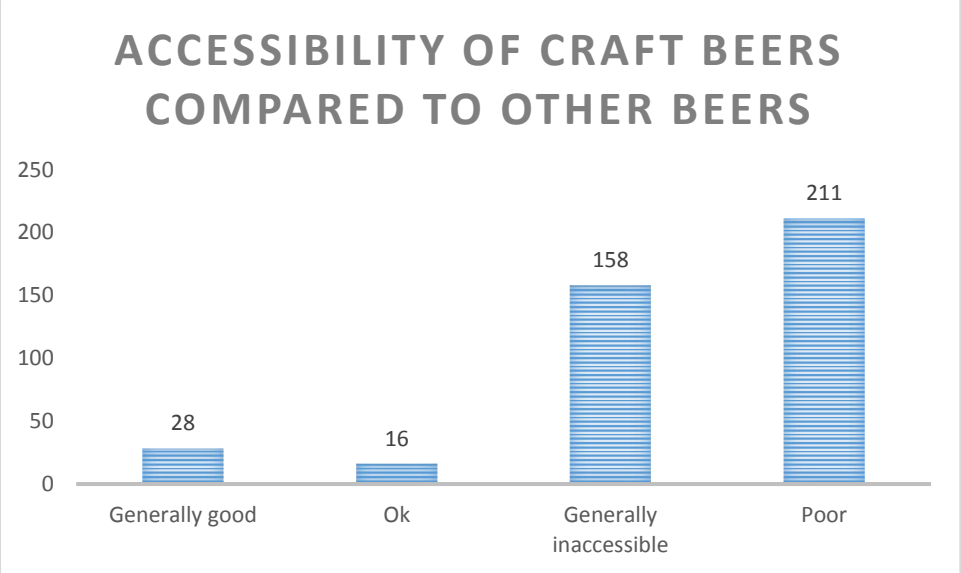

Figure 4-11: Accessibility of craft beers in general compared to other beers.

In terms of geographic location of the respondents, an overwhelming majority of 89.1% (369 respondents) indicated that accessibility to craft beer as defined by the beer being available at the time and place they are looking to purchase the beer, is generally inaccessible or poor. This is in comparison with 3.8% (16 respondents) respondents that believe accessibility to craft beer is generally okay and 6.8% that believe accessibility is generally good. This question considered that some of the major appeal to convenience by any beer is its availability at the correct location and time for the consumer looking to engage with that product.

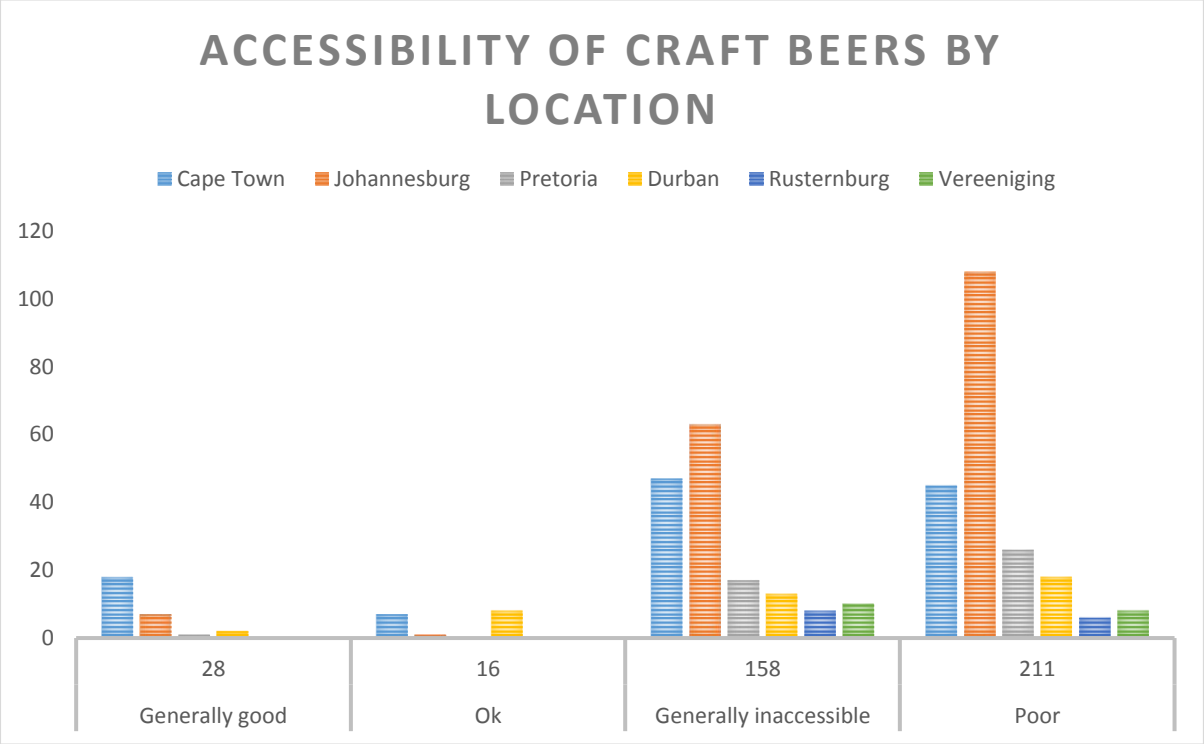

Figure 4-12: Accessibility to craft beers by location as perceived by respondents

The majority of those that believe that craft beers are generally good are located in the Cape Town region however, the overwhelming majority of respondents in all the regions generally find craft beers inaccessible or poor. In all instances the averages were quite similar for all the regions as summarised in the following figure.

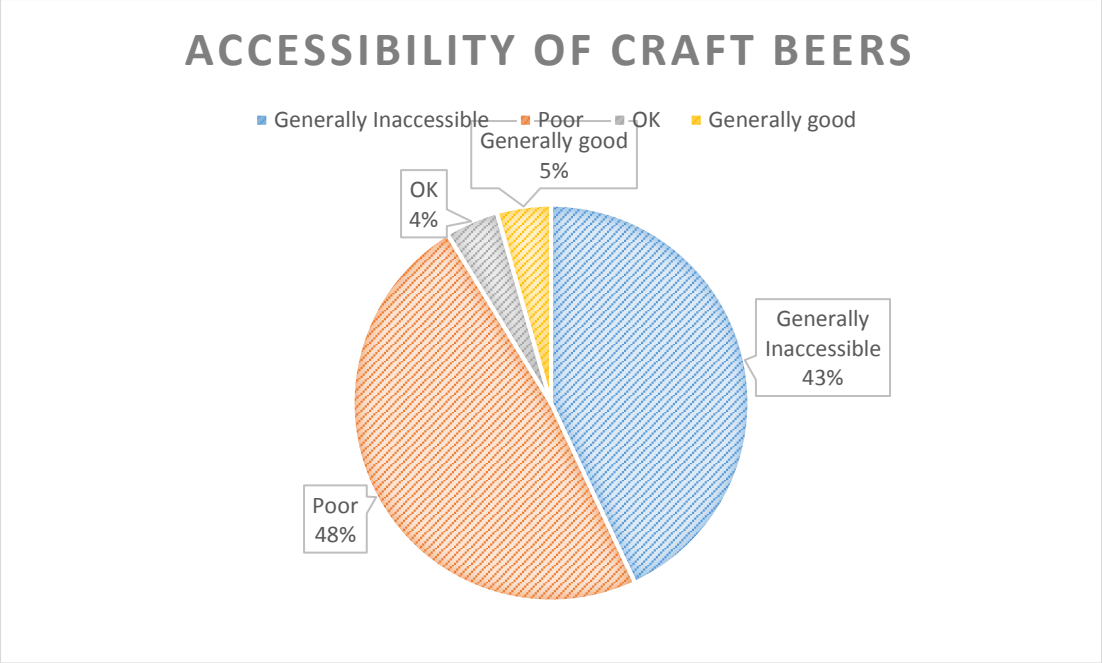

Figure 4-13: General trend of craft beer accessibility across all regions.

The results show that 48% of the respondents had poor access to craft beer and a further 43% believe that craft beer is generally inaccessible. The remainder of the respondents had generally good (5%) and “ok” access to craft beers.

4.3. PART II: Craft Breweries’ Owners Questionnaire Results

4.3.1. Craft breweries capacity and capabilities assessment

The capacities of the responding breweries were studied and the results were such that Craft Brewery A at current production levels of 250 000 litres of beer per month had massive capacity compared with the rest of the other breweries.

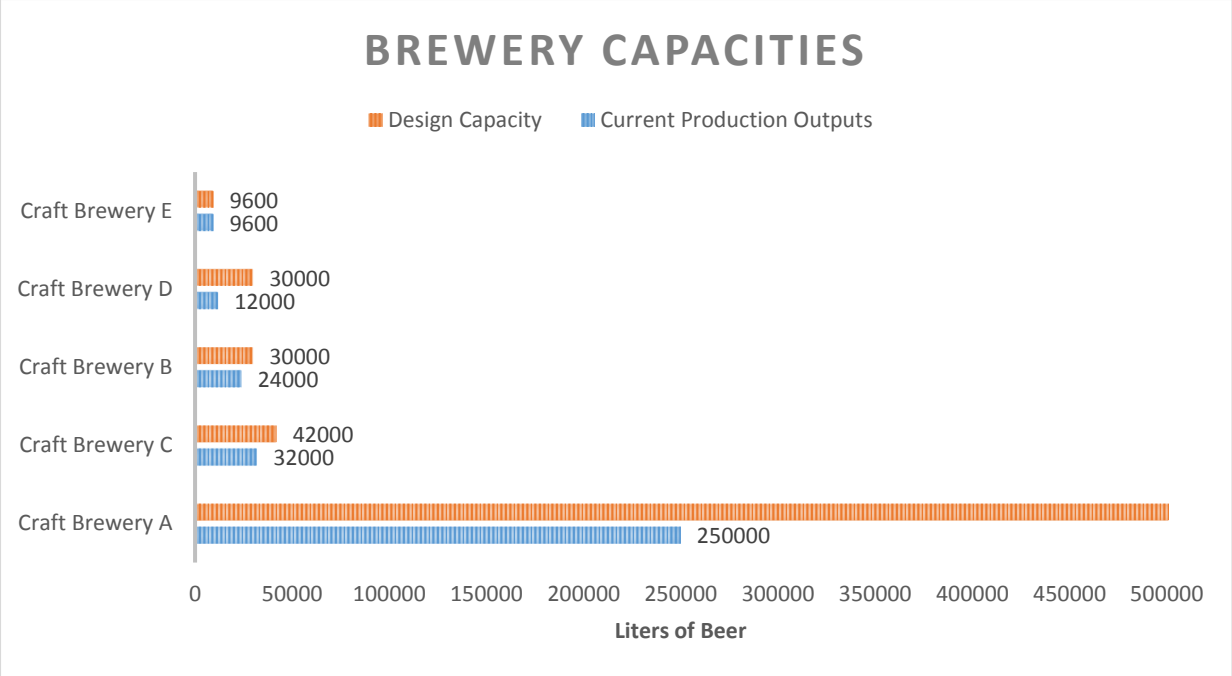

Figure 4-14: Design capacities and operating capacities of each brewery that responded to the survey.

The other breweries had much less capacities with current production levels ranging from 9600 litres per month to 32 000 litres per month. The capacity of a brewery is determined by the size of each batch that can be produced by the brewery and complemented by the processing equipment and the quantities of human capital operating the equipment that is currently in the employ of the craft brewery.

Out of the five breweries, only Craft Brewery E was running at full capacity compared with the design capacity. Craft Brewery D was running at 40% of design capacity, Craft Brewery B at 80% capacity and Craft Brewery C at 76% capacity.

4.3.2. Determination of size and location

The pattern of decisions regarding the choice of equipment sizing to determine the overall size of the manufacturing facility were studied. All the craft breweries that responded had a variety of reasons that were considered when determining the final size of the manufacturing plant and its location.

Table 4-1: Considerations taken in determining the size and location of the breweries.

Factors determining craft brewery capacity		
	Factors determining size selected	Factors determining location selected
Craft Brewery A	Second hand equipment	Distribution Costs Affordability of real estate Licensing Accessibility to major routes
Craft Brewery B	Affordability of brewing equipment Size of the location to fit the equipment in	Proximity to tourism areas Branding
Craft Brewery C	Second hand equipment	Affordability of real estate
Craft Brewery D	Related to market demand of the brands brewed	Access to the market Access to route
Craft Brewery E	Affordability of brewing equipment	Affordability of real estate

The smaller firms in the case of Craft Brewery B, C and E were largely influenced by affordability of the equipment that was required and the affordability of the space that was to be used as the location of the plant. The larger firms in Craft Brewery A and D were largely influenced by the market size they wanted to reach

4.3.3. Process technology decisions

The type of process technology employed at each facilities was recorded as follows:

Table 4-2: Manufacturing technology employed at the craft breweries

Manufacturing Plant Technology used		
Manual	Craft Brewery E	Craft Brewery C
Partial -Automation	Craft Brewery B	Craft Brewery D
Mostly- Automated	Craft Brewery A	

Craft Brewery A: The brewery is mostly automated at approximately 80% automation of all activities that go into brewing the beer. The plant is divided into the brewhouse facilities that largely handles hot product from the cooking process. This is followed by the cellars area where the actual fermentation and maturation of the beer takes place. The filtration and bottling plant then follow. The supporting facilities such as the refrigeration plant, water treatment and heating plant are all fully automated. The cleaning component of all the product handling equipment are fully automated.

Craft Brewery B and Craft Brewery D: Both are about 50% automated with the rest of the brewing activities completed manually by the brewing operators. In both cases cleaning of the beer handling facilities is manually undertaken by the operator. To this extent, some consistency of achieving the same amount of cleanliness is reduced. The supporting facilities such as the heating plant, refrigeration plant and water treatment are all handled automatically.

Craft Brewery C and Craft Brewery E: At these two breweries, there are more manually completed brewing activities than automated ones. Only activities that cannot be performed by an operator are automated such as the heating plant and refrigeration plant. The cleaning of the plant is manually completed by the operators. Most of the beer transfers between different stages of the process are also manually handled.

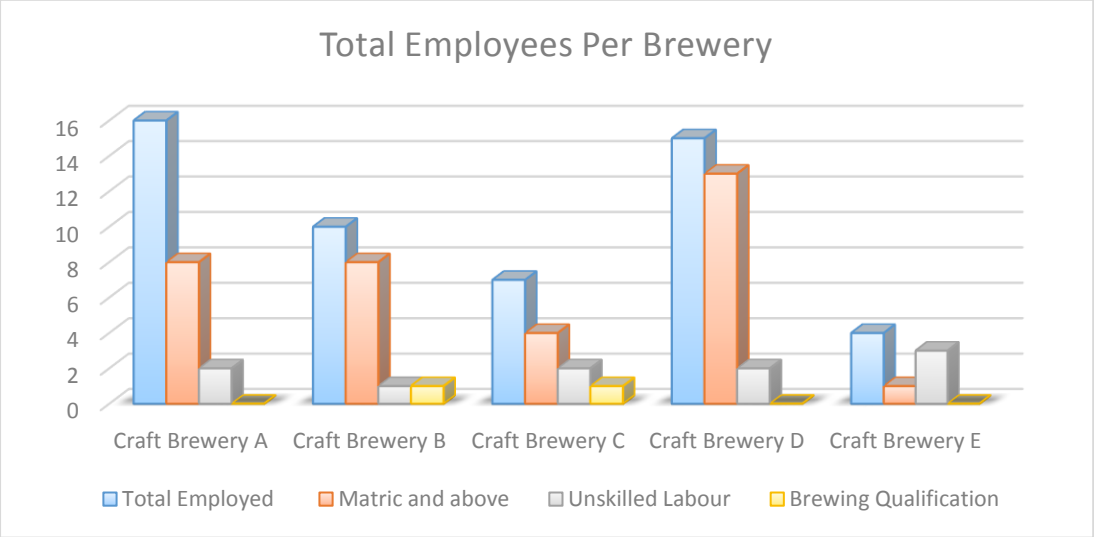

Figure 4-15: Employees at each brewery and their respective skill level

The number of employees at each brewery were assessed as follows:

Craft Brewery A employed the most employees at 16 in number given its large size of operation compared with the other breweries. The level of automation however meant that less employees than in a manually run plant were required. The next highest employer is Craft Brewery D employed 15

personnel. Craft Brewery B brewery employed 10 personnel. There were seven employees at Craft Brewery C and a total of only 4 employees at Craft Brewery E brewery. Only Craft Brewery B and C had a person with previous brewing experience as well as brewing qualifications with previous careers at a large commercial brewery.

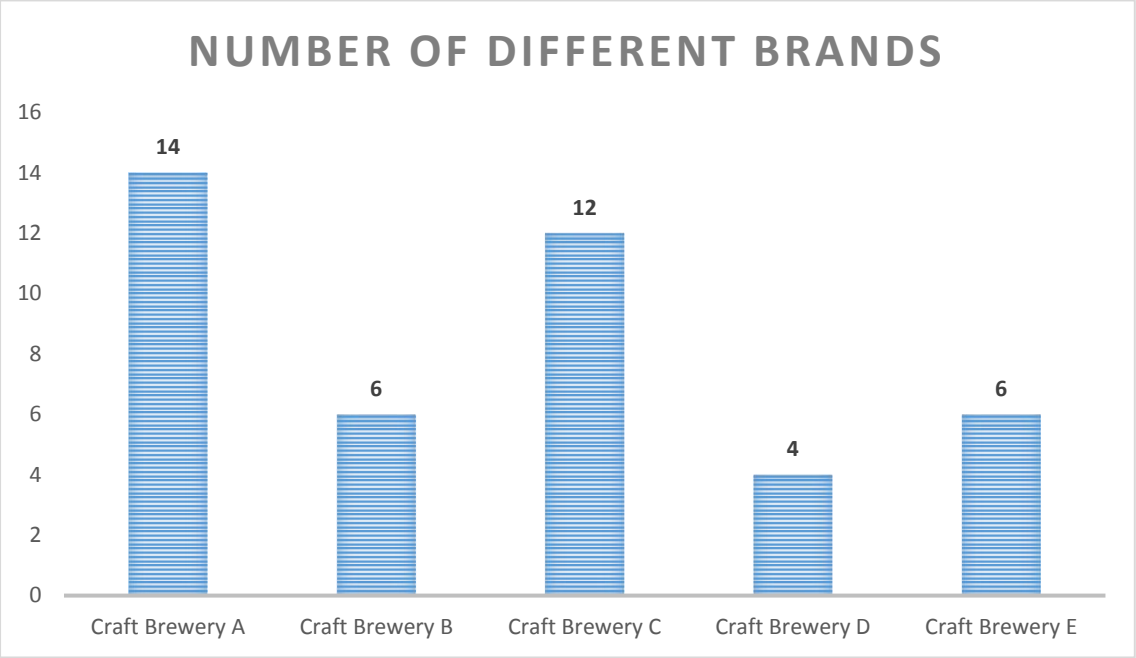

Figure 4-16: Number of different brands produced at the breweries

The breweries were assessed for the number of brands that they are currently producing which might add to the complexity of operations and hence influence the degree of focus. Craft Brewery A currently produces at least 14 different brands that are a combination of in-house brands and contract brewing brands. Craft Brewery B currently makes about six different types of beers being Lager, an apple ale, a cherry ale, a ginger ale, an a speciality beer and a more seasonal stout in winter. Craft Brewery C currently produces about twelve brands including those that are for contract brewing. About 95% of the beer made at Craft Brewery C is packaged in kegs which are bulk stock keeping units and only 5% is bottled which considerably reduces the complexity of managing a bottling plant. Craft Brewery D is currently making only four different brands with a further two brands in the development phase. Craft Brewery E brewery currently manages six different brands.

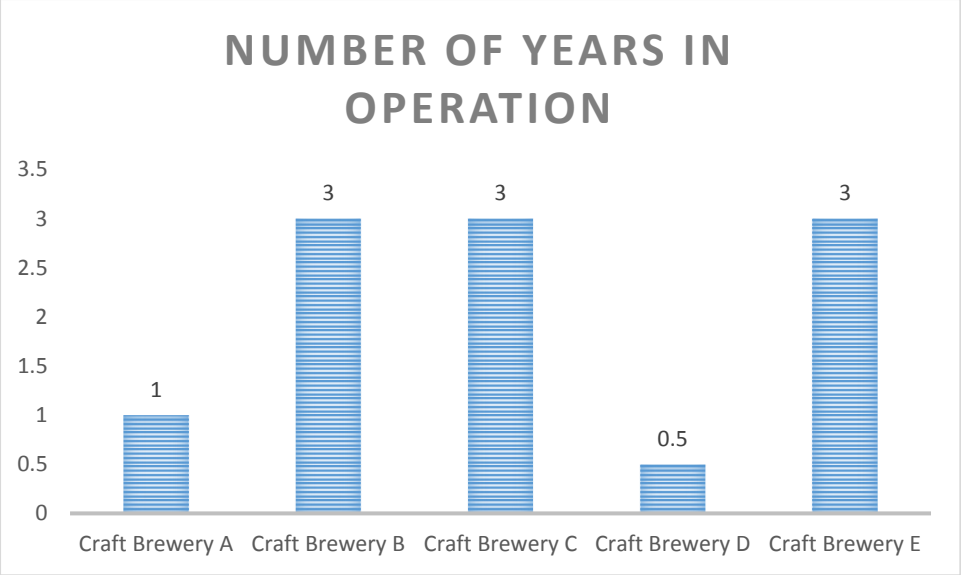

Figure 4-17: Years of operation of the craft breweries

Of the five craft breweries three of them had been in operations for 3 years, namely Craft Brewery B, C and E. Craft Brewery A has been in operation for one year and Craft Brewery D for only half a year. It must be noted that these numbers represent the time since the first saleable product was commissioned and that planning of the operations started years earlier for all the craft breweries.

4.3.4. Craft Breweries manufacturing strategy assessment

4.3.4.1. Vertical integration consideration

Some of the breweries that responded were found to have considered vertical integration to some extent in making decisions regarding risk, product quality, the cost structure of the brewery and the degree of focus of the organisation.

Table 4-3: Vertical integration consideration by each brewery

Vertical Integration		
Decisions	**Company**	
Have not considered vertical integration	Craft Brewery E	
Decided Against vertical integration altogether	Craft Brewery B	Craft Brewery C
Decided to integrate to some extent	Craft Brewery A	Craft Brewery D

Decided to integrate to a large degree	None	

Craft Brewery E: Has had no thoughts of vertically integrating any part of the supply chain given the brewery's relatively small size in terms of quantities of beer produced. Raw materials such as malted barley and hops are largely procured through SAB Ltd. Distribution is outsourced to a company that specialises in this field. There is no on premise sales licence for beer to be drank on site and the location of the brewery is in an industrial area.

Craft Brewery C: Its major raw materials are sourced from SAB Ltd and packaging materials are sourced from Console Pty Ltd and Coleus Pty Ltd. Approximately 30% of the beer made out of this brewery is sold at a restaurant which is a sister company of the brewery. Also, about half of the beer made from the brewery is contract brewing. This means that customers in essence rent out the facility to produce their own beer which they will market, distribute and sell completely separately from the brewery.

Craft Brewery B: Similar to Craft Brewery C, its major raw materials are procured from SAB Ltd and packaging materials are also sourced from large corporations such as Coleus and Console. A large quantity of the beer produced here is sold in kegs which are re-usable. In the past, the brewery has tried to distribute internally but found it practically impossible to distribute reliably as demand increased. The distribution was later outsourced. A small percentage of the beer is sold through the beer garden that is on the same premise as the brewery. The location of the brewery is ideal for such an arrangement. The brewery is currently considering opening sales outlets in and around the local area that will exclusively sell products from the brewery. This requires large capital investments and is currently on hold.

Craft Brewery D: The decision was deliberately made to have international option for the supply of brewing raw materials like malted barley and hops. This gives the brewery a differentiation option as well. The brewery has invested resources in developing an in-house restaurant and beer garden where currently most of the beer is consumed. This decisions means that beer does not have to be packaged and thus saves cost accordingly. The brewery has no intention to do contract brewing at this stage as this would take away focus from developing its own brands.

Craft Brewery A: Given issues previously experienced by the company regarding quality of supply of the raw materials, a decision was made to source raw materials from outside South Africa. Negotiations resulted in the ability to match prices for raw materials procured outside to be similar to

raw materials in South Africa. The brewery was built to a relatively big size on the basis that it will do mostly contract brewing in addition to in-house brands. While the intention was not to own the distribution part of the operation, it was decided very early on to partner with a sister company in this regard. As a result there is better control of costs involved with the distribution part of the operation. Currently over half of beer produced here is brewed under contract brewing and the rest constitute in-house brands.

4.3.4.2. Quality assurance systems

The study investigated the quality systems that have been put in place at the responding craft breweries and found as follows:

Table 4-4: Quality assurance structure at the craft breweries

	Craft Brewery A	Craft Brewery B	Craft Brewery C	Craft Brewery D	Craft Brewery E
Laboratory Analysis	Yes	No	No	Yes	No
In process analysis	Yes	No	No	Yes	No
Sensory analysis	Yes	Yes	Yes	Yes	Yes
In trade analysis	Yes	Yes	Yes	No	No
Quality System in place	Yes	Yes	Yes	Yes	Yes

Craft Brewery A and D: Consideration for quality is extensive as proven by investment in a quality analysis laboratory on site. A laboratory in breweries is required to be provided and maintained at the plant site with the necessary equipment and supplies for conducting quality control testing. Automated instrumentation have been installed in the process to track quality continuously. Every batch that is packaged is tasted by experienced tasters to analyse how consumers may react to the product. An extension to this is further analysis of the product in trade when the life of the beer is expected to deteriorate with time. Craft Brewery A site is a certified ISO 14001 site which is a standard for operation like craft breweries and allows for regular health and safety audits to be completed on site. Craft Brewery D is planning to be ISO certified site in the near future and thus putting all the systems in place that are required.

Craft Brewery B, C and E: There is no on site laboratory facility as this is not considered a requirement. Basic instrumentation are used to analyse some quality parameters however these are not continuous monitoring instruments. Tasting of every batch of beer packaged is completed on site before it is

dispatched. The sites are not accredited with any quality certification authority and thus no regular site inspections are done to test systems that have been put in place for conformance to quality. In the specific case of Craft Brewery D and E, there is no follow up with quality in trade as the general belief is that the beer will be consumed in time before its “best before” time elapses.

All sites claim to have some form of quality system in place where analyses are performed at a predetermined rate and results are recorded. This however can only be verified by a valid accreditation by a relevant authority.

CHAPTER 5 DISCUSSION OF THE RESULTS

5.1. Introduction

In this section of the study, the results presented in chapter 4 are discussed and analysed in relation to both the research questions and existing knowledge. In the first section of the chapter the discussion will be of the results from the consumer questionnaire and how they link to the manufacturing strategies of the craft breweries. The second part of the chapter will focus specifically on the interview responses of the craft breweries managers' in relation to manufacturing strategy constructs. The discussion will centre on constructs derived from the descriptions of brewery facilities, capacities, state of process technologies employed, quality assurance and organisational structure decisions.

5.2. Manufacturing Strategy Objectives

5.2.1.Quality of the craft beers

The survey asked respondents about their impression of craft beer quality in which 52.2% of the response was that the quality of the craft beers tasted or drank by them were not consistent or were poor. While no literature could be found to compare these results, this is a very low satisfaction rate with quality by consumers of craft beers. It is worth pointing out that there are costs associated with failure to meet the requirements and expectations of the consumer which could include the consumer declining to use or consume the product again and in the case of craft beer this could mean the consumer opts to try alternative beers.

Manufacturing plants embody a set of trade-offs. Manufacturers seeking to achieve higher conformance of product quality have a wide range of options to choose from including but not limited to improving conformance via defect prevention and improving quality delivered to the customer via inspection (Zaklouta, 2011). The options however have different cost implication and may require trading off the preferred quality of conformance with the implied costs involved. With regard to quality assurance systems, only Craft Brewery A had all the systems in place for the management of quality in response to the survey questionnaire. The other four breweries that responded had a mix of some quality assurance systems in place but not all. This may potentially leave a gap where quality issues are not identified and corrected. All these issues that are not resolved will in time filter through to the consumer and be reflected in the consumer's perception of the quality of craft beer.

Where there are several different ways towards achieving high quality of the beers, finding the most efficient and cost effective one can be a difficult task for craft brewers and may involve iterations of the status quo. Severi & Ling (2013) identified that one benefit of maintaining and preserving

consistent quality is that it builds brand loyalty, this loyalty gives the brewer a base of consumers that will keep coming back for more and therefore a competitive edge. This consistency starts by understanding how beer sensory profile starts deteriorating with age and the criticality of delivering a consistently fresh product (Vanderhaegen, et al., 2006). In addition it is important to understand, that all the characteristics of the beer must remain the same batch after batch. The minimum that may be required is for craft breweries to have an on-site facility to do quality analysis of the beer they produce. Only Craft Brewery A and D currently have an on-site laboratory for this analysis which forms the foundation of understanding every batch of beer that is produced. The other breweries having no laboratory facilities means they are not able to have an in-depth understanding of the products that they make. The finding of this study is that there is a clear requirement for a set of decisions to improve the quality front of beer production at the craft breweries.

5.2.2.Unit cost of craft beer

An overwhelming majority of the consumers (96.9%) of craft beer believe that the unit cost of craft beer is more expensive than a conventional beer. The unit price of any alcoholic beverage is primarily determined by two common factors, namely; the costs of manufacturing including distribution and the excise duty that is imposed by national treasury (Rabinovich, et al., 2009). It follows that for a similar excise duty categorised alcoholic beverage competitiveness is achieved by reducing the manufacturing costs and distribution costs. The impression from the respondents of the survey overwhelmingly perceive the price of craft beer in South Africa to be expensive or very expensive when compared to conventional beer. A feature of modern industry is to employ large scale production which has the advantage of lowering overall manufacturing costs consistent with the principle of economies of scale. This feature is an instrumental part of large corporate brewers' strategies. This however cannot be the strategy that is employed by individual craft brewers as the very definition of craft brewing relates to size. This means that decision patterns that are aimed at lowering the cost that the consumers are paying for, namely a unit of craft beer, should be considered elsewhere in the manufacturing chain.

To control the external cost influencing factors that are key inputs to the craft brewery relates to the management of key stakeholders such as suppliers and vendors. The competitive approach suggests that the development and usage of multiple sources for most or all key materials inputs to the brewing of beer will result in lower negotiated prices as suppliers are made to bid against one another. To this regard, the five responding craft breweries have indicated that they are largely dependent on SAB Ltd for all their malt and hops purchases. This is contradictory to the pattern of being competitive, as this is a sole supplier and requires a new set of decisions to be made regarding the sourcing of key

materials for the manufacturing plant. Only Craft Brewery A indicated a move away from being dependent on a sole supplier for these two key raw materials to the brewing process. This decision by Craft Brewery A was primarily made for differentiation and to strengthen the supply of these materials but not necessarily to reduce cost.

Other patterns of decision that have a direct bearing on the price that the consumer will eventually pay for craft beer are internal to the craft brewery and include but is not limited to the quantity of labour employed to make a unit of beer and improvement on the cost of quality. Decision patterns that are related to these parameters must be made based on a clear understanding of how these impact the total cost of manufacturing.

5.2.3.Accessibility of craft beer

Developing a well-thought-out facility for the production of craft beer automatically provides guidance to the firm in other facilities decisions such as determining the size, location and capabilities of manufacturing plant. There are many variables that affect the accessibility of craft beers in the market and the single most important one of them is the size of the facility built to produce sufficient quantities of beer as per the demand from the market. Under the circumstances of uncertain fluctuation of market demand, the degree of matching between production capacity and customers demand can affect the cost and the efficiency of making beer available to the market. The biggest concern coming out of the survey by consumers was that they are not able to access the beer as required as per Figure 4-11Figure 4-11.

The primary influencing factor for accessibility of beer to consumers is how the beer is packaged and taken to markets (Dai & Zhou, 2008). The large corporate brewers commonly package their beers in bottles and in cans with the right quantity of volume per stock keeping unit (SKU). Various example include beer packaged in 330ml bottles, 440ml cans and 750ml bottles sold as bulk. In mostly high end restaurants, beer is sold directly from kegs which are packaged as 30 litres and 50 litres. The consumer will then have a glass poured from this keg. The majority of the craft beer is served in kegs and therefore not available in convenient packs made available to the consumers through conventional market channels. Craft Brewery A was found to be the only brewery that sold these convenience packed beers and thus able to take their beers into convenience stores and other places where consumers can buy and take the beers to any place they prefer. The other craft breweries largely sold their beers in kegs which limited the reach of the market to places where alcohol is consumed in-premise. This has a negative impact on the quantity of consumers that are able to be reached through different channels and thus limits the competitiveness of the craft breweries. This pattern of decisions to sell out of convenience packaging needs to be considered to improve market reach

5.2.4. Vertical integration considerations

Many organisations in the manufacturing industry, such as brewing, require a steady supply of raw materials and services, as well as a steady market reach for their organisation's products (Harrigan, 1984). The set of decisions that are required to manage the risks of these transactions are a form of vertical integration considerations. If implemented correctly, vertical integration can be crucial to the survival of any organisation while on the other side excessive vertical integration can lead to costly corporate failure (Buzzell, 1983). Taylor (2001) suggests that in the conventional brewing industry, the most important stages of the supply chain for which vertical integration must be considered are:

1. Raw material production and supply - This includes materials like malted cereal grains, hops, packaging materials and cleaning detergents.
2. Production – this is the actual brewing of the beer which is a process that can take between 14 to 21 days and requires much specialised equipment and skill.
3. Distribution – This is the movement of the produced beer from the place of production to the final place of where it will be sold for consumption
4. Retail – This is the place where the beer is actually sold to the consumer

The response by the craft breweries owners indicated that some thoughts towards vertical integration had been entertained. Given the relatively small sizes of the craft breweries, the power to consider backward integration on the raw material side is close to zero. For example, the raw material market for malted cereal grain and packaging materials is heavily monopolised by the large corporations who have reached high levels of economies of scale and thus achieve relatively low cost per unit for these materials. For instance, in 2015, the department of agriculture, forestry and fisheries reported that all the barley farmed in South Africa had a sole buyer in South African Breweries owned malting plant (Department of Agriculture, Forestry and Fisheries, 2015). This means that all the craft breweries in South Africa have to rely on SAB Ltd owned Malting Plant to buy malt from or else face the increased costs of importing malt from market overseas which will significantly increase the costs of manufacturing.

Several challenges are revealed by respondents to the research questionnaire. Craft Brewery A and Craft Brewery C in particular in their response to the relationship with raw material suppliers, pointed out that the quality received from the only supplier in South Africa is inferior at best and poses a risk to the quality of their products. While Craft Brewery A was then able to move on and negotiate prices of raw materials out of South Africa, Craft Brewery C, similarly to other breweries that responded, did not have the resources to do so. The risk forms part of the value chain which is considered in decisions related to vertical integration. Decisions that need to be made include implementing modern

processes and choosing suppliers carefully which could alleviate many of the sustainability challenges for craft breweries. The degree of supplier reliability is an important factor whether the product or process to be brought in-house is proprietary to the firm. For all the major inputs into craft brewing operations, this study finds that the suppliers of raw materials and other services are relatively guaranteed, it is however the quality from this supplier that poses a major risk to craft breweries operations. However, for small operations such as craft breweries, it is crucial for focus to be maintained where vertical integration should not be implemented as it might shift focus away from the core activities of the craft breweries.

5.2.5.Fitting craft breweries into the framework

It is evident that each of the craft breweries have applied varying levels of manufacturing strategies. The study finds that there are common focus decision areas that are inherent in the craft brewery operations.

5.2.5.1. Craft Brewery A manufacturing strategy matrix

Conceptual framework applied to identify immediate objectives for craft brewery A shows as follows:

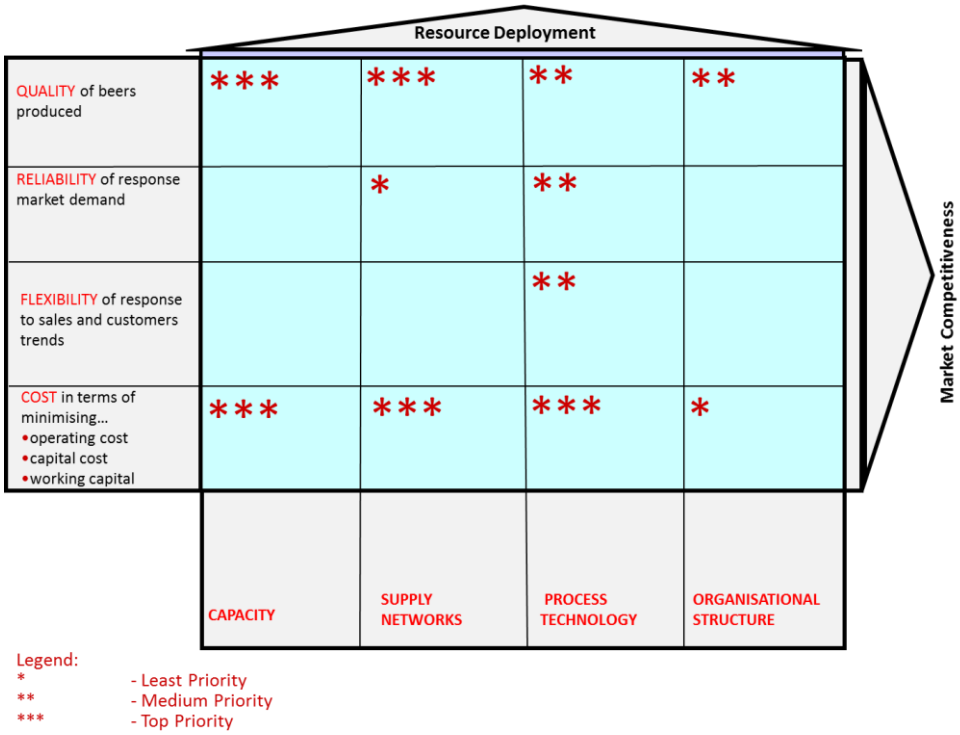

Figure 5-1 Craft Brewery A's fit to the conceptual framework

- Cost of brewing capacity – Given that this is the largest craft brewery, there has been significant investment on the capability to achieve economies of scale. The brewery has been planned for increased capability of volume for its current products and to grow further into the future. This decision to invest in a large craft brewery was made deliberately from the planning phase of the business.
- In-house quality assurance – Craft Brewery A has an onsite laboratory equipped with the relevant brewing equipment to analyse and monitor quality. This decision seeks to improve the product quality and coupled with the decision to procure good quality raw materials from outside South Africa, this shows a deliberate intervention to ensure that the quality of the beers made here is assured.
- Product quality in transit – Craft Brewery A has developed a networking relationship with a distributor from a sister company that can be managed and monitored to keep the integrity of the beer while in transit. The intension and ability to monitor quality after the products have left the brewery shows that decisions were made to assure the quality of the products until they have reached the consumer.
- Process technology deployment – Craft Brewery A employs process technology on site and up to 80% of the brewery has been fully automated. The level of automation at this brewery means that management can easily track the performance of the brewery and remove the human element by being able to produce consistent batches of products. There is also a strong connection with the ability to improve the quality of the beers and the ability to quickly change over from one brand to the next. This is perhaps the biggest investment made for this manufacturing site.

5.2.5.2. Craft Brewery B manufacturing strategy matrix

Conceptual framework applied to identify immediate objectives for craft brewery B shows as follows:

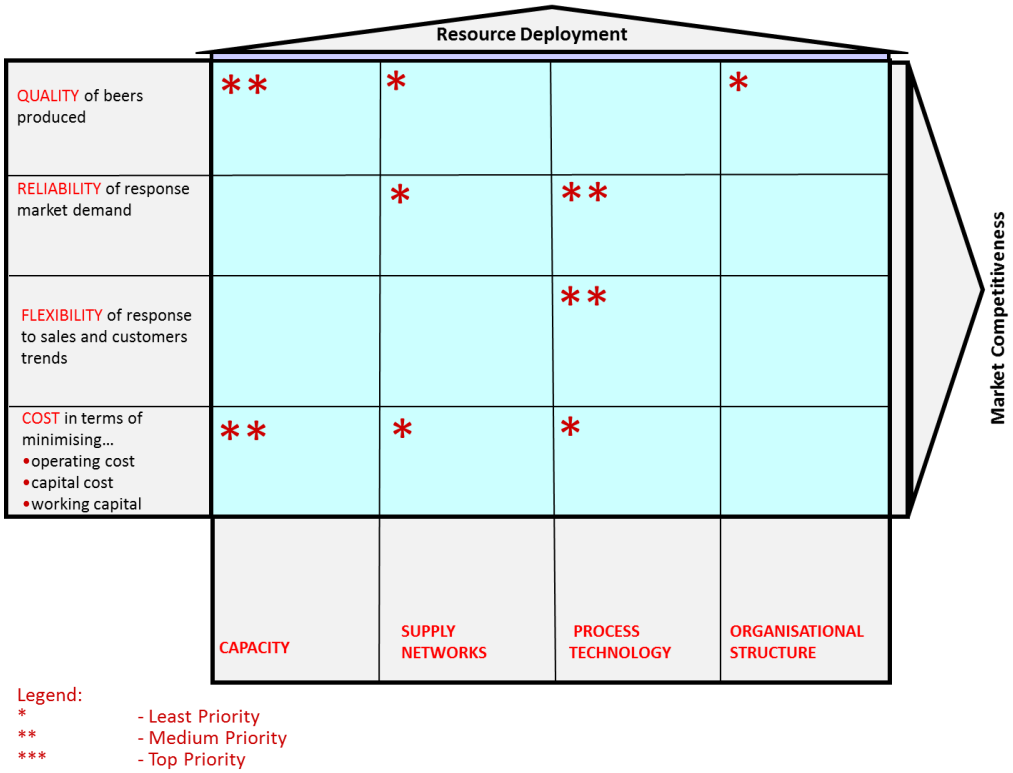

Figure 5-2 Craft Brewery B's fit to the manufacturing strategy conceptual framework

- Cost of brewing capacity – The capacity of the brewery is well over the average size of a craft brewery in South Africa of 10250 litres per month, as suggested in the literature, at a monthly output of approximately 32000 litres per month. Significant investments into acquiring the large equipment were made as part of the decisions regarding size incurring some investment costs for capacities
- In-house quality assurance – Quality of the beer is front of mind and some processes are in place to ensure the quality of the products is good. The required facilities have not been put in place such as an in house laboratory and all the quality analysing instrumentation that comes with it. Quality assurance is basic, and the organisational structure refers to the owner of the brewery as the sole personnel with a brewing qualification.
- Process technology deployment – At 50% approximate level of automation of all the tasks of the production, Craft Brewery B has invested in some process technology. At this level however, the required tracking of performance is low and the human element of introducing variability from batch to batch is inherent. Management has not been able to prioritise decisions on process technology given that resources available are deployed elsewhere. This level of automation and the decisions of where the automation is to be placed, such as the

refrigeration plant and the heating plant allows the brewery a level of reliability in the context of being able to produce products

5.2.5.3. Craft Brewery C manufacturing strategy matrix

Conceptual framework applied to identify immediate objectives for craft brewery C shows as follows:

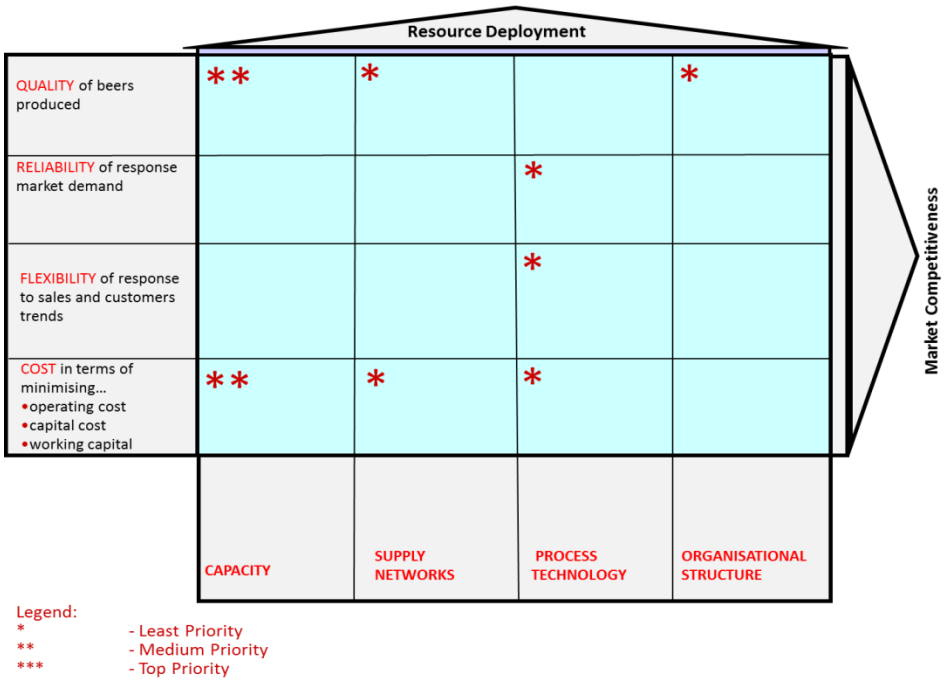

Figure 5-3 Craft Brewery C's fit to the manufacturing strategy conceptual framework

- Cost of brewing capacity – The equipment in the brewery was bought mostly second hand and thus capacities were limited to the existing size of that equipment. Decisions on plant capacities were thus largely based on the cost of procuring the equipment instead of designing fit for purpose equipment as per the market demands that were perceived.
- In-house quality assurance – The craft brewery owner is the main driver of quality with no major investment in quality monitoring process technology employed. Sensory analysis of quality is the main way of final check of batches of beer before they are shipped of site. The organisational structure from a quality perspective is that only the craft brewery owner is the qualified brewer and understands the intrinsic nature of quality for beer production. An investment into a more defined quality assurance system has not yet been made.
- Process technology deployment – A large proportion of tasks at this brewery are completed manually by operators. There has not been any deliberate intervention of automating sections

of the brewery for cost, quality and reliability of beer production. At this level, the required tracking of performance is low and the human element of introducing variability from batch to batch is inherently high.

5.2.5.4. Craft Brewery D's manufacturing strategy matrix

Conceptual framework applied to identify immediate objectives for craft brewery D shows as follows:

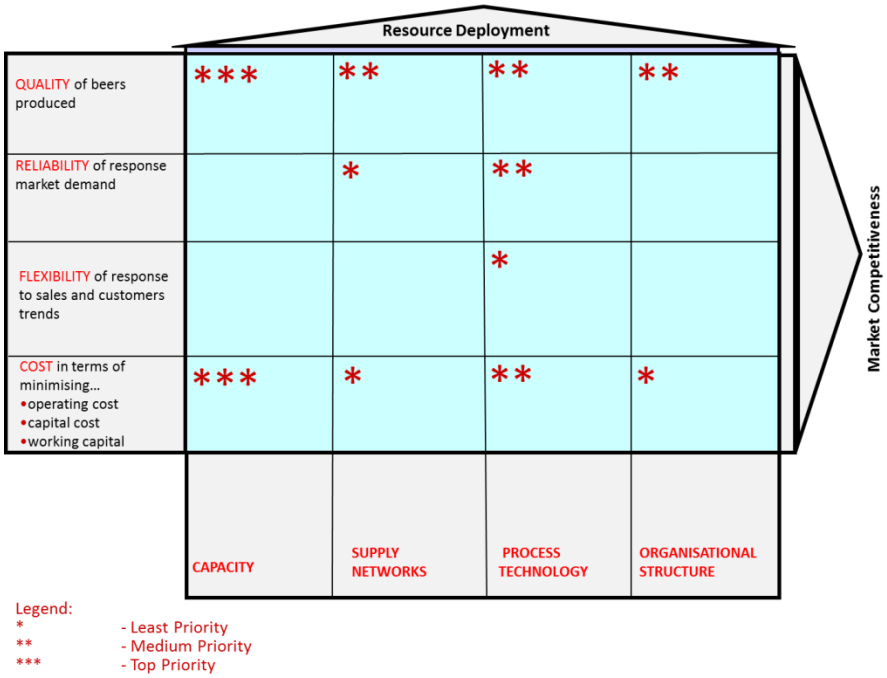

Figure 5-4 Craft Brewery D's fit to the manufacturing strategy conceptual framework

- Cost of brewing capacity – Craft Brewery D was running at 40% of design capacity of approximately 30 000 liters per month output. The investment into the size of the brewery has been made already and now the work will be to increase production based on the market demand.
- In-house quality assurance – Accreditation is a commonly used quality management method and the focus from Craft Brewery D has been to comply with outlined process. This compliance improves the quality assurance of the brewery. As previously noted in Table 4-4 of the results section, management has invested in all the requirements of complying with ISO systems for accreditation. In addition, investment in an in-house laboratory facilities ensures that capability is provided for to analyse quality at the desired frequency.

- Process technology deployment – To insure batch uniformity and integrity of product through each of the process, Craft Brewery D is equipped with several in process instrumentation to measure quality. The employment of this process technology measures and automatically keeps records of desired parameters for reporting purposes.

5.2.5.5. Craft Brewery E's manufacturing strategy matrix

Conceptual framework applied to identify immediate objectives for craft brewery E shows as follows:

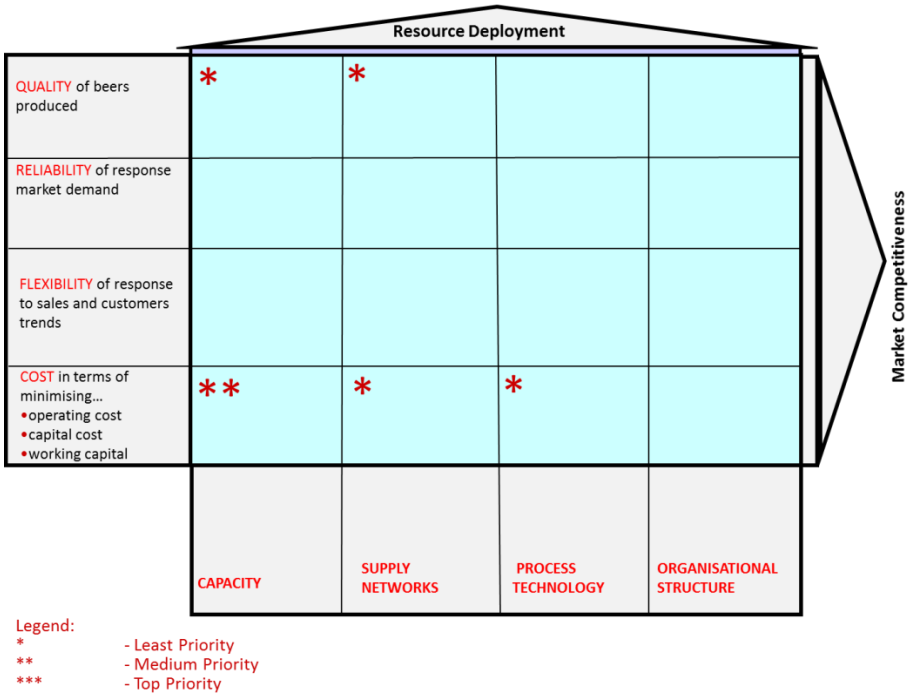

Figure 5-5 Craft Brewery E's fit to the manufacturing strategy conceptual framework

- Cost of brewing capacity – The largest investment made towards the manufacturing operations of Craft Brewery E is the capacity for production. This means that the basic facility to produce beer has been made.
- In-house quality assurance – The brewery has not invested in laboratory equipment to brewing analysis for monitoring quality. Quality decisions are largely dependent on the human element of sight and taste
- Product quality in transit – There are no systems in place to check for quality-in-transit. The products from this brewery do not have an extensive reach and therefore are not kept in transit for long.

- Process technology deployment – Production tasks are mostly completed manually by operators in the plant. There is no automation for the key tasks in relation to cost, quality and reliability of beer production. All performance monitoring and reaction to variability in the process has a human element that will invariably allow for different batches being produced at each attempt.

5.2.6. Current strategy shortfalls

Performance objectives that are directly related to cost and quality proved to be the area where most decisions were deliberately made. Most of the craft breweries studied delay investment in expensive equipment that are customary in the brewing industry at the early stages of their operations. Obtaining adequate access to capital has been proven to be one of the biggest hurdles to starting a new business and growing facilities that are already in production (Kerr & Nanda, 2009). Financial constraints is an issue for flexible solutions to all challenges, ranging from product development problems to production problems (Walters, et al, 2000). In setting up their organisation structures, the craft breweries must develop an understanding of the requirements of the operations and job designs that will focus on understanding the roles of all resources including personnel. An optimisation of all these resources can be done but must cover all the responsibilities that are to be performed by personnel in order to deliver against the manufacturing strategy. Brewing beer requires not only very specific equipment but also very specific human resource skills to understand all the inputs and outputs of the manufacturing plant.

Any organisation can gain competitive advantage if it is able to create value for its consumers. In the case of the beer industry, this superior value can be given either by offering beers that are lower in prices than that of other players in the industry including those of corporate beer makers, or by offering benefits that are so unique that consumers are willing to pay a higher price for it. It has been noted in this study that craft breweries are largely targeting the strategy of providing superior value given the high costs associated with craft beers. In pursuing this strategy, they target a small market of unique consumers that do not necessarily want to drink a “conventional” beer. In doing so, the craft brewers would necessarily need to pursue a differentiation strategy which requires a high degree of focus and ability to deliver products to meet specific market requirements. Diversification is generally understood to be the complete opposite to focusing upon one single core product in an organisation. Craft brewers need to consider moving away from a diversification-like approach where multiple products are made in a single facility and instead focus more on core brands that define their breweries and their market. This would allow the brewers the necessary tools to excel at a particular

product and move away from competing in an already crowded space where corporate giants have the economies of scale to be much more competitive. Manufacturing facilities designed to deliver the selected ability as part of the overall manufacturing strategy will then be aligned with the requirements for improved flexibility and reliability and better quality management processes.

5.3. Participation of Craft brewery personnel in manufacturing strategy formulation

The achievement of a manufacturing strategy driven organisation concerns both managerial and organisational issues at the lowest level of the organisation. The participation by all levels is a minimum requirement which must be initiated from the highest level of the organisation and cascaded down to all levels by deliberate communication. In any particular SMME manufacturing operation, the responsibility for the development and implementation of manufacturing strategy and to a larger extent the business strategy is affected by various factors. One of the largest factors that influences this is the size of the operation and the number of people employed or are running the operation (Alfaxard, 2013). The organisational structure of the craft breweries that participated in the study are such that mostly one person is in charge of the entire operation while the rest of the other personnel involved in the daily operations are there as unskilled labour or to provide assistance with the actual movement of beer and thus not involved in any decision making processes. Such highly centralised operations, as craft breweries, are likely to have only the owner-managers get involved in decisions related to technology choice, manufacturing of new products, human resource policies, quality policies and vendor selection and purchasing (Fine & Hax, 1984). This is a constraint to being able to effectively formulate a strategy and follow up with the execution of that strategy. The organisational structure of the craft brewery should therefore factor in the requirement of multi-disciplinary personnel who can assist in the strategy process. This may not require such resource to be made available from within the organisation but can be externally resourced.

5.4. Trade-offs and degree of focus

As SMMEs do not have adequate resources especially in the form of time, they require easy-to-use and simple frameworks, such as the one sourced from the literature and applied in this report, that take a minimum of time to learn and implement. While investment by craft breweries in process and equipment technologies that are relevant to the industry are expensive, the technologies have a significant role in addressing issues of reliability, reducing manufacturing costs and maintaining consistently good quality of the products. Some trade off may therefore be necessary between cost and technology required to achieve a desirable degree of focus for the craft brewery concerned. The set of decisions that defines the strategic role that direct and indirect process technology can play in the overall operations strategy of the organisation and sets out the general characteristics that help

to evaluate alternative technologies form part of the manufacturing strategy (Slack & Lewis, 2011). Hence in defining their quality management processes, the breweries need to decide the facilities required to manage this part of operations. Given that most of the consumer respondents largely believe that the quality of craft beers they have consumed is either poor or not consistent, there is a significant improvement required on this part of manufacturing. Management of these breweries need to attend to important issues related to managing for conformance quality such as quality measurement, economic justification of quality improvements, and allocation of responsibility for quality (Fine & Hax, 1984). The majority of the quality checks that are done at the craft breweries that responded are done by the operating personnel to avoid investment in technology. This trade-off by the craft breweries to keep costs low, has a major implication for quality assurance. Some level of investment is clearly required to improve the consistency of measuring and monitoring quality.

Another aspect of trade-offs craft breweries should consider is flexibility. In terms of flexibility of the craft breweries, the degree of complexity of the craft brewery's management task is influenced to a large degree by the scope or range of products and processes with which the brewery must be proficient. This means that a trade-off between production of different styles of beers and number of change overs is involved as a limited amount of products and means less requirement for change overs, and therefore is an important decision for the management. Flexibility as a manufacturing strategy construct embodies cost implications when time is lost due to change overs. All the breweries responding indicated that at least four types of different beers are produced within the same facilities. This may be considered too many especially at the infant phase of the manufacturing where competency and experience is still being developed.

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

6.1. Introduction

The overarching purpose of this study was to determine the application of manufacturing strategy principles by craft brewers to their businesses in order to remain competitive in the beverage industry. Objectives were developed to help guide the study in determining what the general sentiment of the market is in relation to craft beers and how that ultimately is connected with craft brewing organisations and the strategies they have put in place to deliver to this market. A theoretical framework on manufacturing strategy mapping from the literature was employed to map the nature of craft brewing operations so as to understand the strategic consideration in the craft brewing industry and its potential for remaining sustainably profitable. This chapter presents the conclusions and recommendations of the study.

6.2. The research learnings

6.2.1. The research question

The research question had several elements to investigate, being how beer consumers are reacting to the phenomenon of craft brewing in South Africa and what strategies have been put in place by craft brewery managers to operate their breweries sustainably through application of manufacturing strategy. These were refiported upon in the results section of the paper in chapter 4 and in the discussion of the results in chapter 5 of the report. In addition, the study was able to investigate and report on whether there has been any manufacturing strategy principles applied in the growth of the craft beer industry and its sustainability. Additional comments on findings on this matter are given under objectives of the research in the following subsection. The research question was therefore addressed.

6.2.2. Objectives of the research

6.2.2.1. Objective 1

The first objective was to establish whether craft breweries have developed any long term manufacturing strategy to apply in running their breweries. This was investigated and found that while there are some indications of manufacturing strategy constructs evident in the operating model of craft breweries, these are not necessarily deliberate actions and seem to be survival moves. Given the finding that manufacturing strategy does not seem to be purposive nor widely applied this poses a sustainability risk to the craft brewery shareholders as it has been indicated in the literature that there is a link between strategy and sustainability.

6.2.2.2. Objective 2

The second objective was to apply a conceptual manufacturing strategy framework sourced from the literature for demonstration to the craft brewing sector in adapting their positions by formulating an appropriate manufacturing strategy. This was shown in section 5.2.1 to 5.2.6 of the report whereby weaknesses around quality, cost of craft beer, flexibility and capacities of the breweries are discussed and suggestions for improvements proposed. This allows the craft brewers to understand the requirements for sustained competition.

6.3. Limitation of the research

The research has some limitation. One such limitation was the relatively small sample of the craft brewers that were able to participate (only 5 out of more than 150, see Figure 2-3). As a result, the demographics of the participating breweries was limited to Gauteng province only. The main reason for the lack of participation by breweries from other regions was largely time constraints and the inability to communicate with the relevant personnel at those breweries. This is largely because the sampling was done exclusively through networking, and was a rather time consuming task. Thus, a larger number of participants could not be incorporated into the study as the researcher would have liked in the given the limited time. For future research purposes, it is recommended that a larger sample and more representative sample be used.

Another limitation of this study which is in relation to the sample, is the relatively few years in operations and thus experience in the craft brewing industry participants. As previously shown, the average number of years in operation of the craft breweries sampled was about 2.1 years, making the sample a relatively inexperienced one. Participation from craft brewers with more years of operation could not be obtained due to reasons previously explained. The results presented by this study may therefore be a representation of the factors that affect breweries with few years of operation from a manufacturing strategy perspective. Given that strategy development is a process which requires various consideration and thus takes time, an average of under three years in operation is not sufficient for most organisations to have completely implementing and testing their strategies.

For future studies, it is suggested that a variety of craft breweries with varying degrees of experience or years of operation be included to help understand the role this crucial factor plays in manufacturing strategy of craft breweries and indeed other SMMEs.

Further, it has emerged during the study of the literature that there is a limited amount of academic research that has been completed in manufacturing strategy of craft breweries. There is therefore no previous work regarding craft breweries that this study can be compared against. While this posed a

challenge for this research, it also presents an opportunity for further research and hopefully the present study will be useful as a baseline for future research in the area.

6.4. Recommendations to the craft beer industry

The literature is limited on the application and suitability of manufacturing strategy frameworks particularly for the SMMEs such as craft breweries. The majority of the craft brewery founders or managers, especially those without prior business or brewing specific industrial experience were uncertain of the challenges that were to be faced by operating a craft brewery. As such, there appears no planning in advance of operating this type of business and as such the management teams often are forced to make unplanned decisions. This is an outcome of the owner-managers and managers not being equipped with knowledge of manufacturing strategies and strategic tools. The recommendation here therefore is for sourcing of simple frameworks such as the one used in this study that may be used to develop manufacturing strategy constructs that can be applied both at management level and by all levels of the organisation. These frameworks that are available from the literature are not required to be comprehensive given that less comprehensive frameworks will give the craft breweries the ability to deal with issues that are directly related to their organisation specific issues.

6.5. Final Conclusion

This study has provided an insight on how the craft brewers in South Africa have approached manufacturing strategy and all the other factors that influence the development and implementation of such a strategy. There are various craft brewery attributes that seem to affect whether some or most of the decisions that are made in relation to cost, quality, reliability and flexibility are adequately dealt with in the operation of a craft brewery. Out of the demographic variables that were included in the study, size of the plant had stronger relation with all the decisions that are manufacturing strategy related.

In conclusion, the craft breweries management must understand that a manufacturing strategy must be comprehensive in the sense that it should not only guide long terms decisions that must be made for sustainability but must also provide guidelines for business managers to address the many facets of manufacturing decision making given the constantly changing environment of the brewing industry.

Given that craft breweries are in essence SMMEs identified by the government as crucial for the development of the economy, this study will provide guidance to prospective craft brewers and those that are already established in the craft brewing industry by providing some principles on what elements of strategy should be in hand during this phase of market growth.

6.6. Suggestions for further research

The manufacturing strategy has been shown to be a function of a plethora of interrelationships amongst the various departments of the organisation and support functions, the external stakeholders such as competitors and available markets. As such, the development of a manufacturing strategy, particularly for smaller manufacturing SMEs like the craft brewers must be designed with a view beyond the borders of the organisation. This study in particular did not look at the relationship between overall craft brewery business strategy and the direct link or influence that it has on manufacturing strategy. This may also be true for the SMMEs in general within the South African context. There is an opportunity to look at the complete scale of all strategies that are developed within the broader SMMEs and how these influence the sustainability of those businesses.

This research also briefly touched upon many aspects of possible influential factors especially those that are external to the business on manufacturing strategy. For instance, different beers are categorised into different excise tax brackets and therefore have higher costs and reduced margins. This was not the subject of this research but given that it looks at the cost aspect of the manufacturing strategy, it plays an important role on the sustainability of these businesses.

Given that this research was limited in time and geographical reach, it was not possible to go deeply into the demographic, craft brewery related or management personality-related aspects of influencing the existence of manufacturing strategy and its successes and therefore only limited to defining whether or not there is such strategies or aspects of manufacturing strategy in place. As such, for future research purposes, the researcher would suggest that each of these aspects be studied separately to get better definition and more clarity. In doing so, each aspect studied separately would generate an understanding of the direct influence on manufacturing strategy

Also, as briefly mentioned in the limitations section, it is suggested that a similar research where the sample size of craft breweries or SMMEs is considerably increased such that generalisation could be made for the South African context.

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Appendices

7.1. Appendix A – School Ethics Clearance Letter

FORM B

School Ethics Clearance No: _____ (office use only)

All submissions and materials must be typed. Handwritten submissions are NOT acceptable.

Surname: Ramorula					Name: Gaolebalwe						
Title:		Prof		Dr	x	Mr		Ms		Mrs		Other:
School: Mechanical, Industrial & aeronautical Engineering											
Staff/Student number: 0401744R			Full time		x	Part time			Staff		
Your telephone(s): 0760102322											
Your Email: Gaolebalwe.Ramorula@za.SABMiller.com											
Name of Supervisor (if applicable): Dr. Bruno Emwanu											
Supervisor's email address: Bruno.Emwanu@wits.ac.za											
Supervisor's tel. number(s): 0117177343											

1. Specifics about the research project (attach project proposal as an appendix)

Title of research project

Application of manufacturing strategy principles in adapting craft brewers for sustainable growth in the South African beer industry

Registered degree		**Undergrad**	x	**Masters (research report)**		**Investigational Project**		**Other, specify** _____

Where will the research be carried out?

Primarily in the Gauteng area. Some respondents from Cape Town and Durban will also be reached.

What are the aims and objectives of the research? (Please list; be brief)

3. To determine from publicly available information the growth of craft beer market share in South Africa in relation to commercial beers.
4. To establish whether craft brewers have developed any long term strategy to make a sustainable effort of growing market share in the beer and beverage sector.
5. To construct a framework for guiding the craft brewing sector in adapting their positions through formulating an appropriate manufacturing strategy that will ensure they remain competitive and are able to grow sustainably in the long term.

2. How will data on human research participants be collected (instruments, methods, procedures)? (Attach instruments as an appendix)

Two approaches will be used.

1. There will be a general survey carried out by using a structured questionnaire as the instrument and applied by approaching people at public places of alcohol sale and consumption, approached face to face and asking them questions set out in the questionnaire. Their general views and knowledge on craft beer and related will be sought

2. Another will be interviews with a few owners of craft breweries

3. Who will the research participants be?

There are two types of participants for this research.

The first is the consumers of beers in South Africa. The population itself comprises South African alcohol consumers over the age of 18 both male and female. A minimum of 400 participants will be approached physically at drinking places and made part of the study across all age range.

The second is the craft breweries owners or managers. The breweries can be of any size and must be in South Africa. There will be 5 breweries that are selected to participate.

Does this research expose either the participant or the researcher to any potential risks or harm that they would not otherwise be exposed to?		Yes	x	No

If 'yes', explain:

4. How will informed consent be obtained? (Attach Participant Information Sheets and Consent Forms for each sample group, and/or other related materials)

How will potential participants be identified / selected / recruited?

Participants for the survey will be selected by virtue of being at a specific place at a specific time where the surveyor will be. The surveyor will during the course of data collection be placed at different premises of alcohol sale and consumption areas where the target population is most likely to come. These consumers will be informally approached for participation.

What will participants be told about the research (including the promises to be made)?

As part of a Master's degree in Industrial Engineering at the University of the Witwatersrand, the research project is being conducted in the field of beer manufacturing to understand trends that are occurring.

It provides an opportunity to provide information that you have either experienced, seen or heard.

How will informed consent be obtained?

x	Formal (Signed form)	x	Informal (e.g. verbal)		Other

Briefly explain your strategy for ensuring informed consent

For the craft brewery owners, they will be given a consent form to read and formally sign as a consent.

For individual participants out at public places they will be informally told what the research is about and given a choice of participation or abstaining.

5. Protecting participant identities

Can **confidentiality** be guaranteed?	x	Yes		No
Can **anonymity** be guaranteed in resulting reports, theses and/or publications?	x	Yes		No

Explain how this will be done? (What will participants be told in this regard?)

Participants need not supply their confidential details such as names, residential address or even contact numbers.

Participants may at any time during the questionnaire refrain from answering any question that they feel will jeopardise their confidentiality.

6. Formal permission (Attach letter requesting permission and letter granting permission)

Has appropriate formal permission been obtained, if required (e.g. employer, government department, land owner, etc.)?

	Yes (attached)	x	Not required		Pending (must be supplied before permission is granted)

7. Protection of data during and after the research

How will the data be protected while the research is in progress? (This includes how the identities of participants will be protected).

Identities of the participants is not required and will not be asked for. The questionnaire will remain completely anonymous

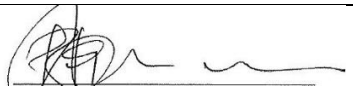
What is to be done with the research data after completion of the project?

Research data may be destroyed.

SIGNATURES (REQUIRED)

In signing this form, the researcher and supervisor (if any) of this project undertake to ensure that any amendments to this project that are required by the School Research Ethics Committee are made before the project commences.

Declaration: We, the signatories, declare that all information on this form is correct , that we will strive to maintain the highest ethical standards in this research at all times, according to disciplinary and university expectations, recognising that ethical practice in research is always a continuing process.

	Date	Name	Signature
Applicant	March 2017	Gaolebalwe Ramorula	
Supervisor		Dr. Bruno Emwanu	

SCHOOL ETHICS COMMITTEE APPROVAL (OFFICE USE ONLY)

	Date	Name	Signature
Member 1			
Member 2			

7.2. Appendix B: Consumer Survey



Questionnaire

South African beer industry trends

As part of a Master's degree in Industrial Engineering at the University of the Witwatersrand, the research project is being conducted in the field of beer manufacturing to understand trends that are occurring.

It provides an opportunity to provide information that you have either experienced, seen or heard.

All information will be treated as confidential.

A – Demographic information

Please mark an X if you see a box like this ☐ on any of the questions you see but if there is no box please add your own opinion

1. What is your gender?

☐Female

☐Male

2. What is your ethnicity?

☐African

☐Asian

☐Caucasian

☐Coloured

☐Other (Please specify)

☐_____

3. Where do you live?

☐_____

4. What is your age group?

☐ 18 - 25

☐ 25 - 35

☐ 35 - 50

☐50 – 65

☐Over 65

5. What is your occupation status?

☐ Student

☐ Self employed

☐ Employed

☐Retired

☐Unable to work/Unemployed

6. Which of the following places are you most likely to consume alcoholic beverages?

☐Craft Brewery

☐Pub

☐Restaurant

☐Event (Sports, Carnivals, Concerts, Braai)

☐At home

☐At a tavern/shebeen

7. Where is your main area of purchase when it comes to beers?

☐Grocery/Liqour Stores

☐Kiosk

☐Restaurant

☐Bars

☐ Other (Please specify below)

B – Definitions and background

It is critical for organizations to understand how to effectively supply craft beers to the consumers and increase their competitive advantage. The research study has a dual aim. The first is to determine the trend of craft beers and commercial lager beers and the second is to identify the effectiveness of certain mechanisms to reach out to the market.

1. **How often do you consume alcoholic beverages?**

☐ Less than once a week

☐ Once or twice a week

☐ 3 – 4 times a week

☐ More than 4 times a week

☐ Other (Please specify below)

_____

2. **What type of alcoholic beverages do you prefer?**

☐ Beers

☐ Spirits

☐ Wines

☐ Flavoured beers (Flying Fish, Castle Lite Lime, Strongbow, etc)

☐ Craft beers (Jack Black, Craft Brewery B, Brewhogs, etc)

☐ Other (Please specify below)

_____

3. **Which particular group of beers do you drink more of?**

☐ Mainstream beers (Castle Lager, Hansa, Carling Black Label, etc)

☐ Premium beers (Castle Lite, Windhoek, Amstel, etc)

☐ International Premium beers (Heineken, Peroni, Miller, etc)

☐ Flavoured beers (Flying Fish, Castle Lite Lime, Strongbow, etc)

☐ Craft beers (Jack Black, Craft Brewery B, Brewhogs, etc)

☐ Other (Please specify below)

_____

4. Assuming that you are able to get any type of drink you want all the time, which type of drink would you prefer?

☐ Mainstream beers (Castle Lager, Hansa, Carling Black Label, etc)

☐ Premium beers (Castle Lite, Windhoek, Amstel, etc)

☐ International Premium beers (Heineken, Peroni, Miller, etc)

☐ Flavoured beers (Flying Fish, Castle Lite Lime, Strongbow, etc)

☐ Craft beers (Jack Black, Craft Brewery B, Brewhogs, etc)

☐ Other (Please specify below)

_____

5. Would you consider yourself loyal to any specific beer brand?

☐ Yes, one or two specific beer brands

☐ Yes, I tend to stick to what I like

☐ Yes, there are loads of brands that I like

☐ Not really, I buy different beers each time that I drink

☐ No, I buy based on other variables that are not brand specific.

☐ Other (Please specify below)

6. When you are in the process of buying beer, which of these come to mind?

☐ I will try out a new brand if the one I like is not available.

☐ I will buy only the brand that I like, I rarely switch brands

☐ If there is a cheaper alternative brand, I will buy that brand

☐ If I have been disappointed by the quality of the brand before, I will look for another

☐ If I see a new brand altogether, I am willing to buy it to just try it.

7. **Describe in detail the quality of craft beers versus that of mainstream beers that you have drank.**

8. **What is your opinion on the price per unit of craft beers when compared to other type of beers?**

9. **Describe your experience of accessing craft beers in comparison with other type of beers that you consume.**

10. **Craft beers are brewed by differing styles ranging from IPAs, Wheat beers, Porters, Belgian styles, Specialty beers, etc… Which styles do you usually drink?**

D – General comments

Thank you for taking the time to complete this survey, if you have anything you would like to add with regards to craft beers please feel free to add a few comments below.

Thank you again for taking the time you took to take part in this study.

7.3. Appendix C – Craft Breweries' Owners Survey & Responses

Questionnaire

South African beer industry trends

As part of a Master's degree in Industrial Engineering at the University of the Witwatersrand, the research project is being conducted in the field of beer manufacturing to understand trends that are occurring.

It provides an opportunity to provide information that you have either experienced, seen or heard.

All information will be treated as confidential.

A – Demographic information

Please mark an X if you see a box like this ☐ on any of the questions you see but if there is no box please add your own opinion

✎ What is the design capacity of the craft brewery that you are operating?

Craft Brewery A Response:

Ans: 1250000l/month

Would need to expand the cellars to get to this number and this has been space planned for already.

Craft Brewery B Response:

Ans: 24000l/month

Craft Brewery C Response:

Ans: 42000l per month

Craft Brewery D Response:

Ans: 30000l/month

Craft Brewery E Response:

Ans: 9600l/month

_____
___

✐ What is the current operating volume of the brewery?

Craft Brewery A Response:

Ans: 250000l/month

Craft Brewery B Response:

Ans: 30000l/month

Craft Brewery C Response:

Ans: 42000l per month

Craft Brewery D Response:

Ans: 30000l/month

Craft Brewery E Response:

Ans: 9600l/month

✐ How long has the brewery being operational?

Craft Brewery A Response:

Ans: Less than 1 year

(It has been in the planning since Sep 2012)

Craft Brewery B Response:

Ans: 3 yrs

Craft Brewery C Response:

Ans: 3 years

Craft Brewery D Response:

Ans: 6 months

Craft Brewery E Response:

Ans: 1 yrs operational but 3 yrs since commissioning started

_____

✎ How long have you been in your current role? And in this company?

Craft Brewery A Response:

Ans: Since inception of the plan

Craft Brewery B Response:

Ans: 3 years

Craft Brewery C Response:

Ans: 3.5 years

Craft Brewery D Response:

Ans: planning since 2014

Craft Brewery E Response:

Ans: 1 yrs operational but 3 yrs since commissioning started

✎What is the location of the brewery?

Craft Brewery A Response:

☒Industrial

☐Residential - Urban

☐Residential - Metro

☐Residential - Rural

☐Other (Please specify)

☐_____

Craft Brewery B Response:

☐Industrial

☒Residential - Urban

☐Residential - Metro

☐Residential - Rural

☐Other (Please specify)

☐_____

Craft Brewery C Response:

☐Industrial

☒Residential - Urban

☐Residential - Metro

☐Residential - Rural

☐Other (Please specify)

☐_____

Craft Brewery D Response:

☐Industrial

☒Residential - Urban

☐Residential - Metro

☐Residential - Rural

☐Other (Please specify)

☐_____

Craft Brewery E Response:

☒Industrial

☐Residential - Urban

☐Residential - Metro

☐Residential - Rural

☐Other (Please specify)

☐_____

B – Definitions and background

It is critical for organizations to understand how to effectively supply craft beers to the consumers and increase their competitive advantage. The research study has a dual aim. The first is to determine the trend of craft beers and commercial lager beers and the second is to identify the effectiveness of certain mechanisms to reach out to the market.

Describe in detail the facilities that have been put in place for this craft brewery and rationale of for each facility.

Craft Brewery A Response:

Strategy behind the brewery
The 1st decision was that we were going to contract brewing focused.
Beer market is mostly inland according to stats. There were no major Gauteng craft beers at the time.
Distribution not easy from coast to inland Gauteng.
Crate a facility for coastal guys to be able to brew and access the inland market.
The demand for contract brewing grew during the planning phase and the size of the plant grew as well. Went from 5 to 30 to 50 to 150hl brew-house.

The investment in technology was required to guarantee customers with already brand reputation to take into account.

Original location was actually in the CBD of Jhb in Newtown in keeping with the heritage. The building was not suitable for the brewery.

We then opted for an industrial area for building purposes and licensing issues.

Total cost of beer includes distribution and that was a major consideration. Access to main roads for logistics for suppliers and for trucks.

Craft Brewery B Response:

2000l BH
6 Fermenters
2000l/h filter
1 BBT
Keg line (50l & 30l)
Pasteurizer
Sterile filter
1 ton boiler
Bottling unit
Wanted to be in the township (the target market was for the specific location), needed the right space, close to the main road for deliveries, good connection to water & waste.
Close proximity to tourism attractions.

Craft Brewery C Response:

The brewery was bought intact, 2nd hand. Refurbishments were necessary to enable brewing. Most of the plant was bought from SAB Ltd from their old Garankuwa operation.
The size was pre-determined but the actually wanted something smaller.
The location was chosen because it's central Gauteng and therefore easily accessible to the market and suppliers.

Craft Brewery D Response:

Accessibility to the people in general was the major consideration
In terms of size it is based on the market demand during the analysis phase when we were planning. We wanted a brewery that could also be modernized and would still reflect the craft nature of the business without necessarily fully automating.

Craft Brewery E Response:

Equipment size was driven largely by affordability.
Location also driven largely by affordability. Rate per sq meter is lower in this area.
Not far from home because I have to run the place myself and the business was always going to be a family run affair that was more a passion that a pure business.

How has the capacity of this operation been determined?

Craft Brewery A Response:

As per above.

Craft Brewery B Response:

Size was decided by the size of the space that was available. We decided to locate the brewery in this area as it satisfied most of our requirements but it also came with an existing building.
Space was the big driver. Chose the fermenter size based on space available.
1st 3 yrs we are under brand building, so capacity is sufficient for the market. People were recruited on a need basis.

Craft Brewery C Response:

Predetermined based on the equipment that we opted to buy second hand
In an 8hr period can only do 1 brew.
7 permanent people all working day shift. If require, this could be extended to shift pattern to run at night.
Currently sales don't require this.

Craft Brewery D Response:

We studied the market that we were aiming for and combined with the budget we had available plus our expectations of the future we opted for this size.
We are still very much in early days but we are growing.
We settled for a somewhat a bigger facility than what market requires at the end.

Craft Brewery E Response:

The place is currently under expansion due to market demand being so high. So we started small to build brand reputation and now that is in place and we are looking to reach out further.
The place is running at capacity at the moment.

The staff only works day shift and sometimes I come in at night under exceptional circumstances to do work.

Have you considered vertical integration in terms of raw materials, distribution, packaging, etc?

Craft Brewery A Response:

Sales & Distribution partner was always part of the plan from the onset. This is because most of the money that is made in beer is driven by how well we can execute this part of the business. We never intended to own. (Cost structure)
We developed a lot of contacts to ensure that relationship are strong with suppliers.
Negotiations are key in developing & maintain all these relationship.
This way we benefit from working with SMEs and not lose focus.
It's also important to understand the power of treating others not as competition but as corporates.

Craft Brewery B Response:

On the raw material side there's very little that we can do because the product is specilised and the raw mats are also specialized as well and not readily available. We have not thought about integration.
Soweto gold outlets are something we thought about. This has been pitched and waiting for approval.
We tried to distribute ourselves, but at a certain volume then it becomes impossible to manage and takes focus away from managing the brewery itself.
We decided to consolidate the distribution.
Only one distributer.
Manufacturing & distributing licence
Selling licence for the beer garden.

Craft Brewery C Response:

Major raw materials are from SAB Ltd, some are imported. Practical impossible to integrate.
Packaging materials are from console, coleus. Practical impossible to integrate.
No integration considered currently.

Approximately 30% of the beer made here is sold at Hogshead restaurant (A sister company) They also sell the full range of products made here.
50% of the beer made is for contract brewing (other people's beers that they sell themselves).
On premise selling is not retail (only a manufacturing license)

Craft Brewery D Response:

No contract brewing was a specific choice. We decided that this constitutes building other people's strength in brands who will later compete with us.
On a small scale it's not best for one to do their own distribution or do integration.
We sell our beers in JHB and Durban. So we have a contract in place with a distributor for this.
We have our own restaurant and a beer garden on site with a license to sell. 30% of the beer from our brewery is consumed here.

Craft Brewery E Response:

Not thought of at these very small quantities.
Labels were designed externally as well but we had originally tried to do them internally.
Raw materials are from SAB who hold the monopoly on these.

What is the state of technology or process technology employed at your plant?

Craft Brewery A Response:

The plant is mostly automated approximately (80% automation)
Automation was deliberate to ensure quality and consistent. The fundamental weakness of the industry is inconsistent and that kills brands.
Taking the human element out of critical areas that determine quality of the beer. Also reduce the cost in terms of waste management.
We still have human interacting.

Craft Brewery B Response:

The plant is mostly automated approximately (80% automation)
Automation was deliberate to ensure quality and consistent. The fundamental weakness of the industry is inconsistent and that kills brands.
Taking the human element out of critical areas that determine quality of the beer. Also reduce the cost in terms of waste management.
We still have human interacting.

Craft Brewery C Response:

Basic plant with minimum automation.
Majority of the activities for brewing are manual.
For the volume we are doing and size of the plant it is not worth the investment.

Craft Brewery D Response:

Semi-automated brewery.
The capital required to automate is intense and the cost-benefit analyze.
The things that are automated are critical to the production. Also try and achieve some consistency within the operation.

Craft Brewery E Response:

Financially didn't make sense to automate.
Also maintenance of it.
In keeping with the name of craft beer it didn't make sense to automate as it would take the tradition away.

What is the range of the products in terms of number and SKUs (stock keeping units)?

Craft Brewery A Response:

50% contract brewing & 50% own brands (14 SKUs). All different bottles.
Excel based scheduling to ensure that changes do not affect production plans.
Complexity is mostly in the packaging area.
Understanding the bottlenecks. Design of the plant allows for quick changeover. This is monitored well.
The automation also helps.
We don't do contract brewing.
It is not easy to manage other people's brands on top of my own. Also takes focus away from the main objectives.

Craft Brewery B Response:

Lager
Apple ale
Cherry ale
Ginger ale
Specialty 1976
Orlando stout in winter.
We don't do contract brewing. It is not easy to manage other people's brands on top of my own. Also takes focus away from the main objectives.

Craft Brewery C Response:

12 different brands. They are all batch based so no changes to the plant equipment or processes when switching between brands.
Labels must be changed at packaging and this is done manually by the operator. This can be done well in advance given the time that is available between bottling different SKUs.
About 95% of beer made here is kegged and only 5% is bottled. The kegs do not require any labelling.

Craft Brewery D Response:

4 brands (all of them in one bottle size). Every time one changes it requires an intensive clean.
2 more variants in the making.
At the moment the degree of complexity is very manageable

Craft Brewery E Response:

6 varieties some bigger than others.
2 of the 6 are very popular (Irish & Stout are these)
I would have stopped at 4 because it is a complex change over managing all these varieties. Scheduling becomes important.

We have introduced contract brewing. This adds to the complexity of change overs.

How many people are employed at your plant and what is their general skill level?

Craft Brewery A Response:

16 ppl…
2 skilled
Average factory worker here is very skilled
Some ppl were very disciplined in their areas.
Good support from our suppliers as per agreed SLAs.

Craft Brewery B Response:

10 ppl on a permanent basis to operate the plant including myself
Director of operations
Head brewer & assistat
Head packer
We worlk with very flexible ppl

Craft Brewery C Response:

7 people run this operations from management to operators and cleaners.
1 advance level experience in brewing
1 in training (B.Sc microbiology) Completing diploma in brewing
Ben has done hands on training for 3 years (Can brew)
The rest are different development stages.

Craft Brewery D Response:

10 ppl.
2 training brewers
General workers.
1 worker with 28 yrs brewing experiences.

Craft Brewery E Response:

4 permanent staff running the operations. We do bring casuals in at times to assist with certain activities.

How is quality of product assured?

Craft Brewery A Response:

We have a contractor who comes in 2 hrs a day (does maintainance as well).
We have a laboratory on site and we test a range of things with very sophisticated equipment.

Paper based system to track issue and corrective actions procedure and recorded.
Health and safety audits are done.
14001 is the goal.
We don't accept any material without a COA.
Traceability is crucial

Craft Brewery B Response:

Instrumentation to allow us to understand the profile of the products.
We have tasters that also know the brands well
We do in trade tasting of our beers.
Most of the quality checks are done by humans to avoid over investment in technology. We take samples to external labs if we want to check specific issues.

Craft Brewery C Response:

A mini lab inside to check for quality
2 x advance tasters in the team.
In house tasting of process (various quality gates within the process to catch defect early)
Outlets visits (checking for expired beer, tasting in trade beer, and extrinsic quality of the bottles).

Craft Brewery D Response:

We've got an in house LAB and we analyze most of the variables to ensure a consistency.
A sensory tasting sessions.

Craft Brewery E Response:

Tasting is one of the fundamental.
No lab equipment. It is subjective on the set recipe and depends a lot on being strict with the recipe and/or manual of the beers.
Sometimes we do in-trade tasting.
Mostly human.

Describe the organizational structure of the brewery?

Craft Brewery A Response:

As discussed above.
We are trying to run this as a business in brewing very professionally.
Business partners and employees all understand the mandate of growing the partnership for mutual benefit.

Craft Brewery B Response:

A culture of fun, and responsibility.
Craft beer has a very limited shelf life so our people must know this and drive absolute cleanliness.

Craft Brewery C Response:

Co-owner/GM/Brewmaster/Operator
Brewing Manager (day to day running of the plant)/Brewer/Operator
Ben (The team leader, coordinates the rest of the team)/Maintenance (mechanical, electrical)/Operator
Driver (collects RMs, takes to different outlets)/Operator
Cleaner/Admin
General operations

Craft Brewery D Response:

In general young and energetic and daring and bold.
For these young guys it's a sense of belief to wanna succeed.
Ppl are dynamic and must be able to run every bit of the plant.

Craft Brewery E Response:

The brewery does not have a lot of people and mostly have my family working and helping around.
Therefore more family orientated.
Our passion resonates with this place.

Describe the relationship with your vendors and suppliers

Craft Brewery A Response:

We have an excellent relationship with most of them.
We are able to engage on issues that arise and resolve them.
Other instances where issues remain unresolved we look for alternative. SAB as example have for a long time not resolved issues on malt quality and we have thus divested from that relationship.

In general all good.

Craft Brewery B Response:

On the suppliers are tricky initially while trying to build the relationship.
Volume predictions are not easy, so getting materials at the right amount is tough and thus it takes time to reach a mutual understand.
Vendors that are supplied directly and we make time to meet with them to build the relationship.
The distributor relationship was also tough with its own issues. We also frequent meetings to discuss business.
Price becomes the king on having multiple suppliers.
We also have municipality with Jhb municipality for water & effluent. We have quarterly audits with them.

Craft Brewery C Response:

Healthy relationship (terms and conditions are clear and understood)
Quality wise we get what we asked for and corrections are made when there are deviations.
There are items where there are multiple suppliers but.
The industry is developing into different suppliers that can supply and because the industry is small everyone knows about it.

Craft Brewery D Response:

Relationship with suppliers is great. The biggest in SAB we have a good relationship.
Majority of raw mats are important.
Didn't want to be dependent on the competition.
Multiple suppliers to ensure that we always have the raw materials.
Relationship with government/municipality is on a formal level.
On distribution we have a contract.
The sales team speak frequently with the distributors. Open channel of comms.
No SLAs.

Craft Brewery E Response:

Suppliers side the relationship is good. We do have personal contacts and it helps to understand each other's requirements. They also get to understand what my beers require.

Vendors are a constantly changing environment that is based on demand. We need each other to make successful businesses.
Also keep in touch with their waiters because they are market facing people.
We try to not make it a transaction.

C – General comments

Thank you for taking the time to complete this survey, if you have anything you would like to add with regards to craft beers please feel free to add a few comments below.

Craft Brewery A Response:

I believe in this industry. We strive to be better deliberately.
Pricing is the biggest issue facing the industry and this will have to change.
Consumers will not buy beers at a super-premium with poor quality. So quality has to be assured at all costs.
We will in the future see professionalization of the industry and moving away from the "dream" to more of a business nature.

Craft Brewery B Response:

After a period of time when brands gain popularity, we might have to increase capacity.
These decisions are tough and usually require investors to be approached.
We have to discuss options like outsourced production and do contract brewing.

This industry requires a lot of collaboration to be sustainable.

Craft Brewery C Response:

The industry is growing and getting to a point where quality control will set apart the real brewers.
The consumers are also being more aware and require strict control of beer quality.

Craft Brewery D Response:

The industry is exciting. It has a lot of unique ppl and beers have their own characteristics.
I think it is not well regulated from a health point of view.
Ppl are not auditing what's in the beer and this can be very dangerous.

We want to get ISO certified to ensure compliance to a lot of SHE issues.

Craft Brewery E Response:

The sector of craft beers is still young and very inconsistent.
There's not a lot of information freely available to run these places.
Trying to run this like a normal business is tough

Each brewery is unique in its own way. It very much is a personal approach.

Consumer is starting to wise up and starting to understand the beers better.

Thank you again for taking the time you took to take part in this study.