Master Thesis Part II

Value creation through biotech innovation in the Sub-Saharan Africa beer market

An illustrative case of Novozymes

Copenhagen Business School

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1. Summary

With increasing customer awareness and demand for high performance and sustainable products, firms in different industries will have to seek novel ways to create value on the markets they serve. Novozymes, the world leader in producing industrial enzymes, delivers and applies innovation to create value for customers by improving performance and reducing costs, and to drive the world toward sustainability by making better use of natural resources.

Novozymes continuously looks for business opportunities to get more value out of its current portfolio of products for both customers and its shareholders, and sees a great potential in emerging markets across all its industries. However, emerging markets display different characteristics compared to the developed markets. Serving these markets requires a deep understanding of each market, including local customer needs, preferences and habits, political systems, and manufacturing value chains, then converting this into solutions that will create the most value to individual customers.

Food & Beverages is Novozymes' one of the most important industries in emerging markets. Considering high levels of traditional home-brewed alcoholic drinks and powdered beer consumption in Africa, this market represents a business opportunity for Novozymes. This thesis report analyses the powdered beer and traditional home-brewed beer market in the Sub-Saharan Africa (SSA), and assesses the viability of penetrating into this currently untapped market.

While in the short term there appears to be the potential to have a market for enzymes for powdered beer, long term market trends show that this market is likely to decrease until it is a niche potentially as quickly as the next decade in most SSA countries. For a company of Novozymes size it is not likely to be a good use of resources if that are only starting now.

2. Introduction

This section provides the motivational background as well as the structure of the thesis. Initially, the problem statement, the research objectives, and the purpose of the thesis are presented. This is followed by a brief presentation and illustration of the study process. The section is concluded by a presentation of the organization of the thesis report.

Throughout the current thesis report, the terms ‘organization’, ‘company’ and ‘firm’ have been used interchangeably, and the terms ‘customer’ and ‘consumer’ have been used interchangeably.

2.1. Problem definition

Is there a commercially viable way to create customer value by improving the processing of African crops (e.g. corn, sorghum or cassava) with the use of commercial enzymes for the production of home-brew powdered-beer? If so, what kind of value creation strategy or strategies can be implemented to ensure that Novozymes is able to secure a significant market share in the powdered beer market?

2.2. The expected outcome of the thesis project

As one of the world leaders in industrial enzyme products, Novozymes continuously looks for business opportunities to get more value out of its current portfolio of products, both for its current and potential customers, and its shareholders. The outcome of this thesis project is expected to help the company assess the viability of penetrating a currently untapped market. Additionally, if it is found that the market is attractive but cannot be satisfied by Novozymes' current products, it can help guide the company in its R&D decision-making process for the development of future products.

2.3. Study process

How the study processes was designed and conducted is illustrated in Figure 1. It also aims to provide the reader an overview of the progression of the thesis project. Considering the limited time frame for both the thesis project and the internship at the host company, having an overview of the study proved useful in seeing what needed to be done in a timely fashion.

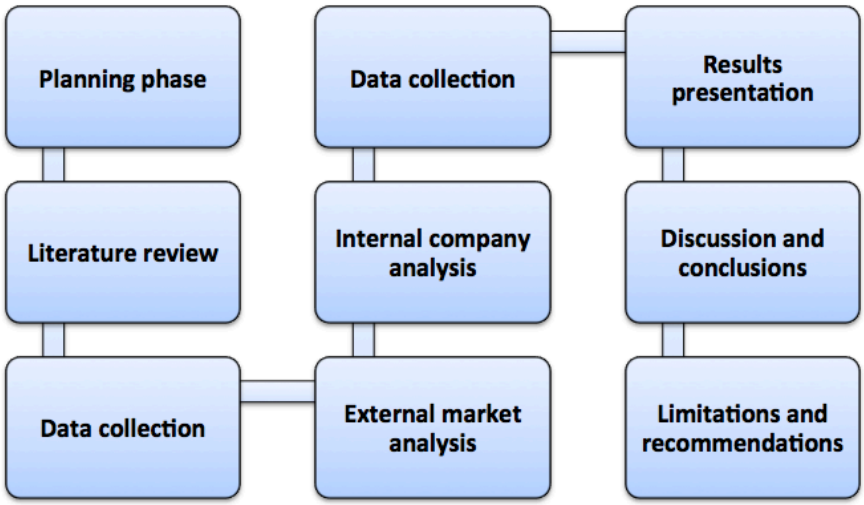


Figure 1. The study process

The study process consisted of nine steps. It started with a planning phase, where meetings were held both with the academic supervisor and the supervisor at the host company to discuss the internship project, its main objectives, and whether it met the academic criteria of a master thesis. A midway report was written, describing the problem definition, how it was useful for the host company, and how it met the academic thesis requirements. Next, a literature review was conducted to identify the relevant theoretical areas that may be related to the thesis project and the research objectives. At a broad level, the thesis project was about value creation in emerging African markets, and therefore required a strategic analysis of the factors external to the case company as well as an analysis of the internal factors. Hence, the study was continued with external market analysis and internal company analysis, both having its own data collection and analysis steps. The study was concluded by a presentation and discussion of the results, and final recommendations to the host company.

2.4. Organization of the thesis

The thesis project examines the market for traditional African beers in the SSA region with an objective of assessing the viability of penetrating the currently untapped powdered beer market in a way that it creates sustainable value for both the customers and the shareholders. Section 1 provides a summary of the thesis report. Section 2 provides the motivational background and the structure of the thesis, including the problem definition, the research objectives, the purpose of the thesis, and the study process. Section 3 provides background information about the history and the principles of beer brewing in the World, and the SSA

region and its market characteristics, and gives an overview of beer brewing in Africa, its history, related traditions, and current practices and trends. In section 4, the case company and its current operations in the SSA region are briefly presented. Section 5 provides a theoretical background for the thesis and the company case study. The main concepts of value creation and proposition, the importance of innovation and sustainability in value creation, emerging markets and value creation in these markets, and the models used in the analyses are presented. In section 6, the methodology and data collection process as well as its limitations are presented. In section 7, the findings of the work performed at the case company are presented. The thesis report concludes with a discussion of the findings and recommendations to the case company in section 8.

3. Background: beer and Africa

To provide proper context to the problem investigated in this thesis it is necessary to get an overview of a few topics: brewing and its history, and Sub Saharan Africa (SSA) its history, market characteristics and its relationship to brewing.

3.1. A brief history of beer

Humans may have been drinking fermented alcoholic beverages since the Palaeolithic era starting over two million years ago. However, the requirements necessary for intentional beer brewing, (1. sufficient supply of suitable grain, 2. access to consistent heat sources and 3. proper brewing containers), would not widely available until after the Neolithic revolution started twelve thousand years ago. The oldest recorded evidence suggests that people started brewing between six and seven thousand years ago in China and the Arabic peninsula corresponding with the beginning of recorded human history (Meussdoerffer, 2009). Since it's creation, beer has played an integral role in almost every civilization regardless of location often being used as part of religious ceremonies or offerings, as way to give tribute, as part of daily wages, as medicine or as a way to meet dietary needs. The early Babylonian and Egyptian civilizations spent a lot of time and energy refining the beer fermentation process with the Egyptians going as far as documenting brewing methods on the walls of tombs in hieroglyphics.

Modern brewing recipes can be directly traced to French monasteries in the 9th century as they are credited for introducing hops into recipes, which then became a staple in most beers. This was followed not long after by the professionalization of brewing practices in the 11th century leading to the formation of breweries similar to those as we know them today as well as regulations controlling the health and safety, and sale and trade, concerns regarding beer products. The most famous legislation was the Bavarian Purity Law of 1516, still active today, which among other things limits brewing ingredients to hops, barley, malt and water as well as regulating price, production and quality of beer (Meussdoerffer, 2009).

The next major shift in brewing started during the late 17th century when the brewing process started to become industrialized. Historians believe that this shift was initially driven by the needs of the British navy as four liters of beer was included as part of the daily rations of each of its sailors. As the navy grew during the imperialist era, the production of beer needed to increase as well to meet the increased demand. By 1850, breweries in London were using the basis of modern beer manufacturing processes in their production. Another consequence of British imperialism in brewing, is the British empire spread their industrial brewing practices all over the globe and by the early 20th century beer manufacturing had spread everywhere from Brazil to Japan to Tasmania. (Meussdoerffer, 2009).

Today, beer is drank in every part of the world. The World Beer Cup currently recognizes 96 unique styles of beer and it is estimated that this has created over 32,000 different beers. In 2015, the global beer production was almost 2 billion hectroliters with five companies, Ab Inbev – Miller, Heineken, Carlsberg, Snow, and Tsingtao representing over 50% and Ab InBev – Miller representing 30% of production (Barth, 2016). This accounted for over 550 billion usd in revenue.

3.2. Principles of beer brewing

Brewing is process of creating an alcoholic beverage by steeping starches in water and fermenting the solution. In its purest form the ingredients are only hops, barley, malt and water however many other things are often added to bring additional flavors. The multistep process that usually contains the following: malting, mashing, lautering, boiling, fermenting, conditioning, filtering and packaging (Figure 2). Each step of the process serves a specific function to create the final product. (Yui, 2006)

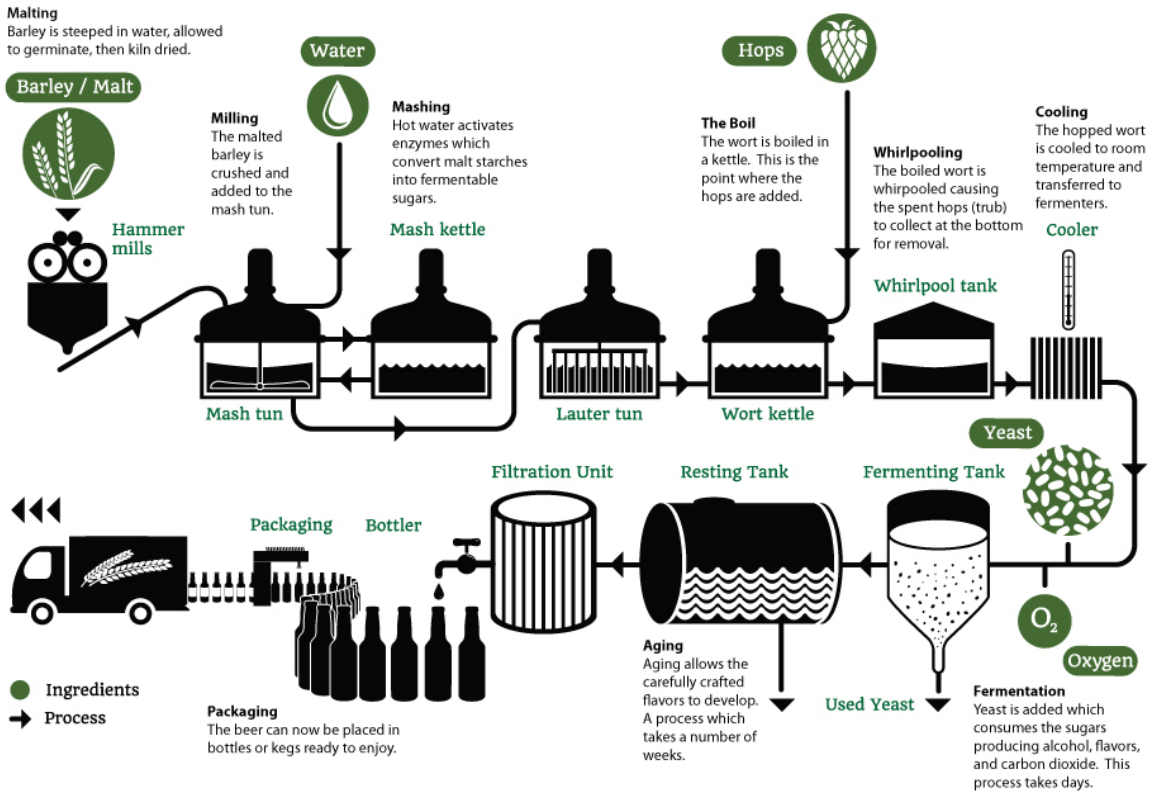


Figure 2: Brewing Process (chromacademy 2017)

Malting

Malting is the process designed to create malt from grains. Malt is germinated grains where the germination process has been stopped prematurely by heating. It is done through three steps: steeping, germination and kilning. During steeping, the grain is placed in water to help start the sprouting process. Once the grain starts to sprout it will be removed to allow gemination to occur. When the grain has been allowed to germinate for a sufficient amount of time it will be moved to an oven to dry. The benefits of malting are sugars and starches in the grain become more easily accessible, and enzymes are produced that are later involved with the breakdown of starches to simpler sugars (Hall 2011).

Mashing

Mashing is the process designed to create wort from grains. The wort is a solution of fermentable sugars. This is done by mixing the malt, additional grain and water and heating the resulting mixture. Often during the heating process the temperature is stopped at various points to help specific enzymes with their optimal temperatures for maximal activity (Figure 3).

Temp °C	Temp °F	Enzyme	Breaks down
40–45 °C	104.0–113.0 °F	β-Glucanase	β-Glucan
50–54 °C	122.0–129.2 °F	Protease	Protein
62–67 °C	143.6–152.6 °F	β-Amylase	Starch
71–72 °C	159.8–161.6 °F	α-Amylase	Starch

Figure 3: Optimal rest temperatures for major mashing enzymes

The benefits of mashing are that the enzymes produced during malting will break down the starches into fermentable sugars (Hall 2011).

Lautering

Lautering is the process of separating the wort from the undigested parts of the grain. This is done through some form of filtration. The goal is to create a solution of mostly fermentable sugars and free amino nitrogen. Other parts of the grain will decrease the efficiency of the yeast to ferment the sugars to alcohol (Hall 2011).

Boiling

At the boiling stage hops and potentially other ingredients for flavor are added to the wort and boiled. A number of chemical reactions occur at this step that create the desired flavor profile. A number of compounds that give bad flavors are evaporated out. The solution is also sterilized by killing unwanted bacteria. This step is extremely important to achieve the desired taste and ensure safety (Hall 2011).

Fermenting

At the fermenting stage, yeast or in certain beer styles bacteria is added to the wort. The yeast will convert the sugars in the wort into carbon dioxide and alcohol. After this step, the solution can officially be called a beer. (Hall 2011) Traditionally, naturally occurring yeasts were used as part of the process however now many different yeast strains have been breed for different beer styles and flavors (Figure 4).

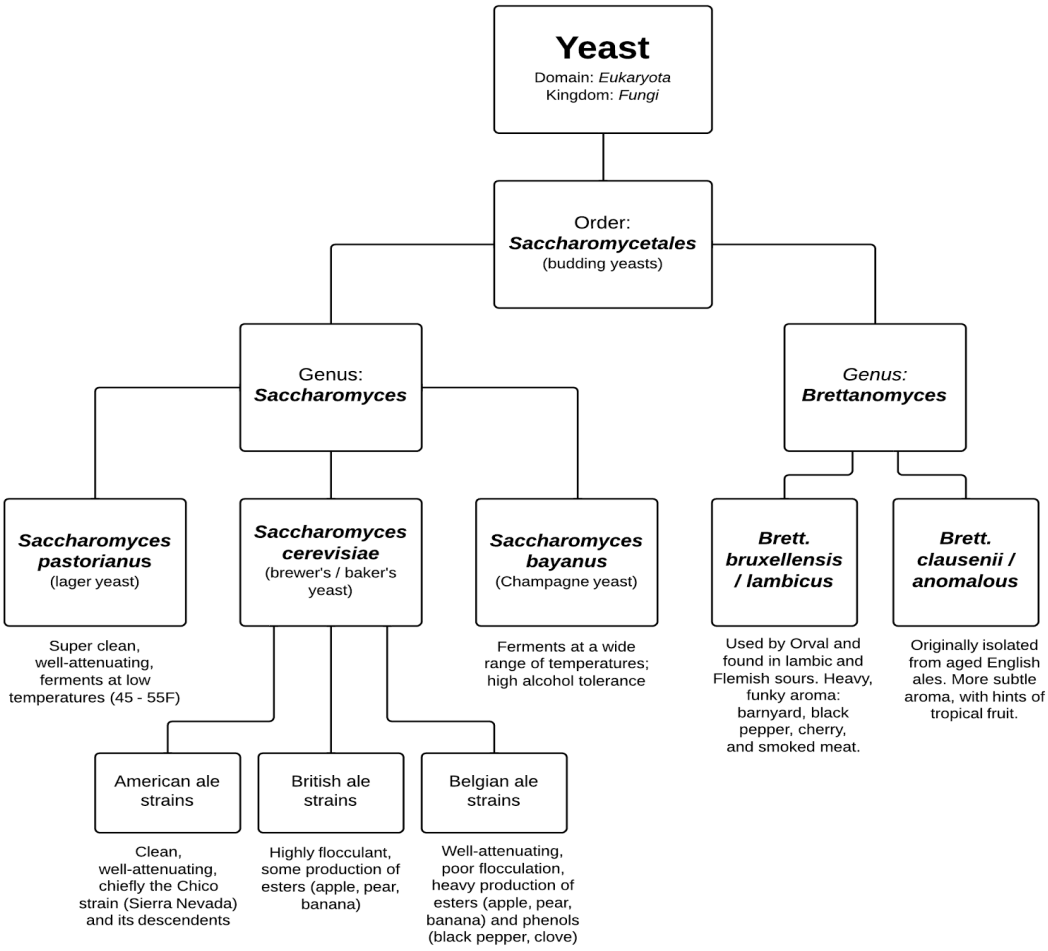


Figure 4: Different Yeast Strains and their Flavors (Morgan 2013)

Most strains of yeast can only survive in solution of up to 12%-14% alcohol limiting the potential alcohol content a beer can have (Hall 2011).

Conditioning

After the initial fermentation, the beer is separated into another into another container so the conditioning process can occur. Conditioning is a way to age or mature a beer so that certain flavors are accented while others are diminished. This process can last anywhere from a couple days to many years. There are a number of different methods used. Krausening is when actively fermenting wort is added to a finished beer to have secondary fermentation. This will cause additional carbon dioxide to go into the beer. Sometimes this is done directly as part of the bottling process so that extra carbon dioxide is produced in each bottle. Lagering is the process of conditioning at near freezing tempatures for a few months. Most often used to create lagers (Hall 2011).

Filtering

Some beers will undergo additional filtering steps to ensure smoothness and crispness.

Packaging

After all the brewing steps, the beer is ready to be packaged for consumption and transportation. The most common ways to package beer is through bottling, canning, casking and kegging. Sometimes when beers is put into casks or bottles sugars or active wort can be added so that conditioning can continue to occur.

3.3. Sub-Saharan Africa (SSA) in context

SSA consists of the entire African continent south of the Sahara desert including 48 countries with over 1 billion people. SSA is broken into roughly four regions: West Africa, East Africa, Southern Africa and Central Africa. Each one has a rich and vibrant history that deserves more in depth research and focus than able to present in this paper. However, one stage of Sub-Saharan history that is necessary to have a framework for the modern era is the colonization of the region by European powers in the late 19th century. In 1884, the Berlin Conference was held to set guidelines on how to divide the African continent. The aftermath of the Berlin Conference led to Africa being almost completely divided by 1914 (Figure 5) (Metzler 2017)

Figure 5: European Colonial Division of Africa (Metzler 2017)

The region remained under European control until the 1950's when some African countries started to gain its' independence. However, it would take over 30 years before most of the region would have their own sovereign nation. Colonialism left most of the region both politically unstable and economically depressed. It could be argued that SSA has only started to recover around the 2000, when indicators like Gross Domestic Product (GDP), Gross

Domestic Income (GNI), life expectancy and % enrolment started increasing rapidly and indicators like % living in poverty and % malnourished started decreasing rapidly. (World Bank 2017)

3.4. Characteristics of African markets in general and its comparison to the beer market

Two major trends are becoming drivers of change within African markets, urbanization and increasing wealth. These trends are causing multinational brands to see Africa as the next attractive that has not be fully penetrated (Figure 6) (SAB Miller 2015)

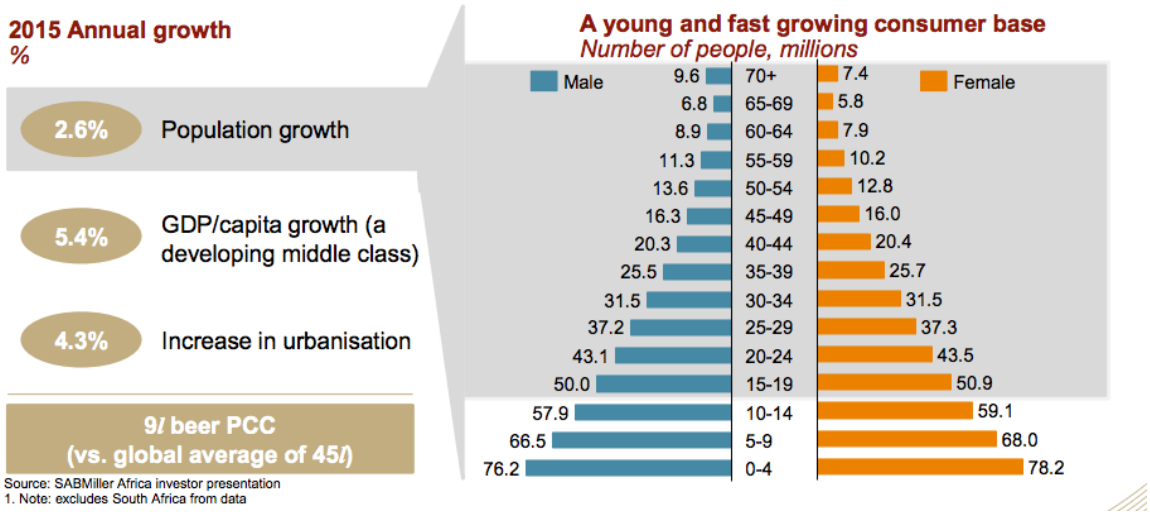


Figure 6: Key African Market Statistics

Currently, roughly 40% of all Africans live in urban centers with that number increasing annually by over 4%. With the increased urbanization often increased wealth and increased consumer density. According to a McKinsey report on African consumers, the equivalent of $3,000 USD gdp per capita is an important threshold for a country to pass. At this point individuals have the ability to have significant discretionary spending and the retail sector starts to grow exponentially (Hattingh 2012). According to the World Bank, SSA passed this threshold on average in 2010 (World Bank 2017). As the region continues to grow economically so will their discretionary spending.

Historically, most Sub-Saharan Arican consumers were priced out of most mainstream beers since it would take a significant portion of a day's wages to be able to afford a single 500 ml bottle (Figure 7) (SAB Miller 2015)

Figure 7: Number of Hours worked per 1 Bottle of Beer

This caused the consumer to be pushed down the beer product pyramid (Figure 8) until they had a beer they could afford. The cost of a 500 ml bottle at each tier is as follows: Powdered Beer/ Home Brew $.5 USD>, Opaque Beer $.75 USD, Mainstream Commercial Beer $1 USD and Premium Beer $1.25 USD (SAB Miller 2015)

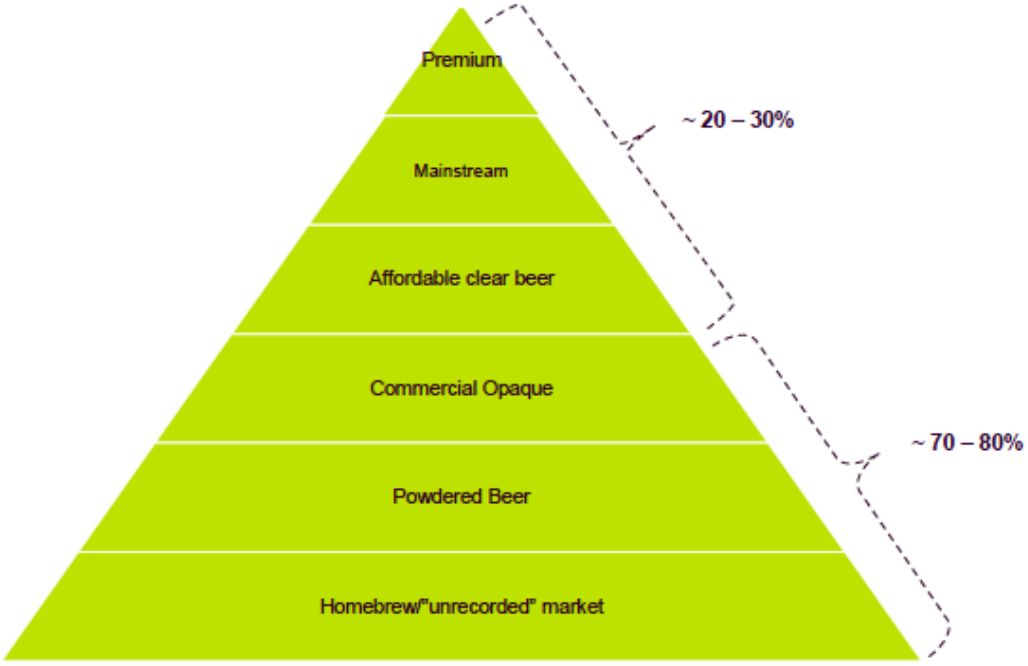


Figure 8: Beer Segmentation in Africa (Lindegaard 2017)

However, a very small increase in discretionary spending for beer less than $1 usd per bottle could allow a consumer to jump from home made beer to premium beer.

To try to capitalize on this trend many global beer brands have been trying to create brand loyalty and more price sensitive consumers into their product sales funnels. The most successful so far has been SAB Miller with its sale of Shake Shake a commercial opaque beer.

3.5. The importance of alcohol in SSA: historical overview, importance of alcohol (beer), culture & traditions, and current trends.

Traditional homebrewed beer in Africa is quite different from the beer that most people from western cultures are used to. It is thick and opaque with the consistency of a watery porridge or oatmeal. They have sour undertones similar to sour cream. Usually the beer is less alcoholic about 2%-3% per volume and they are almost always actively fermenting when drank. This means the alcohol content is increasing over time up to about 8% but also that there is a short shelf life with the brew spoiling within a week. Maize, Millet and Sorghum are the most common grains used for brewing however depending on the region other grains might be used as well (Figure 9). (Haggblade 2004)

Location	Local name of beer	Type of malt	Source of starch
Western Africa			
Benin	Chapalo	Millet	Millet
	—[a]	Sorghum	Sorghum
	—	Maize	Maize
Burkina Faso	Dolo	Sorghum or millet	Sorghum or millet malt
Ghana	Pito	Sorghum or millet	Sorghum or millet
Ivory Coast	Dolo	Sorghum or millet	Sorghum or millet
Mali	Dolo	Sorghum or millet	Sorghum or millet
Niger	Dolo	Sorghum or millet	Sorghum or millet
Nigeria	Pito	Sorghum or millet	Sorghum or millet
Togo	Dam, dolo	Sorghum	Sorghum malt
Central Africa			
Angola	Walwa	Maize	Maize
Cameroon	Amgba	Sorghum	Sorghum
	—	Sorghum or millet	Sorghum or millet
Central African Republic	—	Sorghum or maize	Sorghum or maize
Chad	—	Millet	Millet
Congo	Gwalo	—	—
Rwanda	Ikigage	Sorghum	Sorghum
Zaire	—	Sorghum, maize, or millet	Sorghum, maize, cassava, or millet
Eastern Africa			
Ethiopia	Bouza	Sorghum	Sorghum
Kenya	Busaa, pombe	Sorghum or millet	Sorghum, millet, or maize
Sudan	Merissa, marisa	Sorghum	Sorghum
Tanzania	Pombe, Bwalwa	Sorghum or millet	Sorghum or millet

Location	Local name of beer	Type of malt	Source of starch
Uganda	Busaa	Millet	Sorghum
	Omwenge	Sorghum or millet	Banana
	Omuganda		
	Malwa	Millet	—
Southern Africa			
Botswana	Bojalwa ja setswana	Sorghum or millet	Sorghum, millet, or maize
Lesotho	Yalwa, joula	—	—
Malawi	—	Maize	Maize
South Africa			
Ndebele, Zulu	Utshwala, tshwala	Sorghum	Sorghum or maize
Pedi	Bjalwa ja mabelethoro	Sorghum or millet	Sorghum or millet malt
Shagane	Mqomboti	Sorghum	Sorghum or millet
South Sotho	Joula, joala, jalwa	Sorghum	Sorghum or maize
Swazi Shosa	Utshwala	Sorghum	Sorghum or maize
Tswana	Bogule	Sorghum or millet	Sorghum or maize
Venda	Mela	Sorghum or millet	Sorghum or maize
Zambia	7-Day beer	Sorghum or millet	Sorghum or millet
	Katata	Millet	Maize
Zimbabwe	Zezuru	Sorghum or millet	Maize

Figure 9: Regional Beer Names and Grain Used (Haggblade 2004)

The first documented case of beer brewing in Africa was over five thousand years ago in ancient Egypt. There are not great historical records about when brewing practices migrated south of the Sahara but by the time Portuguese explorers were exploring SSA in the early 1500s brewing was prevalent throughout the region suggesting the practice has been around considerably longer. Some beer historians believe that beer brewing in the region predates even the ancient Egyptians. Evidence suggests that brewing as a profession started as early as the 14th century in Western Africa and had become a profession across the region by the end of the 19th century. In many countries, woman were the expert brewers making brewing a major source of income for woman in the region. Today, it is estimated that 90% of homebrew is brewed for resale. Industrialized factory brewing of traditional beers started in the early 1900s in Zimbabwe and South Africa. Both countries were British colonies at the time so it is likely that British brewing practices influenced the industrialization of brewing in these two countries. Today there are a number of brands that produce traditional homebrewed style beer on scale (Figure 10) (Haggblade 2004).

Location	Brand name	Type of malt	Source of starch
Western Africa			
None	n.a.[a]	n.a.	n.a.
Central Africa			
None	n.a.	n.a.	n.a.
Eastern Africa			
Kenya	Chibuku	—[b]	—
Tanzania	Chibuku	Sorghum	(Maize)
Uganda	(Chibuku)[c]	Millet	—
Southern Africa			
Botswana	Chibuku	Sorghum	Maize
Malawi	Chibuku	(Sorghum)	(Maize)
South Africa	Tiokwe, ijula, zebra, and many others	Sorghum	Maize
Swaziland	Imvelo	(Sorghum)	(Maize)
Zambia	Chibuku	(Sorghum)	Maize
Zimbabwe	Chibuku Ngwebu	Sorghum	Maize

Figure 10: Mass Produced Traditional Homebrew Style Beer (Haggblade 2004)

To this day, traditional home brewed beers play in integral part of SSA society. It is a major part of ceremonies and special events like weddings, funerals, work parties, social gathering and religious ceremonies. Additionally, it is common to drink homebrew in establishments that brew and sell their own beer often known as “shebeens”, “dolo bars” and “beer clubs”. It is the literal livelihood of many people in SSA providing both a key source of nutrition and employment in areas where it is prevalent. It is estimated that traditional home brewed beer accounts for up to 12% of caloric intake in certain African countries. Also, it is a key source of protein, iron and B vitamins that may not be found in other parts of the diet. The production and distribution of home brewed beer employs up to 20% of the workforce at least part time in certain regions (Haggblade 2004).

Two major related trends, the increased urbanization and wealth of SSA, are going to drastically change the relationship of people in SSA with traditional home brewed beer. First and foremost, increasing wealth in the region will allow consumers to have more choice to meet their nutritional needs. This will likely decrease the necessity to use home brewed traditional beer as part of the diet as other options become economically viable. For example, it has been shown that there is a correlation between increased wealth and meat consumption (Figure 11) (Speedy 2003)

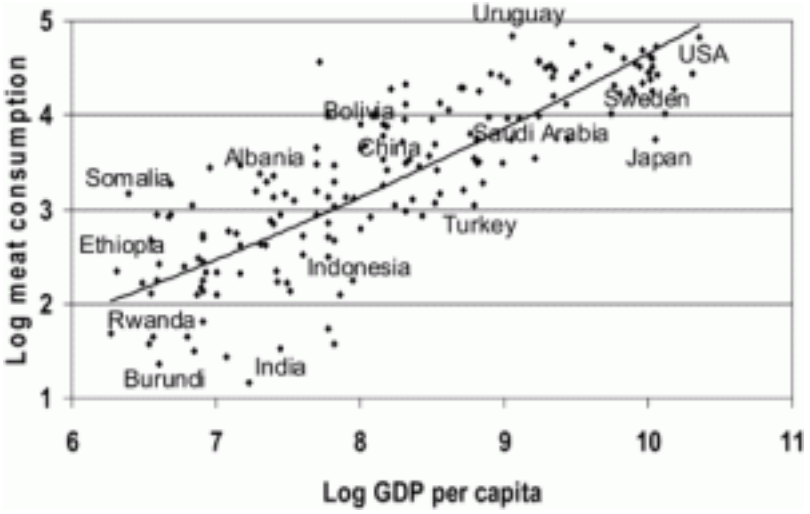


Figure 11: Meat Consumption based on Country GDP(Speedy 2003)

It is likely that diets in SSA will start to resemble the diets of other wealthier countries around the world. Additionally, as mainstream global beer brands are becoming more affordable to the Sub-Saharan African consumer, these brands will start to take at least a portion of the region's beer consumption that traditionally has been home brews. In addition, as more and more people move to cities, there will be an increase in cosmopolitan living. This often brings with it a move from more traditional forms of culture to more trendy, mainstream and branded forms of culture. This will further convert some Sub-Saharan African consumers to switch from traditional home brew to global brands. One area that will probably resist the trend away from traditional home brews the longest is the use of the beer as part of certain ceremonies and special events. There is a strong association of these drinks and certain ceremonies and special events. It will be extremely difficult to change people's customs and traditions. It is likely that this is how the traditional home brews will mostly be used 50 to 100 years from now.

4. Case presentation

4.1. Company profile

Novozymes A/S was created in 2000 when Novo Nordisk was split into three companies: Novo Nordisk A/S, Novozymes A/S and Novo A/S. Novozymes took over the industrial enzymes business of the company. This business segment had been started in the 1940's when Novo researcher's discovered a way to extract trypsin from pancreatic glands. Trypsin could be used in cleaning leather hide as part of the tanning process. Today, Novozymes produces enzymatic products in the following areas: agriculture, bioenergy, food and beverages, household care, leather, pharmaceuticals, forestry, textiles, and wastewater management. Household care particularly detergents is the largest and most successful business area however in recent years the company has taken efforts to greatly expand its other business areas (Novozymes 2017).

Partnering and Sustainability are two core tenants for how Novozymes does business. These two concepts appear both in its purpose statement: "Together we find biological answers for better lives in a growing world. Let's rethink tomorrow." and it's strategy: "Partnering for Impact" (Novozymes 2017).

Brewing products fall under the Food and Beverage group. This group is arguably the second largest after household care. Most of these products are sold for industrial brewing and novozymes sells to most major breweries in the world.

4.2. Product portfolio for brewing industry

Novozymes has products that can be used in all parts of the brewing process. In general, these products fall under one of six categories: cereal cooking, raw material optimization, separation and filtration, attenuation control, fermentation control, and diacetyl control. Each of these has its own product line with unique value propositions to the customer (Novozymes 2013).

Cereal Cooking

During the mashing process if starches are not treated the right way then it will be difficult to convert them to fermentable sugars. Products under this line are used to ensure a successful mash. Their benefits include: "faster and more consistent liquefaction, lower mash viscosity, which means easier wort production, no danger of resistant or retrograded starch formation, or insufficient saccharification reduced processing costs through more efficient liquefaction and increase yield of up to 1%, and improved flexibility in using various cereal grain adjuncts" (Novozymes 2013 pg. 53).

Products include: the Termamyl line of products (Novozymes 2013).

Raw Material Optimization

Historically, only certain cereals had high enough yields and quality to be efficiently used by industrial brewers. Novozymes created a mixture of products to open up the types of raw materials that a brewer could use. These products, "achieve faster and advanced viscosity

reduction and increased extract yield in your cereal cooking, optimize your liquefaction temperature and reduce your energy consumption, improve mash separation and beer filtration, optimize your processability, starch degradation and FAN release, adjust your fermentability, and control your degree of fermentation, primarily due to an increase of maltose" (Novozymes 2013 pg. 19).

Products include: Attenuzyme, Ceremix, Fungamyl, Neutrase, Ondea, Termamyl, and Ultraflo.

Filtration and Separation

Filtration and Separation are often limiting factors to how fast the brewing process can move from one step to another one. Improving these two areas can lead to higher volumes of beer produced in a given time period. These products were created with that goal in mind (Novozymes 2013 pg. 67).

Products include: Ultraflo line of products and Finizym

Attenuation Control

Low calorie beer production is increasing in popularity. To ensure that a beer has a lower caloric content for the same alcohol percentage it is necessary to reduce the number of non fermentable dextrin chains. Novozymes created products with this purpose in mind (Novozymes 2013 pg. 87).

Products include: AMG L BrewQ, Attenuzyme line of products, Novozym 26062, and Fungamyl.

Fermentation Control

As part of the fermentation process, the yeast needs free amino nitrogen (FAN) to help cell growth and proliferation. Products were created to ensure that FAN levels are sufficient (Novozymes 2013 pg. 101).

Products include: Neutrase line of products

Diacetyl Control

Diacetyl is common compound found in the brewing process which has been found to create the worst taste, particularly in the Pilsen style of beer, for consumers. So many breweries try to minimize the amount of diactyl found. Novozymes developed a product to do that (Novozymes 2013 pg. 109).

Products include: Maturex

4.3. Current company operations and future aims in the brewing industry in SSA

Novozymes currently works with most major multinational breweries in the world including Carlsberg, Heineken, Diageo, Ab InBev – Miller amongst others. Looking back at the beer

pyramid in Sub Saharan African from section 3.4 (Figure 12), these players primarily make beer in the top three segments: Premium, Mainstream and Affordable Clear Beer, which account for up to 30% of the African beer market. Though these relationships, Novozymes has been able to significantly penetrate the market for the top three segments.

Figure 12: African Beer Market Segmentation (Lindegaard 2017)

Since it is estimated that the bottom three segments (Commercial Opaque, Powdered Beer and Unrecorded Homebrew) of the pyramid take up 70-80% of the beer market in terms of volume, Novozymes is looking to expand its penetration in these segments. The company has decided to start in South Africa for two major reasons. One, Novozymes already has an office in South Africa lowering the initial costs of starting operations in the country. Two, South Africa is the most industrialized economy in Sub Saharan Africa making it much easier to figure out who the relevant stakeholders are as well as who are potential clients. In 2016, it was estimated Novozymes sold 4500 kilograms of enzymes for powdered beer to South African companies.

Novozymes is starting to put some people on the ground working remotely in key markets like Nigeria and Kenya however there are no plans to build offices there unless there is a need due to successful penetration.

5. Theoretical background

This section provides a theoretical background for the thesis and the company case study. The main concepts of value creation and proposition are presented, and the importance of innovation and sustainability in value creation is discussed. This is followed by a presentation of emerging markets and their characteristics, and value creation in these markets. Finally, a brief theory behind Porter's five-force model and stakeholder analysis are presented.

5.1. What is value?

At a broad level, the term value can be used in different contexts. For example, a common perspective on the management of organizations states that creating and delivering superior customer value to high-value customers will increase the value of an organization (Slywotzky, 1996). The latter two value concepts consider value from the perspective of an organization, where high-value customers quantifies the monetary worth of individual customers to the organization, and value of an organization quantifies an organization's worth to shareholders. Customer value takes the perspective of an organization's customers, considering the benefits that they receive by buying and using the organization's offering.

If a business does not create value for its customers, it will struggle to sell its products and services, and if it fails to create value for its shareholders, it will compromise its ability to raise capital with the support of its owners. Therefore, value is a fundamental concept to understand. However, people in different roles and at different levels within organizations usually have diverse views about value, and hence coming to a common understanding of what value means is often challenging. McKinsey consultants Ralf Leszinski and Mike Marn wrote in their article 'Setting the value, not price' that value might be one of the most overused and misused terms in marketing and pricing (Leszinski & Marn, 1997). Considering the importance of value for businesses, it is plausible to argue that, unless everyone within the organization reaches a common understanding of value, it will be impossible to successfully manage the drivers of value that the business needs.

Commercial interest in the idea of value is nothing new, and over the years several definitions have been suggested. Some of the definitions of value in the literature are as follows:

Value in business markets is the worth in monetary terms of the set of economic, technical, service, and social benefits that a customer receives in exchange for the price it pays for a market offering (Anderson & Narus, 1998).

Value is the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given (Zeithaml, 1988, p. 14).

Buyers' perceptions of value represent a trade-off between the quality/benefits they perceive in the product relative to the sacrifice they perceive by paying the price (Monroe, 1990, p. 46).

Value is what a customer gets in exchange for the price it pays (Anderson & Narus, 1998).

Based on the definitions above, a workable definition of value was suggested by Kelly and colleagues (2017, p. 8):

Value = perceived relevant and distinct benefits – total cost of ownership

The above definitions are mainly concerned with customer value, which is also the value we will primarily talk about throughout this report. However, there is also shareholder value, which may be defined as an organization's ability to earn a return for its owners. Creating shareholder value is mostly the result of management's ability to grow sales and earnings over time, and strictly depends on managers acting appropriately to achieve this (Smith, 2015).

5.2. Assessing value

Economists tend to refer to the theory of utility when looking at value and consumer behaviour. The theory is based on the assumption that individuals are rational, meaning that individuals maximize utility in their decisions, and essentially states that customers spend their income as to maximize the satisfaction they get from products. In other words, customers spend their money on what they expect will give them most satisfaction (Bach et al., 1987, p. 92). However, it is also important to keep in mind that rationality may relate to customers' preferences differently. For example, one customer may put more value on flavour and choose a sugary cereal, while a second customer may prioritize healthy choices

and choose granola. At the end, based on their preferences, both make the economically rational choice.

How do customers develop their expectations and how do they judge the value of a product? Customers' perceptions of value of a product are based on their beliefs about the product, and their unique experiences, needs and expectations. In other words, customers assess the overall value of a product on the perceptions of what is given and what is received (Zeithaml, 1988, p. 14). In the next section we will discuss different types of value in more detail, but we find it necessary to briefly mention here the distinction between perceived use value and exchange value. The use value refers to the specific qualities of a product perceived by individual customers in relation to their needs (e.g. the flavour or healthiness of a cereal product), and therefore judgments about the use value are subjective and they pertain to the individual customer. Exchange value on the other hand refers to price of a product. It is the monetary amount realized at a single point in time when customers buy the product.

Perceived use value can be translated into monetary terms, and be defined as the price a customer is willing to pay for the product if there is a single supplier (Collis, 1994). This is referred to as the total monetary value. This judgment is based on the assessment of the product's value by the customer, and is associated with the customer's willingness to pay. These monetary judgments cannot be made in isolation from the wider needs and economic circumstances of the customer, or the customer's awareness of competing offerings, because in competitive markets where there is more than one supplier for a product, the price paid (the exchange value of the product) will be less than the total monetary value (the use value of the product) perceived by the customer. The difference between the use value of the product assessed by the customer and the price paid is called consumer surplus. In other words, the total monetary value of the product for the customer equals to the sum of the price and the consumer surplus. Consumer surplus is what consumers refer to as value for money (Bach et al., 1987; Whitehead, 1996).

It appears that a product has two elemental characteristics: its use value and its exchange value (price). Raising or lowering the price of a product does not change the use value that such a product provides to a customer. It changes the consumer surplus, and hence the customer's incentive to buy the product. The essence of this can be captured in the equation below (Andersen & Narus, 1998):

$$(\text{Value}_S - \text{Price}_S) > (\text{Value}_a - \text{Price}_a)$$

Value_S and Price_S are the perceived use value and price of the supplier's product, and Value_a and Price_a are the perceived use value and price of the next best alternative product. The difference between value and price equals to consumer surplus, hence the customer's incentive to purchase. Simply put, the equation suggests that the consumer surplus of a supplier's product must exceed that of the next best alternative for a customer to choose to buy the supplier's product over the next best alternative.

If we are to explain it in another way, customers choose the products that will provide the largest consumer surplus, as it is shown in Figure 13 (Bowman & Ambrosini, 2000). The firms must therefore differentiate their products in a way that the customers will see value in them. The products must deliver more consumer surplus than alternatives. Firms can increase consumer surplus by enhancing the perceived use value of their products, thereby increasing the total monetary value, while keeping the price at the same level (product B), or by keeping the total monetary value constant but reducing the price (product C), or by doing both simultaneously (product D). Product D would be selected by the customers as it provides the most consumer surplus, CSD > CSB > CSA.

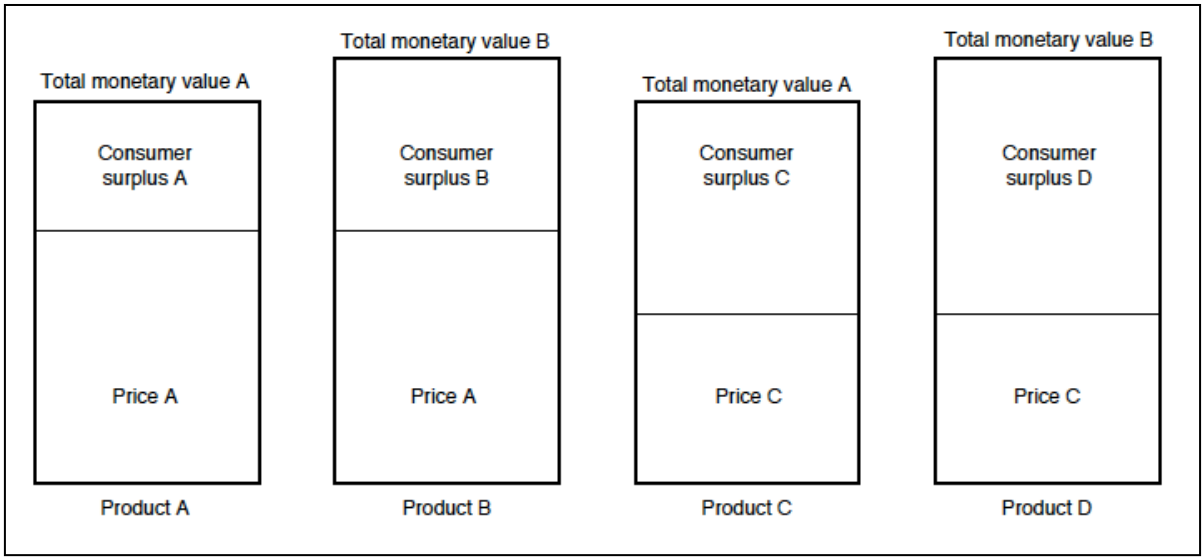


Figure 13. Total monetary value, price, and consumer surplus (Bowman & Ambrosini, 2000)

5.3. Different types of value

There are different types of value with different aspects. Depending on their roles and levels within organizations, people may put more emphasis on one type of value over the other. Among the types of value highlighted by Kelly et al. (2017, p. 8) are economic value, perceived value, relational value, experiential value, and social value. They argue that these different aspects of value can be thought as layers of an onion (Figure 14), each layer is different, yet they all relate together in a whole. The value onion below shows that the core is economic value, and the outer layers are the less tangible dimensions of value that relate to customer perceptions, the processes and exchanges of relationship value, and the extensive and subtle aspects of experiential value.

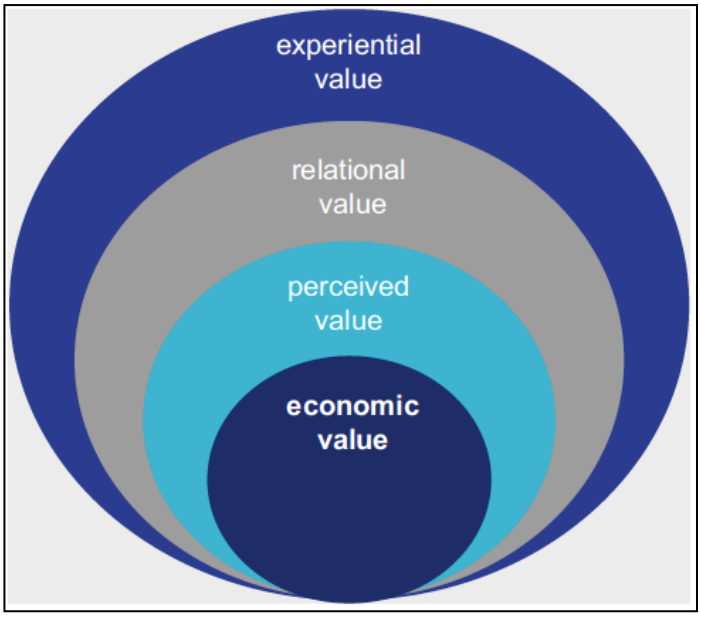


Figure 14. The value onion (Kelly et al., 2017)

Economic value

Economic value is concerned with the cost of a transaction. As it has been mentioned in the previous section, a product is considered to be better value and increases a customer's incentive to purchase, if it is obtained at a lower price than the alternatives. Therefore, it is the most fundamental aspect of thinking about value and exchange of products, services and money. The cost and profit matter to the customer and the supplier, as value for money is often synonymous with a lower price (Kelly et al., 2017, p. 9).

Perceived value

Customers perceive value in different ways. Perceived value is subjective and it is defined by individual customers based on their perceptions of the usefulness of the product and the sense of personal esteem they get from being seen to purchase and use it (Miles, 1961). Customers assess the overall value of a product on the perceptions of what is given and what is received (Zeithaml, 1988, p. 14), meaning that value is not a constant, objective and monetary calculation, but something that changes depending on how the customer perceives the sacrifices made and how the product is perceived relative to the alternative products.

Relational value

Relational value is primarily concerned with the intangible aspects of value that occur between people, and is particularly important in business-to-business (B2B) customer relationships. Relational value is more about the way customer interactions take place over time rather than the price and the attributes of a product or service. As it is evident from the examples of rice merchants in China (Grönroos, 1996) and traders in pre-industrial times (Sheth & Parvatiyar, 1995), relational value is not a new concept. These examples show that customers and suppliers have long extracted value from their business relationships, and hence continued to stay in these relationships. There are several things that are important to consider in the context of relational value (Kelly et al., 2017, p. 11).

- Doing business is not a single transaction, exchanges occur over time.
- The relationship itself adds value to the core solution offered through a product.
- Value can be added and subtracted during the course of a relationship.
- Value is mutually created for both supplier and customer.

Kelly et al. (2017, p. 12) summarize the factors that add value to a business relationship as the use of specialized knowledge skills and competence, the development of trust, showing commitment, commercial attractiveness through access to wider networks of suppliers, competence in managing relationships and communication, and dialogue and problem solution; and the factors that subtract value from a business relationship as incompetence, inconsistency, unfulfilled promises, rudeness, aggression, unhelpful staff, and distrust.

Experiential value

Experiential value is concerned with the sense of value a customer receives from the whole experience of dealing with a supplier. In other words, it recognizes value in the context of customer experiences (Kelly et al., 2017; Cetin et al., 2014). In contrast to the traditional value concept, which is defined as the trade-off between quality and price and referred to as utilitarian and or functional value (Dodds & Monroe, 1985), experiential value is related to emotions and interactions with the product and service that are unique and long-lasting rather than transactional in nature (Wu & Liang, 2009). Enhanced experiential value can positively affect customers, and be a source of desired customer behaviours, such as satisfaction, loyalty and word-of-mouth. It may also open doors to value co-creation, and motivate customers to join suppliers to generate a value-creating system where further value is created jointly and reciprocally and both parties pay attention to the health of the entire commercial relationship, not just to their individual needs (Kelly et al., 2017, p.13).

5.4. Value creation

Based on the work of Doyle (2000), Lindgreen and Wynstra (2005) argues that the emphasis on understanding value creation was not always necessary in the past where firms could still achieve high profitability, because markets were regulated, production resources were scarce, distribution channels were controlled, and poorly performing firms were acquired. They conclude their argument by saying that in today's markets such opportunities are disappearing due to recent trends, including changes in physical distance and time, liberalization of economies, deregulation of industries, globalization of markets, and rising customer awareness and expectations (Lindgreen & Wynstra, 2005). Based on this, it is reasonable to argue that in today's competitive markets business begins with value creation. This must be done in a way that the value created for customers is superior to competition, because customers who are satisfied with a supplier's products or services and the value within remain loyal to that supplier, and place their future purchases with that supplier (Lindgreen & Wynstra, 2005; Eriksson & Löfmarck-Vaghult, 2000; Rust & Zahorik, 1993). Therefore, value creation is a fundamental concept to understand.

5.4.1. Defining value creation

At a broad level, value creation entails a process that increases the customer's well being in a way that the user is in a more favourable situation in some respect than he/she was before. Traditional views on value creation state that firms and customers are separate entities, and that firms control value creation, such as by supporting the customer's peace of mind, making life easier for the customer, solving customer problems, satisfying customer needs, or simply relieving the customers of some responsibility (Grönroos & Voima, 2013, p. 135). More recent views on value creation on the other hand state that firms and customers are part of a value creating system, where value is created jointly (Kelly et al., 2017, p. 14; Grönroos & Voima, 2013). Ramaswamy (2011, p. 195) describes co-creation of value as a process by which mutual value is expanded together. Some of this value expansion my originate from activities from direct interactions between firms and the customers, and part of it may originate from independent activities of the parties in a business relationship, where the focus is still on the mutuality of value creation. Coupled to these two views, there are two ways of looking at value and value creation: 'value in exchange' and 'value in use' (Vargo et al., 2008). While 'value in exchange' represents the traditional views about value creation, where firms create value in products or services and convey it to the customers, 'value in use' represents the more recent views, which assume that value is co-created by a joint effort of firms and the customers.

To clarify the distinction between the two perspectives of value creation, consider a value creating pharmaceutical company. The firm puts value into its products by using its internal resources and transforming raw materials into medicines that will benefit the customer. This valuable product is then exchanged for money, generating 'value in exchange'. From a customer's perspective, these medicines have no value until they are consumed and take effect. In other words, they do not have any real value on a shelf at the pharmacy unless they are used. Therefore, the total value created and embedded in the product of the pharmaceutical company comes from a wider value network that involves the firm and the customers as well as the medical personnel and facilities taking care of the patients (Kelly et al., 2015).

5.4.2. Value creation through innovation

What is innovation?

In an industrial survey of literature on innovation, Edison et al. (2013) found more than 40 different definitions for innovation, among which the following definition given by Crossan & Apaydin (2010) was considered to be the most complete:

> *Innovation is the production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome*.

Innovation is related to, but not the same as invention. While invention is the first occurrence of ideas, innovation refers to their first economic utilization or commercialization, and successful launch to market as products or services (Schumpeter, 1949; Haner, 2002; Banerjee, 1998). Hence, innovation is more than invention or product development. It rather means doing things better. Innovation is multifaceted and can take varied forms. It could be the invention of new technologies or products and their launch to market, or it could be more efficient and effective supply chains, better customer service, experience and engagement, better product designs and renovations or better solutions through integration of ideas across business processes.

Types of innovation

Different types of innovation require different kinds of underlying knowledge and have different impacts on a firm's customers as well as competitors. Four of the dimensions that are most commonly used to categorize innovations are: product versus process innovation, radical versus incremental, competence enhancing versus competence destroying, and architectural versus component (Schilling, 2017, p. 48-51).

Product versus process innovation: Product innovations are embodied in the outputs of a firm, such as its products or services; whereas process innovations are innovations in the way a firm conducts its business, such as in the techniques of manufacturing or marketing the products or services. Such innovations often aim to improve the effectiveness and efficiency in processes. Product innovations and process innovations may occur in tandem in a way that new processes may enable the production of new products, and new products may enable the development of new processes.

Radical versus incremental innovation: Multiple definitions have been posed for radical and incremental innovation, but most hinge on the degree to which an innovation represents a departure from existing practices. Radical innovation is defined as the focused exploitation of emerging technologies to radically reinvent industries or to displace incumbent product or service offerings in existing markets; whereas incremental innovation is defined as the continual refinement and enhancement of existing products, services or processes within a relatively stable competitive environment.

Competence enhancing versus competence destroying innovation: An innovation is considered to be competence enhancing from the perspective of a firm if it builds on the firm's existing knowledge base, and competence destroying if the innovation does not build on the firm's existing competencies or renders them obsolete. An important aspect of these two types of innovation is that an innovation can be competence enhancing to one firm, while competence destroying for another.

Architectural versus component innovation: Innovations are considered to be architectural or component innovation based on the assumption that most products or processes consist of nested systems, meaning that the entity is a system of components, and each of those components is a system of finer components until a point is reached, where the components are elementary particles (Simon, 1962). Architectural innovation changes the overall design of a system or the way its components interact with each other, whereas component innovation alters one or more components that does not significantly affect the overall configuration of the system.

Innovation in biotechnology

Biotechnology refers to any technological application of using biological materials, such as living organisms or derivatives thereof, to make or modify products or processes for specific use. Biotechnology can be classified into three main categories: red biotechnology, which relates to human and animal health-care related products; green biotechnology, which relates to agriculture and stockbreeding; and white biotechnology, which relates to industrial production processes, energy and the environment.

Biotechnology industry is a high-tech, knowledge driven industry, and is strongly dependent on scientific advancement. Product and process innovations are the types of innovation that are the most relevant to biotechnology industry, because biotechnology firms provide new

products and services, such as new treatment methods, medicines, modified foods, and sustainable energy solutions, to a demanding society as well as opens new doors to combat against poverty worldwide, for example through the development of staple foods with improved nutritional value.

Value creation through innovation

Delivering value to customers is one of the primary objectives of business, and firms that are able to constantly meet this objective are best positioned to thrive in the long term. Innovation is intrinsically linked to value, as new ideas are essential for firms to develop products or services that will better solve customer problems and meet customer needs and expectations. Firms can use innovation to transform existing products and processes and enhance the value attached to them, or develop entirely new product and process categories and reshape the markets. As a result such innovative approach will create significant new value that did not exist before. By continuously being involved in value creation through innovation, firms can not only better serve to their existing markets, but also gain access to new markets.

Furthermore, as described previously, different types of innovation exist, and one type of innovation may be more important than others. The Harvard professor Clayton Christensen pinpoints the importance of implementing radical, disruptive innovations for incumbent firms to thrive in their markets (Christensen, 1997). He postulates that incumbents become so entrenched in serving their existing customers that they fail to grasp the potential disruptive impact that new technologies can bring to their markets, which may eventually lead to their displacement on their markets by new entrants. His view implies that incumbent firms tend to focus on existing customers and implement incremental innovations to improve existing products or processes, and neglect the potential future impact of newer technologies on their markets. In other words, they fail to develop a portfolio approach that balances both incremental and disruptive innovation.

Finally, innovation is not only important for creating customer value, but also shareholder value. A recent study conducted by Forbes ASAP magazine found that innovation is the dominant driver of shareholder value creation process (Baum et al., 2000), and accordingly Boston Consulting Group's annual innovation survey found that 75 per cent of CEO's see innovation as a top-three priority in their organizations (BCG, 2015).

5.4.3. Value creation in emerging markets

Defining emerging markets

An emerging market is a country or a group of countries that has some characteristics of a developed market, but does not meet the standards to be a developed market (MSCI Market Classification Framework, 2014). Vladimir Kvint, an economist and academic, provides the following definition for emerging markets (Kvint, 2009):

> *Emerging market country is a society transitioning from a dictatorship to a free-market-oriented-economy with increasing economic freedom, gradual integration with the Global Marketplace and with other members of the Global Emerging Market, an expanding middle class, improving standards of living, social stability and tolerance as well as an increase in cooperation with multilateral institutions.*

Emerging market countries are considered to be in a transitional phase between developing and developed status, and constitute the major growth opportunity in the evolving world economic order. Among them are many countries in Africa, most countries in Easter Europe, some countries in Latin America, Middle East and South East Asia, and Russia.

Characteristics of emerging markets

Emerging markets display different characteristics compared to the developed markets. Sheth (2011) identified five dimensions on which emerging markets are different from developed markets, which are briefly mentioned below.

Market heterogeneity: Emerging markets display large variance across almost all products and services, because the markets are local, fragmented, low scale, and mostly served by owner-managed small enterprises. The consumers in emerging markets are referred to as the 'bottom-of-the-pyramid' consumers, who are below the official poverty levels and have no access to basic utilities, such as electricity, running water, banking, or modern transportation. The heterogeneity in these markets is due primarily to resource constraints, such as the wide

gap between the haves and have-nots with respect to income and net worth, rather than diversity of needs, wants, and aspirations of consumers. There is also a huge diversity between urban and rural areas with respect to access to products and services.

Socio-political governance: Socio-political institutions, such as religion, government, business groups, non-governmental organizations, and local community, tend to have significant influence in emerging markets. These institutions rather than competition govern the markets, and it is common to see many government-owned and –operated enterprises serving the markets with near-monopoly powers. Similarly, a few highly diversified trading and industrial groups dominate the emerging markets, and have access to and influence on governments' planning and policy changes.

Unbranded competition: The majority of consumption in emerging markets is for unbranded products and services. This is because branded products and services are not available in rural markets due to lack of access, poor infrastructure, and higher cost, and a household is not only a consumption unit but also a production unit. There is an enormous value creation through labour on making consumable products from raw materials for almost all basic necessities. Outsourcing is also minimal in emerging markets, which is due to the availability of labour at home and lack of affordability of branded products and services. The presence of unbranded products and services implies that, in emerging markets, market creation and development may be more necessary than market orientation.

Chronic shortage of resources: Emerging markets tend to have limited resources in production, exchange and consumption. For example, limited electricity, heterogeneous supply of raw materials, and lack of skilled labour make production sporadic and inconsistent, leading to diseconomies of scale.

Inadequate infrastructure: Large urban areas in emerging markets may have adequate infrastructure, but this is not the case in the rest of the market. Inadequate infrastructure includes physical roads, logistics, storage, and market transaction enablers, such as point-of-sale terminals, banking functions. Moreover, communication, information, and transaction technologies, such as telephones and electricity, are also scarce in emerging markets. Therefore, non-traditional channels and innovative ways of access to consumers may be necessary and profitable in emerging markets.

Africa, perhaps the largest emerging market in terms of the number of individual countries present, displays all of these characteristics, which pose significant challenges for firms that operate or are willing to operate in African markets. The most significant challenges associated with the African markets are underdeveloped infrastructure, disorganized and fragmented retail landscape, lack of reliable market research, unclear and inconsistent government regulations, and a severely limited pipeline of talented workforce (Meacham et al., 2012).

Value creation in emerging markets

Because of the unique characteristics of emerging markets, the firms aiming to operate in these markets must develop a deep understanding of the local conditions, such as learning about the local consumer preferences and habits, and how to navigate the socio-political systems and manufacturing value chains, and subsequently translate this knowledge into solutions that will create the most value to customers. Due to the disproportionate size of below-poverty-level consumers in emerging markets, majority of the population cannot afford as much as their more affluent western counterparts, leading to a high demand for products and services that are affordable. Furthermore, the shortage of resources and infrastructure challenges in emerging markets necessitate functional and flexible products and services. Therefore, the value creating process for targeting emerging markets may involve innovating in pricing, efficiency, flexibility and functionality of products and services. This may be achieved through product and process simplification to take out the cost and resource improvisation to reduce the dependency on scarce resources.

5.4.4. Value creation through sustainability

Considering the global events happening nowadays, it is reasonable to argue that the world is inextricably interconnected, and that poverty, environmental degradation, and perceived exploitation in one part of the world will not remain geographically isolated (Soros, 2002). Firms are becoming challenged to take more of the world into consideration, and protect the environment and the society upon which the global economy depends (Nye, 2001). This brings us to the idea of value creation through sustainability.

Global sustainability has been defined as the ability to meet the needs of the present without compromising the ability of future generations to meet their needs, and involves different dimensions, including economic, social and environmental (WCED, 1987). The idea of

sustainability increases the expectations from businesses on economic, social, and environmental performance. Therefore, a sustainable business is one that continues to sustainable value creation by delivering simultaneously economic, social, and environmental benefits.

There are four sets of drivers of global sustainability (Hart & Milstein, 2003). The first set of drivers includes the global increase in industrialization and the associated material consumption, pollution, and waste generation. Industrial activity around the world has grown to a point where it generates significant pollution and consumes virgin materials, resources, and fossil fuels at an increasing rate, irreversibly affecting the environment, including impacts on climate, biodiversity, and ecosystem function (Daily, 1997; Hawken et al., 1999).

The second set of drivers includes the proliferation and interaction of civil society groups. Non-governmental organizations and other civil society groups have started to function as the monitors and enforcers of social and environmental standards as the power of national governments eroded in the wake of global trade regimes (Florini, 2000). With the advancement in information technologies, such as the Internet, these groups are fully informed and interconnected, and as a result they challenge firms to operate in a transparent, responsive manner.

The third set of drivers includes the emerging technologies, such as biotechnology, nanotechnology, information technology, and renewable energy. These technologies may provide disruptive solutions that could render the basis of many of today's energy and material intensive industries obsolete, and reduce the human footprint on the planet, leading to the eventual eradication of the problems of rapid industrialization (Hart & Milstein, 1999).

The forth set of drivers includes the global increase in population, poverty, and inequity (World Bank, 2000). The rapid growth in global population has resulted in increased migration from rural areas to urban areas, and inequities in income, which in turn is seen as the reason for accelerating social decay, political chaos, and terrorism (Hammond, 1998). This puts a huge responsibility on business for wealth generation and social development through sustainable value creation on a massive scale.

Creating sustainable value requires that firms address each of the four sets of drivers described above. Firms can create value by (i) reducing the level of material and natural resource consumption and pollution associated with rapid industrialization; (ii) operating at

greater levels of transparency and responsiveness, as driven by civil society; (iii) developing new, disruptive technologies that hold the potential to significantly reduce the size of the human footprint on the planet; and (iv) meeting the needs of those at the poverty level people in a way that facilitates inclusive wealth creation and distribution (Hart & Milstein, 2003).

5.5. Value proposition

The value proposition, which may consist of a product, or bundle of products or services, solves a customer problem or satisfies a customer need, and therefore it is the primary reason why customers choose one company over another. Value propositions vary in nature, some may be innovative and represent an entirely new offer, whereas others can be similar to the existing market offerings, but with new features and attributes.

A value proposition often contains a unique mix of elements designed to cater the specific needs of a customer segment. Some of the elements that can create customer value are listed below.

***Novelty*:** Some value propositions satisfy a whole new set of customer needs that was not perceived by customers before, because there was no similar offering. Such value propositions are often technology related.

***Performance*:** One common way to create value is to improve the performance of products or services. However, improved performance may have its limits, as it is seen in the personal computer industry. Improved PC performance, such as more disk storage, better graphics or faster processors, has failed to produce corresponding growth in customer demand.

***Customization*:** It involves tailoring products or services to the specific needs of individual customers or customer groups. This may be related to value co-creation, which has gained importance in recent years.

***Design*:** It is an important part of value proposition, for example, in fashion and consumer electronics industries. A product may stand out due to its superior design. Despite being an important element of value creation and proposition, it may be difficult to measure.

***Status/brand*:** Some products or services may be seen as status symbols. Hence, customers may find value in the simple act of using and displaying a specific brand or product.

***Price*:** The price of products or services is one of the primary reasons why customers may choose a firm, product or a service over another. Therefore, offering similar value at a lower price may increase the incentive of a customer to purchase a product or service, and is often a common way to satisfy the needs of price sensitive customer segments.

***Cost reduction*:** Cost is an important consideration in businesses. Helping customers reduce their costs is therefore an important way to create value.

***Risk reduction*:** Customers value reducing the risks that they may incur when buying products or services. Therefore, a source of value may be the improved relationships with customers through extended product or guarantee service after the purchase.

***Accessibility*:** Firms may create value by making products or services available to customers who previously lacked access to them.

***Convenience*:** Firms can create substantial value by making products or services more convenient or easier to use.

5.6. Value creation and proposition require strategic analysis of markets

The primary pursuit of any business is to understand what customers value, and create that value for them in a profitable way so that it also creates value for the shareholders. While customers are the final arbiter of value, it is the firm's role to explore, interpret and deliver value based on what they believe that customers are seeking. From a firm's perspective value creation is a strategic issue (Normann & Ramirez, 1993; Payne & Holt, 2001). Executives are therefore required to make informed decisions on how to refine their value creation strategy to provide superior value that will solve customers' problems and meet their needs and expectations as well as provide the firm a competitive advantage over its competitors.

In developing a value creation strategy, firms must have a thorough understanding of the dynamics and demands of the markets, in which they plan to operate, and conduct a thorough assessment of organizational capabilities to ensure that they have the strengths, resources and capabilities required to create value to meet those demands. To achieve this, firms may conduct external market analysis and internal company analysis.

5.6.1. External market analysis

An external analysis is concerned with the factors external to a firm that affects its strategies to achieve success, and involves an in-depth analysis of current and potential customers and competitors, markets, and environmental factors including government policies, social concerns, trends and technological developments (Figure 15).

Customer analysis is the first step of external analysis, and involves identification of the firm's customer segments, and their motivations, problems, unmet needs, and expectations. Competitor analysis involves identification of current and potential competitors and determination of their products or services, performance, strategy, strengths, and weaknesses. Market analysis aims to determine the attractiveness of the market and to understand the dynamics of the market so that threats and opportunities can be detected and strategies adapted. Finally, environmental analysis is the process of identifying and understanding emerging opportunities and threats created by forces, such as trends, new technologies, government policies and social concerns, in the context of the business (Aaker, 2014, p. 10-11).

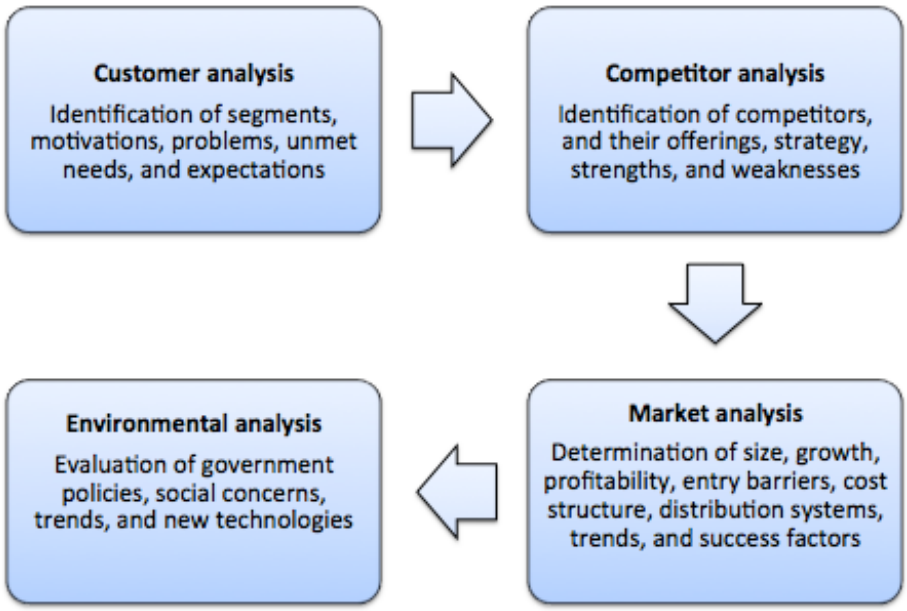


Figure 15. External market analysis

5.6.2. Internal company analysis

Value creation requires investments in assets and capabilities that can be leveraged to provide better customer solutions and simultaneously provide sustainable competitive advantages. Hence, the analysis involves an internal assessment to ensure that the firm possesses the capabilities, resources and strengths needed to create value and deliver it to the customers. The outcome of the analysis enables firms to ascertain what kind of value they are best equipped to deliver.

5.7. Stakeholder analysis

Stakeholders are defined as individuals or groups with whom the organization interacts or has interdependencies, and any individual or group who can affect or is affected by the actions, decision, practices, policies, or goals of the organization (Carroll, 1993). Therefore, stakeholders involve all the actors that have an impact on or relation with the firm and the value being created, such as customers, suppliers, employees, competitors, government agencies, capital providers, and social community (Figure 16).

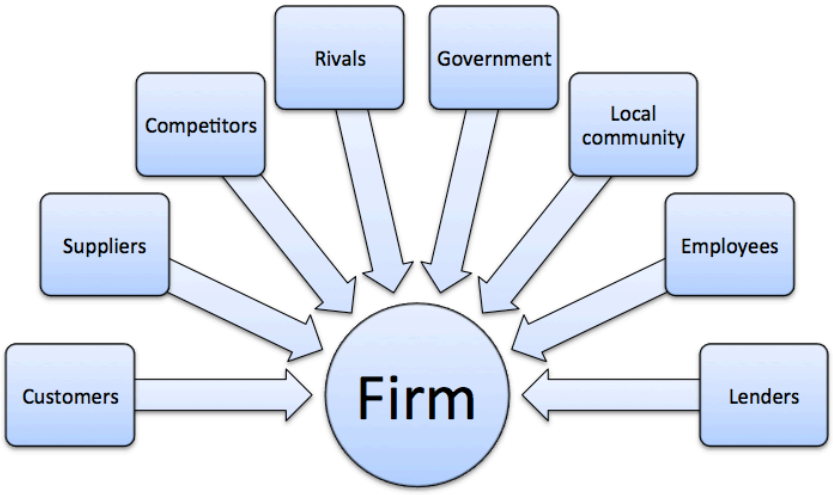


Figure 16. Stakeholder of a firm, adapted from Schilling (2017)

Stakeholders can be classified into primary and secondary stakeholders (Clarkson, 1995). Primary stakeholders are those who have high levels of interactions with the firm and are vital for the survival of the firm. Secondary stakeholders affect or are affected by the firm, but are generally not engaged in transactions with the firm and are not essential for firm survival. Such a classification seems suitable for understanding marketing stakeholder relations, where key commercial partners or networks are the primary stakeholders, and government agencies or local community are secondary stakeholders. Stakeholders can also be classified into internal and external stakeholders. In this case, while the customers, suppliers, competitors, governments and some capital lenders are external stakeholders, employees, and other capital lenders such as shareholders can be classified as internal stakeholders.

Typically, the initial step of a stakeholder analysis is to identify relevant stakeholders. Second, the nature, scope and importance of the stakeholder connection are determined. Third, an analysis is made to ascertain how effectively the firm is currently meeting the needs or expectations of each stakeholder. Finally, the firm addresses the unmet needs of stakeholders through modification of the firm's plans, policies, and activities (Freeman, 1984).

5.8. Porter's five forces

First described in an article published in Harvard Business Review in 1979, this model explains the five forces that affect industry structure, competition and profitability, and illustrates the balance of power in a market between different types of organizations. The model was originally developed to assess industry attractiveness, including profitability, but in practice, the model is often used to assess a focal firm's external environment, such as the factors that may create threats and opportunities for the firm. The five forces include the threat of entry, the bargaining power of suppliers, the bargaining power of buyers, the threat of substitutes, and the degree of existing rivalry (Figure 17).

Understanding the five forces, and their underlying causes, reveals the roots of an industry's current profitability, and provides a framework for anticipation and influencing competition and profitability in the long term. The configuration of the five forces may differ depending on the industry, and one force or forces may become more important than another for a firm

in formulating strategy and making strategic decisions. Each of the five forces is briefly explained below.

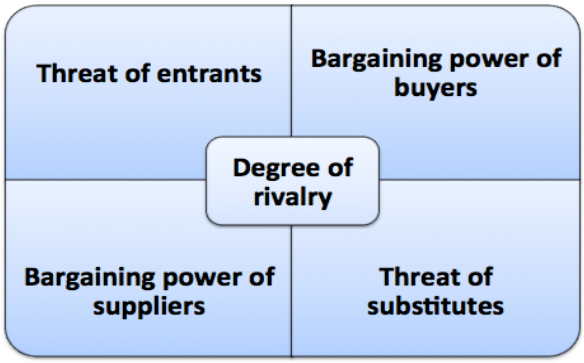


Figure 17. Porter's five forces

The threat of entry

New entrants to an industry with new capacity and desire to gain market share may put pressure on prices, costs, and the rate of investment necessary to compete. The threat of entry is influenced by the height of entry barriers that are present, the degree of reaction that an entrant can expect from incumbent firms, and the degree of industry attractiveness. Entry barriers can include factors, such as large capital requirements, brand loyalty, high customer switching costs, unequal access to supply and distribution channels, restricting government policies, and the threat of retaliation by existing firms. While profitability and growth may attract new entrants, strong entry barriers will deter them.

The bargaining power of suppliers

The degree to which a firm relies on one or more suppliers will affect its ability to negotiate good terms. Powerful suppliers may capture more of the value for themselves by charging high prices, limiting quality or services, or shifting costs to the buyer firms. If there are few suppliers, or suppliers are highly differentiated, a firm may have limited choice in its purchasing decision, and thus may have little leverage over the supplier to negotiate prices, delivery schedules or other terms. On the contrary, if suppliers are very abundant or not highly differentiated, a firm may force the suppliers to bid against one another and negotiate more favourable terms. A firm may also face switching costs in changing suppliers. When

switching costs are high, the firm may find it difficult to play suppliers off against another. Furthermore, suppliers may threaten firms to integrate forward into the industry. In this case, if firms of an industry make too much money relative to the suppliers, they might induce the suppliers to enter the market.

The bargaining power of buyers

Powerful customers are the flip side of powerful suppliers, and can capture more value by forcing down prices, demanding better quality or more service, and playing the firms of an industry of against one another. The degree of a firm's dependence on a few customers may increase the customer's bargaining power. If a firm's product or service is standardized or undifferentiated, the buyers will typically experience greater bargaining power; whereas if a firm's product or service is highly differentiated, the buyers will typically experience less bargaining power. Switching costs also influence the bargaining power of buyers. If buyers face low switching costs, this will increase their bargaining power. On the contrary, if buyers face high switching costs, this will increase their dependency on supplier firms and lower their bargaining power. Furthermore, buyers may threaten the firms to integrate backward into the industry, increasing their bargaining power over the supplier firms.

The threat of substitutes

Substitutes are products or services that are not considered as direct competitors, but fulfil a strategically equivalent role for the customer. Substitutes perform the same or a similar function as a firm's product or service by different means. The more potential substitutes there are and the closer they are in function to a firm's product or service, the greater the threat of substitution. Substitutes are always present, but they are easy to overlook, as they may appear to be very different from a firm's products or services. Therefore, firms should particularly be alert to the changes in other industries that may make them attractive substitutes when they were not before. Substitute products or services may limit a firm's profit potential by putting a ceiling on prices. If a firm does not distance itself from substitutes through product performance, marketing, or other means, it will suffer in terms of profitability as well as growth potential.

The degree of existing rivalry

The degree of rivalry in an industry is affected by a number of factors. For example, the number and relative size of competitors shape the nature of rivalry. When competitors are numerous or are comparable in size, the intensity of rivalry will be high. Rivalry is also influenced by the degree to which competitors are differentiated from each other. If competitors are highly differentiated, they will experience less rivalry, because their products or services are likely to appeal different market segments. Furthermore industry growth and exit barriers also influence rivalry, as slow growth will induce fights for market share, and exit barriers will keep firms in the market even though they may be earning low or negative returns.

Rivalry among existing competitors may take many forms, including price discounting, new product launches, advertising campaigns, and service improvements. And if it is intense, it will decrease profitability of an industry. Competition on dimensions, such as product features and performance, after sales support services, or brand image, may decrease profitability less compared with competition on price, because competition on dimensions other than price may improve customer value, and thus can support higher prices.

6. Methodology and data collection

This section explains how the study was conducted and the underlying research methodology. It includes the epistemological basis, and the collection and use of the empirical as well as the theoretical data. The section aims to provide the reader a clear view of the study and methodological process used.

6.1. Research process

A single case study has been used in this thesis work with an aim of designing a marketing strategy for the case company, Novozymes, which is one of the leading companies in producing industrial enzyme products. The case study consisted of determining the ways to improve the processing of African crops in the production of home-brew powdered beer with the use of enzymes, and finding appropriate strategies for Novozymes to implement in order to secure a significant share in the powdered beer market in the Sub-Saharan Africa.

In order to give a more complete overview of how the study was conducted, a description of the research process and its different elements will be provided here. The research process consisted of seven steps, as illustrated in Figure 18. For simplicity, the research process is illustrated as being linear; however it is important to note that the process involved many iterations.

Figure 18. Research process used in the thesis

6.2. Literature review

The theoretical understanding of value creation, value creation in emerging markets through innovation and sustainability, and the principles of strategic market analysis was based on a literature review. Furthermore, the knowledge of and data on beer brewing, beer types in African markets, and the importance and consumption of alcohol in the Sub-Saharan Africa were obtained from academic literature and published non-academic reports and articles on the Internet.

6.3. External analysis

An external analysis of the powdered beer market in the SSA region was performed in order to get insights into the market, and develop and adapt a profitable strategy for value creation for both customers and the shareholders. The analysis involved the factors external to the case company that can affect its strategy, such as potential customers, suppliers, business partners, competitors, submarkets, and the environment outside of the market. The main objectives of the external analysis were to:

- Identify current practices in the brewing industry and current products in the powdered beer market in the SSA.
- Map the value chain and identify the key players in the powdered beer market.
- Define the submarkets (specific national markets) in SSA.
- Map each of the submarkets and identify the target customers.
- Determine the cost window in each of the submarkets.
- Identify present and potential opportunities, threats, and trends with each of the submarkets.

Porter's five-force model and stakeholder analysis formed the basis for analyzing the environment external to the case company. Here, we do not find it necessary to explain these tools in detail again, as they have already been discussed in the theoretical background section. However, it is important to note that, in the stakeholder analysis, the emphasis was put upon the stakeholders external to the company, such as the customers, suppliers, business partners, governmental and non-governmental agencies, etc.

6.4. Internal analysis

The analysis of the internal environment of the case company was performed to primarily identify the firm's strengths and weaknesses, core competencies, and the key resources that would give the firm a competitive advantage in value creation over its existing and potential competitors. The main objectives of the internal analysis were to determine:

- Current and potential enzymatic applications, and enzyme portfolio of Novozymes.
- Company strengths and weaknesses.
- Key company resources for value creation.

- Core competencies and competitive advantage

6.5. Data collection

The data collection in the current study consisted of desk research and primary research to get insights into the external market and the internal company environments, and laboratory experiments to test the effect of Novozymes' certain commercial enzymes on the improvement of the home-brew powdered beer. The data collection process can be divided into three main parts: secondary research, primary research, and pilot brewing experiments.

6.5.1 Secondary research

Secondary research, also called desk research, refers to all research work conducted using secondary sources. It differs from primary research in that the data worked on will have already been collected by a third party, such as government surveys, internal reports, or published literature (Housden, 1992). The sources of information used in the current study have been categorized into groups, which are listed below. The specific sources in each of the categories have been cited in the text, where they were used as the source of information.

- Company annual reports, manuals, marketing information, advertising, and press releases
- Annual reports and other government reports about relevant companies that are available for public review
- Subscription based information through the databases at the Copenhagen Business School Library.
- Reports and press releases from trade associations, regulatory bodies, and non-governmental organizations
- Reports and statistics from parastatal organizations, such as the World Health Organization and World Bank
- Online research, including the newspapers and business magazines about local markets
- Market research data from commercial organizations, such as private market research companies

6.5.2. Primary research

Secondary research may answer many of the objectives of a market research, and any remaining information gaps can be filled through primary research. There are three types of primary research, observation, experimentation, and survey, and the best solutions often involve a mixture of these methods. In the current study, we have used experimentation and survey. However, experimentation methodology was not in the sense that it involved customers and tested the impact of various factors on their behaviours. It rather involved laboratory experiments with pilot brewing set-ups to test the effect of various commercial enzymes on the improvement of two types of powdered beer product received from South Africa. The survey methodology involved questions about the company operations and the powdered beer market in the SSA region, which were directed to key persons responsible for sales and marketing in the selected countries in the SSA region. These questions were listed in Appendix 1.

6.6. Segmentation of the SSA beer market for analysis

It is important to recognize that Africa is not a single market with a single set of standardised risk factors and homogenous potential for rewards. At a broad level, some similarities exist; however, if one digs down into certain countries, it becomes evident that Africa is comprised of distinct markets, each with its own advantages, disadvantages, cultural differences, and business practices.

The African beer market consists of premium beers, mainstream beers, affordable clear beers, commercial opaque beers, powdered beer, and unrecorded home-brew beers with premium beers at the top of the pyramid and unrecorded home-brews at the bottom. The beer types that belong to the bottom of the pyramid, including commercial opaque beers, powdered beer and unrecorded home-brews, constitute 70-80% of the beer consumption volume in Africa. The population with low income or limited access to shops or drinking places and mostly living in rural areas primarily consumes these types of beers; whereas the European style, clear commercial beers are primarily consumed by the middle- or high-income population living in urban areas.

Additionally, it would be extremely difficult for Novozymes to attempt to penetrate every Sub Saharan country at once. So, they would have to prioritize which countries to attempt to launch their products first based ease of success.

Therefore, the market analysis was focused on powdered beer and unrecorded home-brew beers in certain countries that were selected based on the following criteria:

- Large population (>40 million)
- Significant non-mainstream alcohol consumption, either in terms of unrecorded litres per capita, or % consumption of other alcoholic beverage type
- High rural population

Since it is known that the powdered beer market is extremely price sensitive, countries with these characteristics could potentially generate large enough sales volume to become attractive enough to pursue for Novozymes.

6.7. Limitations

The African markets have unique commercial environments, and may be limited in terms of reliable data, market research firms, and trained interviewers. Hence, there is a scarcity of data and insights about consumers' needs and behaviour, as well as the retail environment in Africa. The shortage of data and information is made even more challenging because of the diversity of both African consumers and markets. As a result, estimating market size, volumes, trends, and demands for products or services, and monitoring consumer needs and behaviour in African markets can be complex and challenging for firms. Firms are dependent on limited and not-so-reliable data from public research firms, unless they invest in developing capabilities to gather their own information and understand the dynamics of African markets. More than 80% of the population in SSA is rural based, which is characterised by poor transport and road systems, lack of information and communication technologies, and low levels of literacy. Furthermore, Africa lags behind access to the Internet compared to the developed countries, making market research in Africa largely dependent on face-to-face interviews. Taken together, gathering information about African markets is not an easy task.

Accordingly, the major limitation faced during the thesis project was in data collection, as it was extremely difficult to get access to and gather reliable data and information about the

African markets. For example, the consumption of home-brew traditional African beers, including the powdered beer, falls into the category of unregistered alcohol consumption in Africa. Therefore, it was difficult, if not impossible, to obtain exact data on the volumes of consumption of these traditional beers, and to estimate the demand for the powdered beer products.

7. Results

Four countries were found to meet the criteria for analysis (large population (>40 million), significant non-mainstream alcohol consumption, either in terms of unrecorded litres per capita, or % consumption of other alcoholic beverage type, and high rural population): Ethiopia, Kenya, Nigeria, and South Africa. These four countries would have the greatest projected market size.

7.1 Country Profiles

Each of these countries has unique demographic data that is worth getting an overview as a way of getting context. Population data came from the World Bank (World Bank 2017). Alcohol trends came from the World Health Organization (WHO 2014). Two statistics were calculated from the given data: alcohol and beer consumption. Total consumption = drinking population times pure alcohol per capita Beer consumption = (Total consumption times 48% drinking beer)/(average % alcohol content of beer(4.5))

Ethiopia

- Population:

  99+ million

- Drinking Population (15+):

  58+ million

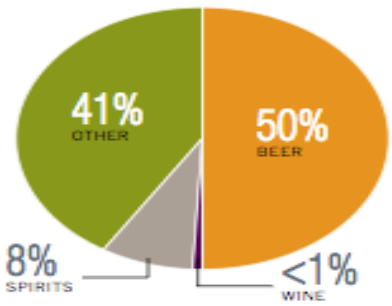
- % Rural (Now): 81

  (in 2050): >50

- Total alcohol consumption:

  2665 million liters

- Total beer consumption:



Alcohol per capita (15+) consumption (in litres of pure alcohol)

	Average 2003–2005	Average 2008–2010	Change
Recorded	0.9	0.7	→
Unrecorded	3.5	3.5	→
Total	**4.4**	**4.2**	→

Figure 19: Ethiopia Alcohol Statistics (WHO 2014)

240 million liters

Kenya

- Population:

  45+ million

- Drinking Population (15+):

  26+ million

- % Rural (Now): 74

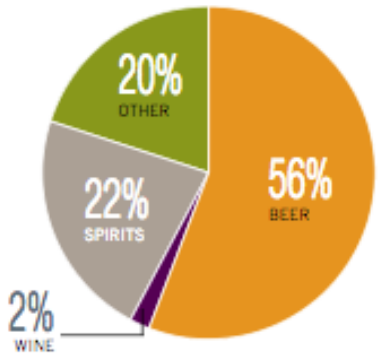
  (in 2050): 25-50

- Total alcohol consumption:

  2665 million liters

- Total beer consumption:

  240 million liters



Alcohol per capita (15+) consumption (in litres of pure alcohol)

	Average 2003–2005	Average 2008–2010	Change
Recorded	1.6	1.8	↗
Unrecorded	2.5	2.5	→
Total	**4.1**	**4.3**	→

Figure 20: Kenya Alcohol Statistics (WHO 2014)

Nigeria

- Population:

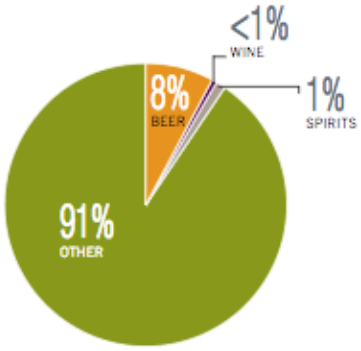
  181+ million

- Drinking Population (15+):

  97+ million

- % Rural (Now): 52

  (in 2050): 25>



- Total alcohol consumption:

  2665 million liters

- Total beer consumption:

  240 million liters

Alcohol per capita (15+) consumption (in litres of pure alcohol)

	Average 2003–2005	Average 2008–2010	Change
Recorded	9.8	9.1	→
Unrecorded	2.5	1.0	↘
Total	**12.3**	**10.1**	↘

Figure 21: Nigeria Alcohol Statistics (WHO 2014)

South Africa

- Population:

  54+ million

- Drinking Population (15+):

  42+ million

- % Rural (Now): 35

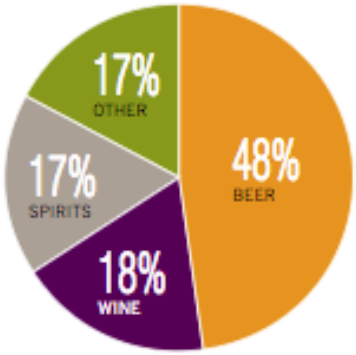
  (in 2050): 25>

- Total alcohol consumption:

  2665 million liters

- Total beer consumption:

  240 million liters



Alcohol per capita (15+) consumption (in litres of pure alcohol)

	Average 2003–2005	Average 2008–2010	Change
Recorded	7.6	8.2	→
Unrecorded	2.5	2.9	↗
Total	**10.1**	**11.0**	→

Figure 22: South Africa Alcohol Statistics (WHO 2014)

7.2 Stakeholders

Once the key countries were chosen it was necessary to map out the stakeholders in each. The general stakeholder types were more or less same across countries, as similar roles are

needed to produce powdered beer. However, in each country there were specific actors fulfilling each role. There was an attempt to figure out who the actors are in each country with varying degrees of success depending on the country as the availability of data greatly differed from one country to the next. Some actors were found to have multiple stakeholder roles particularly food companies that vertical integrated their processes.

Farmers

Farmers are extremely price sensitive and likely would be hesitant/ be able to adapt technologies that increase their costs. Since Novozymes products would likely be added downstream in the process, farmers would be supportive of it if the increased volume of crops sales due to the increased usability of the crops is greater than the likely price decrease due to the fact that the Novozymes addition will likely need less grain to achieve the same results. This would decrease demand and thus prices. This decreased demand could be offset if the producers decide to scale operations due to the new technology.

Millers

Millers are cost sensitive as well however they would be one potential customer of this product. Millers are likely to use the product if the cost of the product is less than the financial benefits of using it. Besides the cost of the product itself there would be very few additional costs to using a Novozymes product, as it shouldn't change their current process significantly. Some potential benefits include the ability to create more powdered beer from the same amount of grain essentially increasing production without changing anything, and the ability to create a higher quality product potentially leading to increased market share or a price increase.

Packagers

Packagers are in a similar position as the millers and are often the same actor. They have the same cost/benefit concerns. One thing that is different is that if the millers and packagers are separate and a Novozyme product is added at the millers and not with the packager they might be more resistant if the millers try and push up the price.

Brewers

Brewers are in an interesting position as they would like the ability to brew more beer for less grain and a have higher quality product however almost any increase in price would likely push the consumer towards beer higher up in the beer segmentation pyramid towards commercial produced beer. It is likely that they will be opposed if there is any increase in cost to them.

Beer Consumers

While beer consumers would likely benefit and want an increase in quality it is hard to imagine them sticking with powdered home brewed beer if it is comes with an increase in cost.

Some of the individual actors that were found are listed by country:

- South Africa: Botselo Mills, Tiger Brands, Premier Foods, Pioneer Foods, RCL Foods, Cereal & Malts, Rio Tenco
- Nigeria: Dangote Group, Flour Mills Nigeria,
- Kenya: Unga, Capwell Industries, Pamat Foods, Sifted Maize Millers, Hammer/Posho Millers, Alpha Grain Millers
- Ethiopia: Alpha Grain Millers

7.3 Market Size

To help make recommendations about whether or not to enter the powdered beer market in SSA a market size had to be generated. Considering the lack of available data, a model was created to estimate the total market size. Initially, based on top level data from the WHO an idealized maximum market size was calculated. After talking to some of Novozymes partners in the region the market size was adjusted from their sales data.

Idealized Maximum Market Size

This equation was developed to estimate the maximum market size

Market Size = Powdered Beer Consumption (L) * Grains per Powdered Beer Produced (Kg/L)* Enzyme Needed per Grains (g/Kg) * Enzymes in Kg (Kg/ 1000g).

Each of the variables:

To figure out the powdered beer consumption the following equation was created:

Powdered Beer Consumption (L) = (Average of: beer (other%/beer%) and (unreported/reported)* beer consumption (L))

Based on the WHO alcohol report a factor was created to figure out the ratio between powdered beer and commercial beer in a given country and use this to extrapolate the total powdered beer consumption. (WHO 2014)

Country ratios powdered beer to mainstream beer:

South Africa =.35
Nigeria = 5.7
Kenya =.86
Ethiopia = 2.91

Final Powdered beer consumption by country:

South Africa: 1,712,900,000 L, Nigeria: 9,786,900,000 L, Kenya: 1,181,590,000 L, and Ethiopia: 7,755,150,000 L.

The grains per powdered beer produced was taken from a package of Mnanti powdered beer shipped from South Africa:

Grains per Powdered Beer Produced = .75/5 (Kg/L)

The amount of enzymes needed was taken from the Novozymes brewing handbook (Novozymes 2013)

Enzyme Needed per Grains = 250 (g/Kg)

Idealized maximum market size

South Africa: 218,394 kg of enzymes, Nigeria: 1,247,829 kg of enzymes, Kenya: 150,652 kg of enzymes, Ethiopia: 988,781 kg of enzymes

Adjusted Market Size

After looking at supplier data it was decided that the market size data was probably over estimated by a factor of 4 and all country data was adjusted accordingly.

Adjusted market size:

South Africa: 43,678 kg of enzymes, Nigeria: 311,957 kg of enzymes, Kenya: 37,663 kg of enzymes, Ethiopia: 247,195 kg of enzymes

7.4 Internal Analysis

To try and figure out which Novozymes product would be the best for home brewed powdered beer an experiment was run with the Novozymes R&D department where two powdered beer products King Korn and Mnanti were treated with different enzymes and results recorded. Overall, 8 different experimental groups were used with Mnanti and 4 were used with King Korn. While the raw results of this experiment are confidential there are two takeaway results that can be shared: one King Korn's biggest issue was not the naturally occurring enzymes but the naturally occurring yeast. It seems like there would be greater benefit from adding an external yeast than adding enzymes. More studies need to be done to confirm. Mnanti, which already has yeast added, did not have this problem and seemed like there were some potential candidates of enzymes to addfrom the trial we did. However, there was not enough data to show statistical significance so this would need to be investigated further.

8. Discussion and recommendations

From the on set the goal was to figure out whether or not there is a commercially viable way to add value by adding enzymes to improve the processing of African crops (e.g. corn, sorghum or cassava) for the production of home-brew powdered-beer. This leads to three questions:

1. Are enzymes a viable way to add value to improve the processing of African crops (e.g. corn, sorghum or cassava) for the production of home-brew powdered-beer? Almost definitely for powdered beer that has yeast added. Novozymes brewing products work successfully for a number of brewing situations and should continue to work for powdered beer. Our results suggested that the more processed the powdered beer was the more adding enzymes gave a benefit. This would suggest that Novozymes product could be a supplement to add back enzymes that were lost during the production process.
2. In the short term is this commercially viable? Maybe. It seems to have a relatively large market size and a couple of key players with significant market share that would be relatively easy to penetrate. However, it is really hard to figure out exactly how large these player's market size is and it will be hard to penetrate the rest of the fractured market. It is hard to say whether or not it would be worth it to spend the required resources to gain these customers. One other thought, is it could be worthwhile if it is part of a larger strategy to build long lasting business relationships with these plays to sell a portfolio of products across business units. Many of the large players in powdered beer also produce other products and could be interested in baking enzymes for example.
3. In the long term is this commercially viable? Probably not. Market trends are already starting to squeeze the powdered beer market and it is only going to intensify. It would not be surprising if in the next 10-20 years powdered beer became a niche market only for special events and holidays think Ginger Bread houses for Christmas. It is really hard today to tell if a smaller future niche powdered beer market is worth getting into.

Based on this our recommendation to Novozymes, is unless entering the powdered beer market is part of a larger strategy to build business relationships with certain large players across product offerings, we would not recommend pursuing this market.

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10. Appendices

Appendix 1.

The questions about the company operations and the powdered beer market in the SSA region, which were directed to key persons responsible for sales and marketing in the selected countries in the SSA region.

1. What powdered beer products are there on the shelves in Kenya and Nigeria? How much do they cost?

2. Is it possible to obtain data on the sales volumes of these products (at least that of Mnanti and King Korn)?

3. Does Novozymes already have business relations with some of the potential customers, such as Tiger Brands, Botselo Mills or other food or milling companies? Is it possible to obtain data on the volume of sales to these companies? How are they willing to improve their current powdered beer related products?

4. Is it possible to ask simple questions to local people in the SSA region such as: why do they drink traditional beer? What is their motivation: price, taste or availability? Is there anything they do not like about traditional beers? How do they want traditional beers to be improved?

5. The people who make powdered beer for re-sale in local "bars" (also known as dolo bars, shebeen or pitobars in some countries), what would they like to see improved? What is their price sensitivity? Is it possible to obtain any data on their sales volume?