

FUNDAÇÃO GETULIO VARGAS
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

JONAS CHRISTOPHER TIMMERMANN

**CONSUMER PERCEPTION OF BRAZILIAN BEEF: INSIGHTS FROM A
QUANTITATIVE STUDY IN EUROPE**

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Knowledge Field: Marketing

Adviser: Prof. Dr. Luís Henrique
Pereira

SÃO PAULO
2016

Timmermann, Jonas Christopher.

Consumer Perception of Brazilian Beef: Insights from a Quantitative Study in Europe / Jonas Christopher Timmermann. - 2016.
58f.

Orientador: Luís Henrique Pereira

Dissertação (MPGI) - Escola de Administração de Empresas de São Paulo.

1. Carne bovina - Exportação . 2. Carne bovina - Brasil. 3. Marketing. 4. Marca de produtos. 5. Consumidores - Preferência. I. Pereira, Luís Henrique. II. Dissertação (MPGI) - Escola de Administração de Empresas de São Paulo. III. Título.

CDU 659.126.1(81)

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Approval Date

____/____/____

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ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my advisor Prof. Luis Henrique Pereira for the continuous support of my thesis and related research, for his patience, motivation, and immense knowledge. Without him it would not have been possible to complete this dissertation.

I also want to thank Guido Borgato for his significant help and advice throughout the process and his availability when I needed guidance.

Lastly, I want to thank my parents for their unlimited support throughout my academic career.

ABSTRACT

Brazilian beef companies have been very successful in recent years due to a range of external factors. These factors include a favourable climate in Brazil and an abundant supply of natural resources (such as supply of water and cheap farmable land). Economically wise, Brazilian beef companies benefitted from cheap labour, reduced trade barriers and a favourable exchange rate. To investigate the quality perception of Brazilian beef, a quantitative study was conducted with German, French and Italian consumers. The results reveal that Brazilian beef lacks brand equity: Respondents that have never bought (or experienced) Brazilian beef have subconsciously a negative impression of the quality of Brazilian beef. Moreover, the image of Brazil as a country has an effect on how consumers perceive Brazilian beef. This paper suggests that Brazilian beef companies should intensify their marketing efforts and invest in the brand building of Brazilian beef. Since the beef industry is important to Brazil's GDP, the government (supported by ABIEC) is advised to support these marketing programs as well. Brand building serves as a form of protection against times when external factors may worsen.

KEY WORDS: Beef Exports, Brazilian Beef, Branded Products, Consumer Preferences

RESUMO

Empresas brasileiras de carne bovina foram muito bem sucedidas nos últimos anos devido a uma série de fatores externos. Esses fatores incluem um clima favorável no Brasil e uma oferta abundante de recursos naturais (como o fornecimento de água e terras cultiváveis baratas). Em termos econômicos, as empresas brasileiras de carne bovina foram beneficiadas pela mão de obra barata, pelas barreiras comerciais reduzidas e por uma taxa de câmbio favorável. Para investigar a percepção de qualidade da carne bovina brasileira, um estudo quantitativo foi realizado com consumidores alemães, franceses e italianos. Os resultados revelam que a carne brasileira carece de brand equity: os respondentes que nunca compraram (ou experimentaram) carne brasileira têm inconscientemente uma impressão negativa com relação à qualidade da carne brasileira. Além disso, a imagem do Brasil como país tem um efeito sobre como os consumidores percebem a carne brasileira. Este trabalho sugere que as empresas brasileiras de carne bovina devem intensificar os seus esforços de marketing e investir na construção da imagem da marca da carne brasileira. Dado que a indústria da carne é importante para o PIB do Brasil, o governo também (apoiada pela ABIEC) é aconselhado a apoiar estes programas de marketing. Construção de marca serve como uma forma de proteção contra tempos em que fatores externos podem piorar.

PALAVRAS CHAVE: Carne bovina – Exportação, Carne bovina – Brasil, Marketing, Marca de produtos, Consumidores – Preferência

List of Abbreviations

| |
|--|
| ABIEC – Association of Brazilian beef exporters |
| BSE - Bovine spongiform encephalopathy |
| FCOJ - Frozen Concentrated Orange Juice |
| FDI – Foreign Direct Investment |
| FMD – Foot-and-Mouth Disease |
| GDP – Gross Domestic Product |
| ISO – International Organization for Standardization |
| MODERAGRO – Programa de Modernização da Agricultura e Conservação de Recursos Naturais |
| NFAS – National Feedlot Accreditation System (Australia) |
| NLIS – National Livestock Identification System (Australia) |
| NVD – National Vendor Declaration (Australia) |
| SISBOV – Sistema Brasileiro de Identificação e Certificação de Bovinos e Bubalinos |

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1. Introduction

1.1. Brazilian Agribusiness

Brazil is one of the largest countries by geographical size and the largest country in terms of farmable land (Economist Intelligence Unit, 2010). The country is rich of natural resources and has a favourable climate, thus making the country predestined for agricultural goods production. Brazil already ranks as the number one producer of agricultural goods such as sugar, coffee and frozen concentrated orange juice (abbreviated FCOJ, defines commercial squeezed orange juice that is pasteurized and filtered before being evaporated under vacuum and heat). In terms of exports, Brazil is the top global supplier of sugar, coffee, FCOJ and beef (Duff, 2011). Over the last decade, the share of exports to emerging countries has increased rapidly, growing from 36% in 2002 to 58% in 2011. Additionally, agricultural exports have benefitted from price growth. For example, between 2001 and 2011 the prices of sugar and coffee (agricultural goods with the highest export value for Brazil) increased by 13% and 16% respectively (Duff, 2011). This growth in agribusiness also had a significant impact on Brazil's GDP. Currently, the agribusiness sector represents 23% of GDP, 27% of jobs and 44% of all exports (HSBC, 2014).

How did Brazilian agribusinesses become so large in size? One of the main reasons is a favourable climate. There is sufficient rainfall in agricultural production areas (1200-2200 mm/year) and the winter is generally mild in temperature, allowing for two or more harvests in most regions (Duff, 2011). Furthermore, Brazil has an abundant supply of water, almost three times the fresh water supply of the U.S., and cheap farmable land, which can even be further extended. Currently, Brazil has one of the lowest ratios in terms of planted acres to total area (Economist Intelligence Unit, 2010). Moreover, productivity gains in the agribusiness have been substantial, mainly through the implementation of modern technology and investment in research. For example, over the last 30 years the planted grain area only grew by 30%, whereas grain production increased by 190% (Duff, 2011).

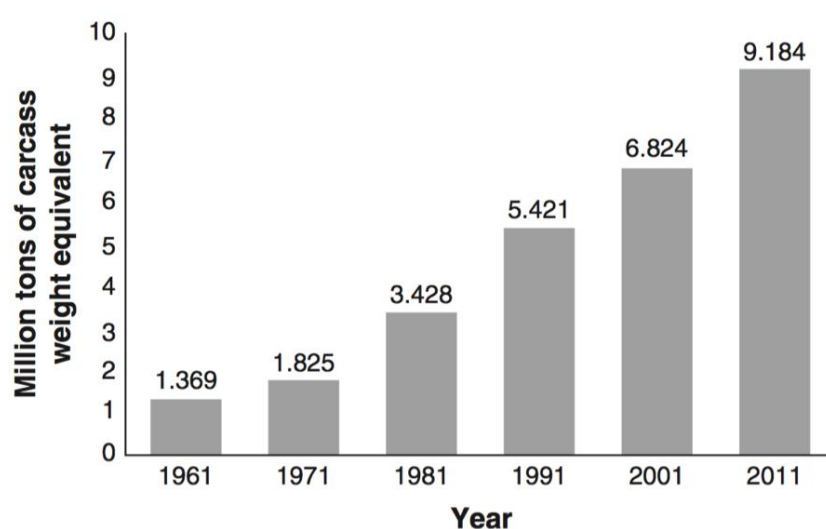
1.2. Brazilian Beef Industry

The agribusiness sector in Brazil remains crucial to the overall GDP. Within this sector, the beef industry makes up approximately 27% (Bonsall, 2012). Driven by growing demand from the domestic and international markets, the beef industry grew

rapidly over the last decade. Currently, 80% of total beef production in Brazil is destined for the domestic market, mainly driven by the growing middle class and rising income levels. In terms of international demand, Brazil has become the largest exporter of beef in the world in 2004 (Duff, 2011). This success in exporting beef was on the demand side fuelled by a growing appetite for beef from emerging countries (e.g. due to higher incomes). On the supply side, Brazil's success was mainly due to its cost-competitiveness in international markets with low prices for land and labour, and the limited scope for supply growth in other exporting countries at competitive costs (Duff, 2011).

Brazil exported approximately 2.03 million tons of beef and veal in 2014, which constituted roughly one third of total beef and veal exports in that year (US Department of Agriculture, 2014). In addition, Brazil has the second largest cattle herd in the world, estimated at 205 million, whose productivity in heads per hectare increased by around 25% over the last ten years. Looking at the beef sector development over the last 50 years, one can get a concrete idea of the tremendous growth occurring in the beef industry in Brazil. The beef production in Brazil has increased from approximately 1.4 million tons to approximately 9.2 million tons, which ranks Brazil currently as the second largest producer behind the United States (Bonsall, 2012).

Figure 1: Evolution of Brazilian Beef Production



Source: Paulino & Duarte, 2014

Due to its success, the Brazilian beef sector has developed some large companies, all of whom are able to influence international markets. For example, the largest beef processor in the world is now a Brazilian-based company, JBS, which transformed from a US\$1bn to a US\$40bn company. The company acquired Bertin in 2009, the second-largest beef packing plant in Brazil, which increased the company's number of beef plants from 19 to 34 in Brazil. Just to put this into perspective, these beef plants have the capacity to slaughter 40,000 cattle per day which constitutes approximately 22.3% of Brazil's total slaughter capacity. Since the company acquired the U.S. firms Swift, Pilgrim's Pride and National Beef Packing Company as well as Australia's Tasman Group, the company now exports to about 150 countries and thus can be considered a global player (Bonsall, 2012).

The competition in the global market for beef becomes increasingly harsh with intensifying pressures from importing countries concerning health and sanitary controls. However, in recent years beef prices have risen sharply due to constrained supply and strong demand especially in Asia. For example, the USA has the lowest beef cow inventory since 1952 due to droughts that have occurred over the last years and it will take about 5 years to replenish the stock (Wieland, 2014). Analysts also argue that strong international demand for Brazilian beef remained steady in 2015 due to limited supplies on the world market, demand from Russia as a result of European sanctions and the reopening of Chinese markets to Brazilian beef companies (Dumas, 2014).

1.3. Purpose of Thesis

The industry dynamics outlined in the previous section offer Brazil's beef companies an enormous opportunity. Beef of Brazil has gained tremendous visibility abroad through its growth in exports, which serves as a great chance for Brazilian companies to improve its brand image and to consequently increase the perceived value of its products (Pereira, Pozzobon & Pereira, 2009). However, in order to keep Brazil's position as the world's leading exporter of beef, further improvements need to be seen. Millen, Pacheco, Meyer, and Rodrigues (2011) suggest that the production cycle needs to be more efficient to supply international and external demands in the future, meaning that sector productivity and yield parameters have to be improved. Rabobank (2014) further notes that Brazil has to increase feedlot capacity to increase

the quality of their beef. Currently, less than 10% of Brazil's beef production is generated by lot feeding. Lot feeding (in contrast to grazing on rangeland) leads to more intense production systems and allows cattle to be slaughtered younger and heavier. In combination with shifts in technology, this will improve beef quality and helps Brazil to expand to higher-value export markets, such as Europe and Japan that are currently served by Australia and the U.S. Additionally, Brazil's beef industry faces other challenges, like the relatively low level of animal traceability and a low perception of animal health. This has resulted in many bans on Brazilian beef imports in the past years with negative effects on sales (e.g. Europe and U.S.).

This dissertation researches the low level of animal traceability and low perception of animal health. It is examined whether people from three European countries associate Brazilian beef with quality attributes. Additionally, it is tested whether traceability and Brazil as a country (country of origin) affect the quality perception of Brazilian beef. The research question is as follows:

Do Europeans associate Brazilian Beef with Quality Attributes?

1.4. Objective

The quality perception of beef is an important determinant for beef consumption. However, so far the research about how consumers perceive the quality of Brazilian beef is limited. Therefore, this dissertation aims to find out whether consumers associate Brazilian beef with quality attributes, and further investigates whether traceability and country-of-origin have a positive effect on the quality perception of Brazilian beef. Evidence has shown that consumers are changing their beef consumption patterns by focusing more on 'quality characteristics', such as healthiness and freshness of beef, as well as a more transparent production process (Santich, 2014; Verbeke & Viaene, 1999; Grunert, 2005).

To test whether traceability and country-of-origin affect quality, two further assumptions are made which are supported by previous literature (please find details in corresponding sections):

1. *Cattle traceability has a positive effect on the quality perception of Brazilian Beef.*
2. *Brazil's image as a country has a positive effect on the quality perception of Brazilian beef.*

The results of this thesis help all stakeholders involved in the Brazilian beef industry – from the beef companies to the government – by providing valuable insights for further expanding the beef business domestically and internationally. This thesis gives an overview of the industry at large and also provides a comprehensive analysis on the industry's strengths but also weaknesses in terms of consumer perception. Unfortunately, this field of study has not received much attention yet in Brazilian academic literature. The purpose of this research is to provide an incentive for other scholars to study this topic further. Considering its current economic importance and the continuing growth in the future, this topic so far has not received the recognition it should have. In fact, Brazil has the capabilities to shape the future global beef business. For that, however, one needs to further understand how consumers perceive Brazil's beef.

1.5. Outline of Thesis

The thesis is divided into three main parts. The first part gives an introduction to the Brazilian beef industry and outlines its unique characteristics. Within this part, a comparison is made between Brazil's and other countries' beef production systems. Additionally, it is demonstrated why countries have banned Brazilian beef imports in the past. Furthermore, the traceability system in Brazil is explained (which was mainly installed as a result of the import bans). The second part provides a definition of quality and consumer perception in general and shows how this relates to food. Then it is examined, based on previous literature, how Brazilian beef quality is perceived in the world. Moreover, the environmental impact of beef production and current global demand patterns for beef consumption are elaborated on. The third part describes the results of a survey, conducted with German, French and Italian consumers, on how Brazilian beef quality is perceived. Based on these results, recommendations are provided on what measures Brazilian beef companies and the

government should take in order to increase the quality perception of Brazilian beef. A conclusion summarizes the main findings, followed by limitations of this study.

2. The Beef Cattle Industry in Brazil

2.1. History and Evolution

Brazilian agriculture is an integral part of the global food trade and includes beef production as one of its major businesses. Due to a protectionist economy in the past, Brazil's beef exports have only started to flourish over the last two decades. A main reason for that was the formation of ABIEC (Association of Brazilian beef exporters) in 1979 which is the main representative of the Brazilian beef industry in areas such as health requirements and international trade. This organization has helped to increase professionalism in Brazil's beef industry by stimulating its members to be more performance focused and by promoting a dialogue between companies and governments. By being the voice for all of its members, ABIEC's objective is also to strengthen the brand image of Brazilian beef and to capture new markets. Since 2001, ABIEC has aggressively engaged in marketing efforts and started a program to promote Brazilian beef as a natural (grass-fed instead of grain-fed beef) and healthy product. In 2006, ABIEC's marketing efforts focused mainly on the European Union (60% of Brazilian exports), but other important markets like the Middle East, Russia and the U.S. were also targeted (Steiger, 2006).

Currently, approximately 6.8 million Brazilians are directly or indirectly involved in the Brazilian beef industry. Beef production in Brazil has increased immensely since the 1960s, ranking Brazil now second in the world. In line with this development the cattle herd grew to over 200 million head, a 24% increase since 1994 (Steiger, 2006). Moreover, the number of feedlots in Brazil is still relatively small compared to other beef exporting countries. Cattle are kept in these feedlots only for a short period of time (usually at the 'finishing period') which leads to the conclusion that the Brazilian beef industry can still be regarded as 'grass-fed' (Paulino & Duarte, 2014). This is one of the reasons why production costs for Brazilian beef are approximately 50% lower than in the US and 60% lower than in Australia. As a result, the Brazilian beef industry can be considered as highly competitive in the global food trade and consequently beef exports grew from 2.6% of total beef produced in 1961 to 17% in 2012. However, these numbers also show that the majority of beef is still bound for

the domestic market, where demand was driven mainly by rising income levels (Paulino & Duarte, 2014).

2.2. Production Systems

There are different systems of beef cattle production in regions of Brazil. Although cattle production is present in all regions, for the last three decades cattle production has moved to the Centre-West region of Brazil (Steiger, 2006). Generally, half of the area utilized for beef production is in five states: Mato Grosso, Minas Gerais, Mato Grosso do Sul, Goiás and Pará (Appendix A and B). The different systems of beef production are ‘grass-fed small enterprises’, ‘grass-fed medium specialised operations’, and ‘grain-fed/grass-fed large commercialised beef operations’ (Paulino & Duarte, 2014). These systems differ in the number of cattle head raised per year. Whereas small enterprises annually raise below 500 head per household, medium enterprises raise over 1000. Commercialised enterprises on average raise more than 4000 head. Moreover, production systems differ in terms of activity performed. These types are ‘cattle breeding’, ‘cattle raising’ and ‘cattle fattening’. Most beef enterprises in Brazil engage in the full cycle of breeding, raising and fattening (Paulino & Duarte, 2014).

For grass-fed operations, additional minerals have to be provided throughout the entire year because the soil in cattle regions tends to be largely low in minerals. This supplementation is needed to maintain animal performance since seasonal variations can lead to changes in quality and quantity of cattle feed. Moreover, creep feeding is extensively used in Brazil to supplement the nutrition of young cattle in order to cause more weight at weaning and thereby decrease the period required to raise cattle (Paulino & Duarte, 2014). Weaning relates to the process of slowly introducing young cattle to its adult diet and removing its mother’s milk as part of the diet. In beef production, the weaning weight of the calf determines almost all profit. Ranches that provide young cattle with additional minerals during the pre-weaning period tend to produce heavier weaned cattle that require less time in the feedlot at a later stage. Typically, these animals undergo one of three common ‘finishing routines’. One of these finishing routines is a ‘super early-maturing’ system, in which calves are weaned and afterwards sent to feedlots at about 240 kg bodyweight and 8 months of age. At these feedlots, the cattle would remain for 120 days and is then slaughtered at

420 kg live weight. Other systems include 'early-maturing', in which calves are weaned until they weigh 170-190 kg (7-8 months old) and raised in grazing systems until about 2 years old. At a weight of around 350 kg the animals are then brought to feedlots. The last system refers to 'pasture growing', in which young cattle is provided with variable quality pastures and reared until about 3 years old. Then the animals are slaughtered at a weight of 450-500 kg (Paulino & Duarte, 2014).

Brazilian beef producers apply these two methods of cattle finishing schemes: the traditional pasture-fed system and feed lotting (see description above). The majority (83%) of producers still engages in the pasture-fed system but this system increasingly comes under pressure as land can be used more profitable for agricultural activities such as cash-cropping. As a result, in recent years the use of feedlots in Brazil has increased because weight gain occurs faster with concentrate diets compared to forage-based diets. This also implies that cattle need to be feed for a shorter amount of time which reduces costs. A production cycle that only uses grazing systems with mineral supplementation results in older cattle and lower meat-eating quality (Paulino & Duarte, 2014). In fact, the age of cattle at slaughter has a great influence on beef quality because older cattle tend to have a greater collagen deposition and reduced solubility (resulting in tougher meat). During the 2000s, the number of cattle finished in feedlots grew by 50% to 3 million. This is only a small proportion of the beef system in Brazil, but the feedlot industry in Brazil has grown rapidly since most beef produced in these feedlots is bound for external markets (Paulino & Duarte, 2014). Nevertheless, the production costs for pasture-fed cattle are usually cheaper. The number of cattle in feedlots depends a lot on the price of feeder cattle, corn and soybean as well as other by-products.

Regarding cattle breeds in Brazilian beef systems, 75-80% have *Bos indicus* content. Of these breeds, Nellore represents the largest group, followed by Guzera and Gyr. The Nellore breed has one key advantage over other breeds, which is its ability to adapt to a tropical climate and resistance to parasites. However, in the southern region of Brazil where temperatures are lower and soils more fertile, European breeds (*Bos taurus*) are raised. Some of that meat, due to better quality (tenderness and marbling), is exported or supplies a domestic niche market (Ferraz & de Felício, 2010). The main breeds in southern Brazil are Aberdeen Angus and Red Angus Herford. When

comparing breeds of *Bos indicus* and *Bos taurus*, Nellore breeds have lower production due to lower levels of milk production and compromised carcass traits. To mitigate this issue, Brazilian beef producers started crossbreeding of *Bos indicus* and *Bos taurus* cattle to ‘create’ a breed with environmental adaptability and high reproduction.

The reason Brazil’s beef industry has grown so rapidly is mainly due to widely available farmlands, cheap labour and the reduction of trade barriers. This has facilitated the emergence of large Brazilian beef companies that used their economies of scale to build stable financials and to acquire competitors from abroad. Additionally, the program MODERAGRO was launched which provides funds for the conversion of land at subsidized interest rates. In 2006, beef producers could lend up to US\$50,000 at an interest rate of 8.5% per year, as opposed to commercial rates of more than 14% (Steiger, 2006). Other factors that contributed to the rapid growth were a weak currency that stimulated exports and marketing programs carried out by ABIEC for Brazil’s beef-packing companies that emphasized their BSE-free products (BSE refers to a disease in cattle that damages the central nervous systems and causes the death of the animal). Nevertheless, the Brazilian beef industry faces a lot of challenges that hurt the brand image of their products. Firstly, Amazon deforestation causes many people to turn away from Brazilian beef due to environmental concerns. Secondly, foot-and-mouth disease remains an issue. Although the Association of Brazilian Beef Exporters (ABIEC) has started intensive marketing campaigns since 2001 to promote the brand ‘Brazilian beef’ as healthy and natural, some countries still ban beef imports from Brazil. Although only 16 out of 27 Brazilian states have overcome FMD (Millen et al., 2011), the industry has reacted and now rears over 80% of cattle in states that are considered FMD-free. FMD is a highly infectious virus that can infect people but affects them most by infecting cattle that is then consumed. The European Union is especially concerned about another outbreak of FMD and therefore demands a traceability scheme throughout the Brazilian beef supply chain as well as the ban of β -antagonists, antibiotics and certain hygiene standards. Thirdly, the Zebu cattle is considered low-quality beef due to their tenderness and slower feedlot growth rates (feed for crossbreds is 6-8% lower). The Brazilian government has already granted financial support by subsidizing semen

imports of European breeds in order to cross with Zebu cattle but the number of crossbreds is still relatively small.

2.3. Comparison with Other Beef Production Systems

Besides Brazil, a few other countries have developed large beef production systems over the years. Due to differences in management and climate, the cattle performance in these countries differs strongly from each other (Malau-Aduli & Holman, 2014). This section describes the different production systems of Australia and Argentina and identifies their unique characteristics in comparison with Brazil's production system.

Australia is the second largest exporter after Brazil in absolute terms – 65% of the total beef production is shipped to other countries, which shows the strong dependence on export markets. Whereas Brazil mainly exports beef to the EU (60%), the Middle East and Russia, Australia's exports are predominantly destined for Japan, the USA and South Korea. The main competitive advantage of Australia's beef industry lies in its disease-free status. Until now neither FMD nor BSE have been discovered in Australia's beef production systems, which is probably due to its geographical isolation and strict border controls. Additionally, quality is assured by the implementation of different programs that demonstrate traceability and other safety practices. For example, the National Vendor Declaration (NVD) provides information about how cattle was raised. The Australian National Feedlot Accreditation System (NFAS) ensures the welfare of cattle, product safety and environment protection. The National Livestock Identification System (NLIS) is a traceability system based on a 'whole life' electronic ear tag. This tag sends all information to a central database and thus allows an easy trace-back to cattle's property of birth. This makes Australia's traceability system unique compared to other traceability systems worldwide. All these programs have given Australian beef a quality label. To keep this disease-free status, continuous investments in biosecurity and quarantine services are undertaken (Malau-Aduli & Holman, 2014).

Brazil's neighbour Argentina also has a long history of beef production. The main difference to Brazil is that Argentina's cattle herd mainly consists of British cattle breeds like Angus and Hereford. Traditionally, these cattle were fed on natural

pastures with only small feed supplementation. However, at the beginning of the 2000s, something interesting happened in Argentina. Many beef producers shifted their focus to oilseed and grain cropping to take advantage of the high world prices at the time. This meant for beef production systems that much pastureland was lost. Instead, beef producers switched to more feeder cattle production methods, which was further intensified by low corn prices and the availability of 'energy-rich rations' (Malau-Aduli & Holman, 2014). Since Argentina has the highest per capita consumption of beef in the world, the government controls the industry quite closely in order to keep inflation low and foster political stability. The Argentinian government has declared that one of its objectives is to supply beef at 'reasonable price'. For example, in 2005 the government made beef exports unattractive by cutting export tax allowances on 200 food products. Additionally, export taxes on beef cuts were increased from 5% to 15% (Steiger, 2006). This form of government intervention further intensified the shift to grain cropping, which was more profitable than raising cattle for the regulated domestic beef market. Moreover, in 2007 identification tags for all cattle have been made mandatory to implement a traceability system. In contrast, Brazil's traceability system is only compulsory for beef that is exported.

2.4. Bans on Brazilian Beef Imports

Outbreaks of the foot-and-mouth disease have occurred in Brazil for more than one century. Although the Brazilian government has implemented programs to reduce the number of such events, a recent outbreak occurred again in 2005 in the state of Mato Grosso do Sul (Costa et al., 2011). A few months after the outbreak in Mato Grosso do Sul, the foot-and-mouth disease was discovered in Paraná. As a result, several beef importing countries banned the import of Brazilian beef. One of these countries was Russia, which at the time was the number one importer of Brazilian meat. At first, Russia only banned imports from the two before mentioned states. At a later stage, these import bans were then extended to the all neighbouring. At the end, eight meat producing states were affected by the import ban which lead to considerable economic losses. Not only had 32,549 cattle to be slaughtered as a result of the disease, in the first two months after the import ban exports fell by 30% (Costa et al., 2011). It was also found that the outbreak of FMD lead to a price shock in the Brazilian meat market. Regarding exports, the price of Brazilian beef decreased

within the first two months after the outbreak and only really recovered again one year after the import ban by Russia was lifted. Farm prices also declined massively due to the import ban since the resulting oversupply was dumped on the domestic market. A recovery of farm prices also only occurred after the import ban was eliminated. This development of export and farm prices of beef in Brazil during the FMD outbreak is in line with other cases from Europe and North America (Costa et al., 2011).

Other bans were imposed on Brazilian beef imports due to an incident of bovine spongiform encephalopathy (BSE) in 2010. These import bans by South Africa, Japan, China, Saudi Arabia and South Korea were only enforced in December of 2012 after Brazil made a BSE report public that documented the case. Additionally, Egypt blocked imports only from Paraná where the case of BSE occurred. Since the report was made public to the World Health Organization only two years after the incident, Brazil was criticized heavily (News Desk, 2012). Although Brazil defends the delay by blaming a ‘laboratory backlog’, certainly this incident did not help in promoting the countries sanitary standards when it comes to the beef producers. In May 2014 it was reported that another potential incident of BSE was examined (Condon, 2014). This time the infected cow was found in Matto Grosso state, one of Brazil’s largest beef producing areas.

3. Traceability of Beef

3.1. Definition and Purpose of Traceability

To ensure that beef is disease-free and adheres to certain quality standards, traceability of beef has grown tremendously. Traceability provides information about suppliers that can be used to recall food more rapidly in the case of food safety concerns. Traceability is defined by the International Organization for Standardization (ISO) as ‘the ability to follow-up any food item through all steps of its production, processing, transportation and distribution’. Other definitions are a bit more precise and include specific items, like the definition of the European Union: ‘Traceability is the ability to follow-up any food product, feed, animal for food production or substances that will be used for consumption, through all steps of production, processing and distribution’ (Furquim & Cyrillo, 2013). Probably the key incident that lead to the development of traceability programs was the outbreak of

BSE in Europe. As a result, mandatory or voluntary schemes were designed by governments for companies to trace the beef that later ends up in supermarkets around the world. However, these programs differ greatly in the specifications they attach and thereby influence international beef markets. For example, whereas the Australian beef industry has very strict traceability systems in place that even enable a trace-back to every cattle's property of birth, other traceability systems work more on a voluntary basis (Monjardino de Souza Monteiro & Caswell, 2004).

The motivations of implementing traceability schemes throughout the beef supply chain are different. Whereas companies are more interested in profits, government institutions are more driven by social welfare. Traceability systems have four important economic impacts: human and animal health, liability, trade effects and supply chain impacts (Monjardino de Souza Monteiro & Caswell, 2004). Concerning human and animal health, traceability systems help to discover diseases that are potentially dangerous to humans. Measures can then be taken to prevent the disease from spreading. Traceability systems need to be implemented across the whole supply chain because diseases might appear at different stages. For example, some diseases come from animals and are carried throughout the whole chain, other diseases might only appear at the processing stage, and others are only life-threatening for animals. However, a widely used traceability system is costly and different hazards require distinctive prevention systems. This becomes clear when looking at the two diseases BSE and tuberculosis. Whereas systems to prevent BSE are broad and require information through the cattle feeding, systems to prevent tuberculosis only require information on farm practices. Similarly, different diseases require different levels of 'precision'. Sometimes only the region of disease origin needs to be determined, other cases of diseases require to identify a specific animal (Monjardino de Souza Monteiro & Caswell, 2004). In general, traceability systems bring three important benefits regarding human and animal health. Firstly, foodborne diseases are reduced which improves public health. Secondly, companies that follow traceability programs avoid that their beef sales are banned, animals euthanized or company image damaged. Lastly, companies and government institutions both benefit from a faster identification to prevent the disease from spreading to other animals or humans (Monjardino de Souza Monteiro & Caswell, 2004).

In terms of liability, traceability systems help to identify the origins of risk. If it is possible to determine who or what is responsible for causing the risk, it is easier for governments to take action (e.g. make a company liable for their wrongdoings). As one can imagine, companies are often strongly against mandatory traceability systems because it increases their liability. Proponents argue that liability has a positive side for the whole beef industry and governments because it incentivizes the use of safer beef production and processing procedures. Furthermore, traceability systems can also prove that companies are not responsible for animal or public health hazards in case they are accused. Traceability might not ensure safer food, but the availability of information and possibility of identifying risks helps companies to be transparent and thus to improve their reputation (Monjardino de Souza Monteiro & Caswell, 2004).

Undoubtedly, traceability systems have a large impact on international trade. The World Trade Organization (that promotes free trade) allows member countries to implement sanitary barriers under its agreement on the 'Application of Sanitary and Phytosanitary Measures'. These barriers are viewed as legitimate if based on a rigorous risk evaluation. When countries that import beef decide to implement a mandatory traceability system, this automatically affects countries that export beef. In a sense, beef exporting countries need to implement the same traceability systems as the beef importing countries, otherwise they will lose this market. The adoption of traceability, which involves costs, pays off if these markets are willing to pay a premium for beef. However, beef exporting countries that have adopted traceability systems and require a premium to recover the costs, could lose markets where traceability is not required. In those markets, prices are usually lower and thus higher prices due to implemented traceability systems are not competitive. This shows that the harmonization of traceability systems is important because it diminishes disputes (Monjardino de Souza Monteiro & Caswell, 2004). Nevertheless, the harmonization of systems does not account for country or regional differences (e.g. countries might not be able to afford such systems and thus are cut off from certain markets).

Moreover, traceability systems affect the beef supply chain. As already stated in the introduction of this chapter, the flow of information along the supply chain is administered by traceability systems. This information is often private and considered as an 'instrument of strategic competition' (Monjardino de Souza Monteiro &

Caswell, 2004). Therefore, beef producers are reluctant to share this information. In contrast, government authorities want a transparent beef supply chain with detailed and wide traceability. In terms of traceability in the supply chain, competition between beef producers does not only occur at the same segment of the supply chain. Based on how much information is made available to consumers at different segments of the supply chain, competition between firms can occur at any segment. Another important issue relates to how the relationships established along the supply chain are influenced by traceability systems. Consumers value information or demand transparency of certain segments of the supply chain more than others. This affects how benefits are distributed and how costs are allocated (e.g. the segment that pays for traceability also wants to reap the benefits).

3.2. Traceability in Brazilian Beef Industry

To understand why the Brazilian government introduced traceability programs in the beef industry, one has to look at past events. The 1990s were a turning point in Brazil's economic landscape, particularly for the agricultural sector. A new currency was introduced, price indexing was stopped, Mercosur was established and Brazil's economy was opened to international markets. Especially the last point had an effect on consumers. Since consumers now had better access to information and were able to compare products, they became more demanding (e.g. demand organic products, focus on quality). More demanding consumers and increasing competition meant for Brazilian agribusinesses, which play a big role in guaranteeing a trade surplus and attract FDI, to be more effective and efficient (Lima et al., 2006). The Brazilian government realized that in order for these agribusiness companies to remain competitive something had to be done. Additionally, the emergence of BSE and FMD in various countries in Europe and other developed nations lead to the introduction of new import regulations for beef. This was a result of concerned consumers who demanded information about the origins of beef and quality assurance.

In order to meet these new quality requirements, Brazil started to implement food quality certifications. However, these new measures were mainly introduced for consumers abroad. These new quality measures included, among others, traceability systems. Since the beef industry impacts Brazil's economy to a large extent, the state had an interest in promoting traceability programs to control the health of cattle and

guarantee good sanitary conditions (Furquim & Cyrillo, 2013). The Agricultural Ministry introduced SISBOV (now named Cattle and Buffalo Identification and Certification System) that serves as a data centre which entails information about the handling of cattle, movement within Brazil and general attributes. Participating in SISBOV is mandatory for beef companies that export to countries requiring traceability. On the other hand, it is voluntary for beef companies producing for the domestic or other markets. If companies participate, substantial investments in control instruments and information technology are usually required. Since the beef production is spread throughout Brazil, the system is dependent on third-party companies that grant certifications (Furquim & Cyrillo, 2013). One positive aspect of SISBOV is that it generated business for a dozens of these certifiers.

Although Brazil implemented the SISBOV structure in 2002, it did not prevent the European Union to ban Brazilian beef imports in 2005. Moreover, SISBOV did not help to improve beef quality and could not prevent other import embargos by Japan and China as a result of an animal infected with BSE in a southern Brazilian state. So far, Brazil is still struggling to establish SISBOV among all beef producers. Although the state has tried in numerous ways to make the system more convenient, numbers estimate that only 1% of all Brazilian cattle farmers engage in SISBOV (proportion of cattle is slightly larger). Most of the SISBOV participants operate feedlots and on average possess twice as much land as non-participants. One issue why farmers are not participating might be the lack of internet access which means that only a few farmers can electronically register cattle or record corrections. Another issue relates to the fact that many farmers are not convinced that the extra commitment of resources to SISBOV will lead to an increase in profitability (Forster, 2013).

3.3. Effect of Traceability on Consumers

Most of the literature on traceability stems from the beginning of the 2000s to measure the influence of traceability systems on consumers. These traceability systems were established to increase consumer confidence in safety and meat quality. Giraud & Amblard (2003) asked 23 French meat consumers in focus groups about the usefulness of traceability. Their answers showed that the majority was not able to define or describe traceability. Additionally, the same study tested the unprompted perception of traceability by means of a quantitative survey. The findings revealed

that respondents use very general and often poor vocabulary to explain traceability. Interestingly enough, the survey also showed that the kind of store is a factor with regard to traceability perception. Shoppers purchasing in stores specialised on meat products (e.g. butcher) seem to pay more attention to traceability than shoppers in regular supermarkets (Giraud & Amblard, 2003).

Gellynck and Verbeke (2001) examined consumer perception of traceability in Belgium. The scholars segmented respondents based on their perception of meat quality and then tested their 'perceived need' of traceability systems. They found out that all Belgian consumers value functional attributes of traceability like organizational efficiency and chain monitoring. However, additional information concerning process attributes (e.g. production methods) was less important to the general population. Only one specific market segment, consumers with a negative perception of meat quality, found this relevant. Therefore, the scholars conclude that public policy should mainly focus on the level of functional attributes (that affects the general population), whereas providing additional information concerning process attributes should be left to the private sector (Gellynck & Verbeke, 2001).

In a paper prepared for the seminar 'Marketing Dynamics within the Global Trading System: New Perspectives', Mora et al. (2006) compare Spanish and Italian consumers with regard to traceability perception. Firstly, they found out that traceability perception differs across Spain and Italy. Whereas Italians refer to traceability as a provider of information to evaluate the quality of food, Spanish see traceability more as a means to guarantee health and food safety. Secondly, when asked to rank different pictures of beef products according to the level of traceability, Italians seemed to rank a good traced product based on the detailed labelled information, such as animal identification number, farm and slaughterhouse. On the other hand, Spanish ranked a good traced product mainly on the basis of origin. Even when they could not find many differences across the pictures, they tended to favour domestic products (Mora et al., 2006).

4. Environmental Impact of Beef Production

When talking about the beef production, one cannot neglect the environmental footprint. Numerous scholars have researched the impact of beef production on the

environment and discovered a wide scope of caused damage. Some experts even go as far and argue that eating less red meat is a better way for people to reduce carbon emissions than selling their cars (Carrington, 2014). 40% of the world's land surface is used for producing food for 7 billion people on this earth. The majority of this land is used to produce meat like chicken, pork and beef. This production of livestock contributes around 40% to the global agricultural GDP. Additionally, it gives work to around 1.3 billion people (Walsh, 2013). Hence, there may be no other single human activity that impacts the planet's environment in a similar way.

The production of beef needs 28 times more land and 11 times more water than the production of meat, such as pork or chicken. As a consequence, beef production results in 5 times more climate-warming emissions. When considering other agricultural products, these numbers are even higher. Comparing the impact of beef per calorie with that of rice, wheat or potatoes, beef requires 160 times more land and produces 11 times more climate-warming emissions (Carrington, 2014). De Vries & de Boer (2011) evaluated how beef production systems impact land use. They claim that the large amount of land required for beef production has two main reasons. Firstly, beef is less efficient in converting ingested energy into meat. Secondly, the production of chicken or pork needs relatively little land use from breeding stock because mother animals produce more offspring annually and the stock has an early sexual maturity.

5. Consumer Perception of Quality Beef

5.1. Definition of Quality

In order to understand how consumers build a perception of what constitutes beef quality, one firstly needs to be familiar with the general concept of quality perception. Previous literature agrees that the concept of quality has a subjective and objective dimension to it. Objective quality usually relates to physical attributes 'built into' the product and is managed by engineers. On the other hand, subjective quality refers to the quality as perceived by consumers (Grunert, 2005). Only when these two dimensions are 'aligned' with each other, quality becomes a competitive criterion for food producers, e.g. engineers incorporate consumer wishes into physical product attributes and consumers then recognize their desired qualities from how the product has been constructed (Grunert, 2005).

The belief that quality is determined by subjective as well as objective factors makes it difficult to sum up quality in one word. Quality is a 'multidimensional construct', meaning that a few dimensions define a product (Sower, 2010). Garvin (1987) suggests a list of eight elements relating to product quality. These elements are performance, features, reliability, conformance, durability, serviceability, aesthetics and perceived quality. When looking at food, the relative importance of each of these eight elements varies significantly. For example, the element of aesthetics (how food looks, tastes, smells, etc.) might be more important to consumers than the element of durability ('lifespan' of food). Another definition of quality looks at the concepts of order qualifiers and order winners (Sower, 2010). An order qualifier relates to a product characteristic that is required for a product to be even considered by consumers. In the case of food, this characteristic would most likely be related to safety issues (is this food safe to eat?). An order winner is a product characteristic that provides a reason for consumers to purchase the product. Coming back to the case of food, this might be a strong brand name.

As can be seen from above, quality is a complex concept that cannot be defined by a single term. The definition that probably comes closest to the universal idea of quality is 'fitness for consumption', meaning that a certain product matches the expectations of consumers and satisfies their needs (Keast, 2009). In that sense, quality can be defined as the sum of all characteristics necessary for a product to satisfy consumers' needs.

5.2. Consumer Perception of Food Quality Frameworks

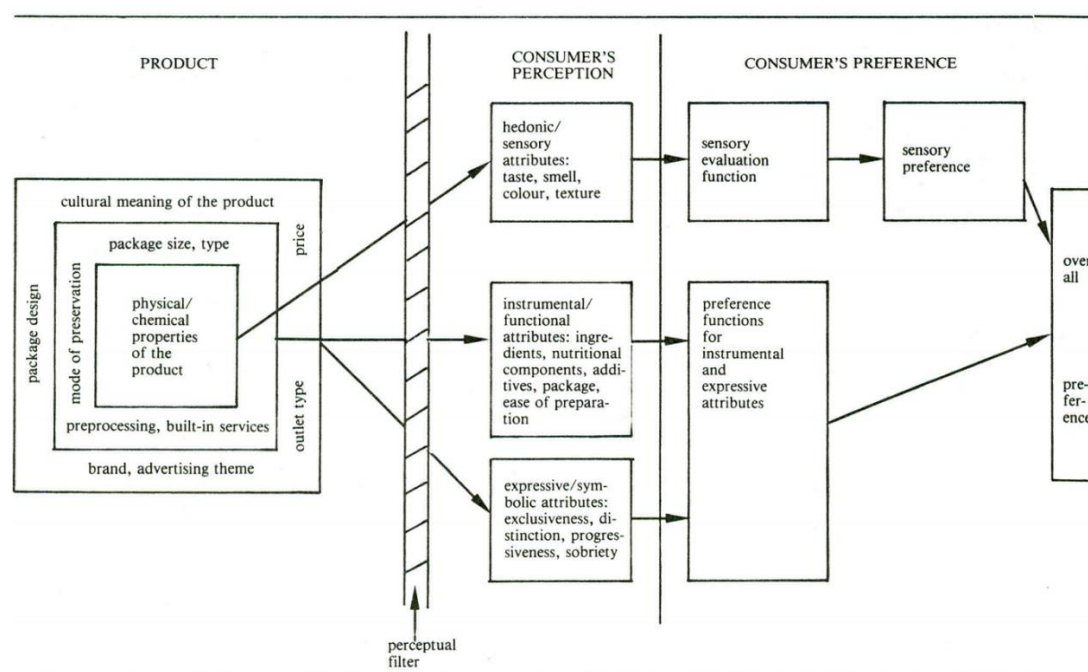
There has been a lot of research on food quality perceptions and its influence on consumer buying behaviour. Scholars have come up with a number of models to describe the factors that form consumer preference. This section introduces two frameworks that take different approaches towards which factors influence consumer perceptions of a product.

Wierenga (1983) developed a framework that describes the nature of perceptions and preferences concerning food products. He argues that three attributes form consumer perception and preferences about a food product, namely hedonic attributes,

instrumental or functional attributes and expressive or symbolic attributes. Hedonic attributes describe aspects such as taste or smell, thus everything that influences sensory organs. Instrumental/functional attributes include aspects such as ingredients (e.g. nutritional components, additives) or use-related factors such as packaging. Lastly, expressive/symbolic attributes refer to status or exclusiveness of food products (Wierenga, 1983).

All these attributes shape a consumer's perception about a food product, but also provide marketers with insightful information on what and how to advertise food products. It is interesting to mention that consumers may value one attribute more than others, hence consumers can perceive the same food product in a totally different way.

Figure 2: Formation of Perceptions and Preferences concerning Food Products



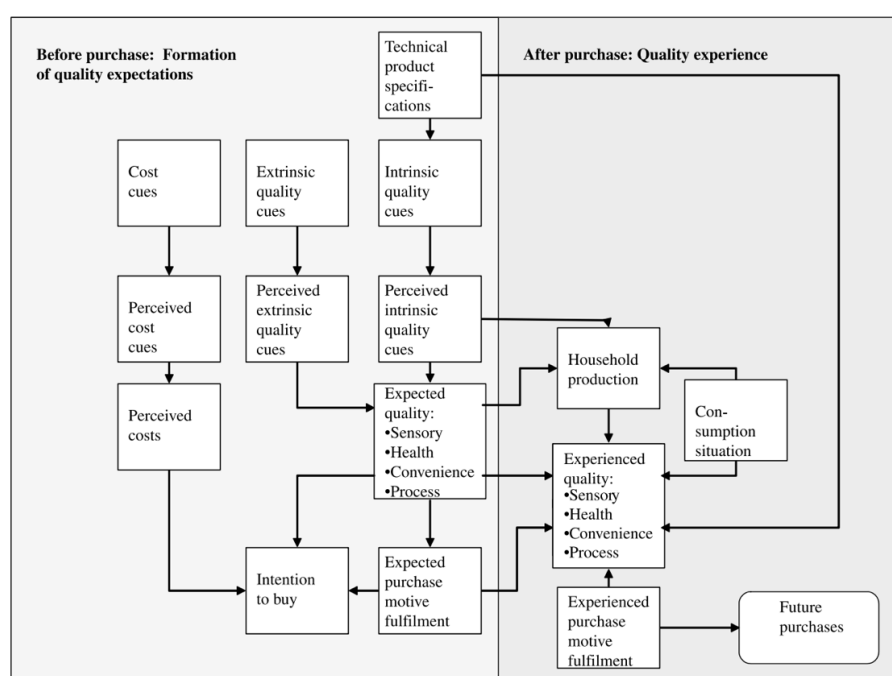
Source: Wierenga, 1983

Another framework, the Total Quality Food Model (Grunert, 2005), organizes knowledge about quality-related consumer perceptions and behaviour. This model was developed more than ten years later than the model by Wierenga (1983) and attempts to provide a more universal approach. The model introduces two main dimensions (horizontal and vertical) along which one can analyse the perception of

food quality. The horizontal dimension relates to time and differentiates between the quality perception before and after the purchase. It is assumed that the way consumers perceive quality is heavily based on their expectation before the purchase. The vertical dimension on the other hand deals with inference-making and describes what drives consumers to purchase one food product instead of another. The basic assumption of the vertical dimension is that consumers judge to what extent properties of a food product help to attain basic life values which they value (Theuvsen, 2007).

According to the model, before purchasing a food product consumers base their quality expectations on intrinsic (physical attributes) and extrinsic cues (brand, product origin, food safety, etc.), as well as cost cues. The intrinsic and extrinsic cues about a food product then form the expected quality which is based on four major aspects: taste, health, convenience, and process. After the purchase, the experienced quality is then evaluated and compared with the expectations based on quality cues before the purchase. If these expectations are met, the consumer is satisfied and might purchase more of the same product in the future (Grunert, 2005). Please refer to the table below to find a graphical representation of the TFQ Model.

Figure 3: Total Food Quality Model



Source: Grunert, 2005

Both of these frameworks underline the fact that the food quality concept is a complex issue. Consumers apply a range of different dimensions when assessing the quality of food.

5.3. Consumer's Valuation of Quality Beef

What consumers value when purchasing beef is an integral part of designing marketing plans. 'Social values' like non-hormone, traceability, origin or environmentally friendly could potentially convince a consumer to purchase beef. On the other hand, consumers might select beef on the grounds of taste, safety, freshness and price (Roybal, 2014). Knowing how consumers rank these attributes helps marketers to tailor their marketing strategies and target. For example, if restaurant chains like McDonalds or Burger King adopt antibiotic-free menus, which impact does that make on their sales?

A number of studies have tested consumer preferences of beef. Kansas State University (KSU) conducted a study with 1,950 U.S. respondents that analysed consumer decisions in purchases of beef, showing that consumers focused more on 'basic quality attributes' like freshness and taste rather than 'social values' (Roybal, 2014). On the other hand, Abidoye et al. (2011) conducted a survey in 2005/2006 that showed different outcomes. They surveyed U.S. consumers about their preferences for quality attributes in beef products and found out that consumers value traceability, U.S. origin and grass-fed. These are all 'social values' which were ranked lower in the study by KSU. Additionally, Abidoye et al. (2011) discovered that U.S. consumers would be willing to pay a premium for beef products that are associated with attributes of traceability, origin and feeding methods. Hence, the scholars show that differentiation pays off.

Grunert et al. (2004) also demonstrate in their study that differentiation can pay off. They used the Total Food Quality Model to assess how consumers perceive beef quality. The scholars found out that beef is to a high degree seen as a commodity because the product is generally unbranded or unlabelled. Consumers are not knowledgeable and judge meat quality mainly on product appearance. Therefore, the scholars conclude that branding can be used to show superior quality and decrease consumer uncertainty when choosing meat products. In fact, they argue that a

branded product can serve as a signal for eating quality, positive health effects and desirable process characteristics such as organic production and animal welfare (Grunert et al., 2004).

5.4. Consumer Perception of Brazilian Beef

Barcellos et al. (2012) did a study on consumer perception of Brazilian traced beef to find out how consumer value this beef. They carried out a survey with 417 Brazilian consumers of which the majority came from Porto Alegre in Brazil (40%). The findings showed that the respondents' main concerns when purchasing beef were tenderness, colour and fat content. Remarkably, the attribute of price was only ranked fourth. These findings were in line with findings from other countries. For example, a study conducted in three large Spanish cities showed that beef consumers did not prioritize price when purchasing beef. Moreover, beef consumers from Chile were primarily concerned about quality, rather than price (Barcellos, 2012). Coming back to the Brazilian respondents, the scholars learned that health was the main issue concerning beef quality. Approximately half of the study participants had some knowledge about beef certification and differentiation. This demonstrates that Brazilian consumers are aware of differentiation and willing to pay a premium for Brazilian beef that is traced. Hence, there is a niche market in the domestic market where consumers would pay more for traced beef (Barcellos, 2012). As of now, there is no mandatory traceability of beef for Brazilian beef producers that supply the domestic beef market.

Guina and Giraldi (2013) investigated whether European consumers' perceptions of Brazilian beef quality were influenced by the overall image of Brazil. In order to find that out the researchers analysed whether the country of origin had an influence on consumers' perception in general and then further looked into how the image of Brazil was perceived. The results showed that the image of Brazilian beef in Europe is seen as positive. However, based on interviews conducted with European importers, it became clear that Brazilian beef in Europe could benefit from more advertisement to strengthen the brand. Additionally, consumers as well as importers regarded the 'outlet logistics' for Brazilian beef as lacking sufficient quality (Guina & Giraldi, 2013).

5.5. Country of Origin Effect

A number of studies have researched the effect of country of origin on the consumer perception of quality. Generally, it seems that consumers in economically developed countries see products from less economically developed countries as inferior in terms of quality and safety. This “made-in” notion can be used as a powerful marketing tool to brand products and to serve as an indicator of quality. In fact, an individual’s image of a certain country influences his or her attitude towards the same country and hence can stimulate emotions and memories. These symbols of emotions on the other hand make country of origin an important image attribute that affects the decision-making when purchasing food products (Guina & Giraldi, 2012). Additionally, the country of origin effect is especially important for countries such as Brazil where exported products are less likely to be accepted abroad as compared to products exported from industrialized countries.

Bilkey and Nes (1982) wrote a comprehensive literature review to summarize findings that relate to the effect of country of origin on purchasing evaluations. They point out that many scholars found a ‘hierarchy of biases’. This relates, for example, to a positive correlation between product evaluation and economic development of a country. Other factors include the ‘source’ of a country’s culture and the stability of its political system. On the other hand, scholars found out that respondents from different countries do not have the same attitude towards a given country. For example, it was shown that Indian students ranked British products higher than Taiwanese students did. This difference in attitudes is most likely due to former colonial ties between India and the UK. Bilkey and Nes (1982) also looked at how the perceived risk of the country of origin influences purchasing decisions. For example, researchers investigated how American consumers perceived risk for American products made in the U.S. compared with the same products made by U.S. companies abroad. It was seen that the products made abroad were perceived as being riskier. However, certain products were perceived as less risky when produced abroad. These products were freeze dried coffee from Brazil and electronic calculators from Hong Kong. In the case of Brazil, scholars argued that the country is a renowned exporter of coffee and this reputation had a favourable effect on the processed form. In the case of Hong Kong, scholars reason that the country has built a reputation for these types of products.

Elliot & Cameron (1994) conducted face-to-face surveys with 401 consumers across the Melbourne metropolitan area to assess the importance of country of origin relative to other product attributes, to investigate whether country of origin can serve as a sign of product quality and to analyse the connection between country of origin and buying intentions (assuming all other product characteristics are equal). The researchers asked the respondents to rank six product characteristics, namely brand name, product quality, appearance, price, innovativeness and country of origin, across a number of different product types. What they found out is that country of origin was ranked significantly lower than, for example, product quality and price. Hence, the researchers argue that country of origin only has an effect on purchasing decisions under *ceteris paribus* conditions (e.g. product quality and price are equal among competing products). To test the relationship between country of origin, product quality and purchase intentions, respondents were given descriptions of three versions of a range of products, the three versions of each product being identical in price, product type and brand name (hence *ceteris paribus* conditions are created and country of origin remains the only differentiator). It became apparent that consumers preferred products from economically developed countries. Hence, a relationship between product quality and the perceived level of economic development of the country of origin could be established (Elliot & Cameron, 1994).

6. Global Demand Trends for Beef Consumption

When looking at beef consumption per capita, there are large differences between countries. For example, whereas people in Bangladesh only consume about 1kg per capita annually, people in Argentina or Uruguay consume about 54kg (USDA Foreign Agricultural Service, 2011). The reasons for that are twofold: High levels of consumption are either based on a tradition of beef production or a high household income. In the top 6 beef-consuming countries per capita beef consumption was higher than 34kg annually. These countries are Argentina, Uruguay, Brazil, USA, Paraguay and Australia. Although the ranking in terms of who consumes the most per capita may change from year to year, these 6 countries ‘dominated’ beef consumption for the last decades. In addition, these countries (except for Paraguay) form the principal of beef-producing countries and, when excluding China, together were responsible for almost half of the global beef production in 2011 (Santich, 2014).

Interestingly enough, the consumption of beef has slowed down or even stagnated in traditional beef-producing and -consuming countries (like Australia and USA) in line with a decrease in red meat consumption and an increase in poultry consumption. The reasons for that can be attributed to a lower price of chicken and the fact that chicken is perceived as being healthier. Although poultry production will become costlier due to more expensive feed, poultry tends to be a more efficient feed converter compared to beef. Additionally, in comparison to beef the quality of chicken is consistent and cooking is easier. Moreover, religion or culture does not hinder people from consuming chicken (unlike beef in India). The industrial poultry production is now the fastest growing sector of the livestock industry and increased production by 25% in just 10 years (Meat Atlas, 2014). Brazil's strong economic development over the last decades more than doubled beef consumption per capita. In countries with no history of beef production, red meat consumption grew due to better living standards and greater household income as well as a Westernisation of eating diets (Santich, 2014).

The attitudes and beliefs about beef consumption have also changed over recent years. For example, people in Europe are becoming more concerned about the fat content of beef and the possible effects of red meat on cholesterol levels (Santich, 2014). In a study participants described 'healthful' beef as labelled, fresh, only slightly processed and well cooked. In contrast, 'unhealthful' beef was described as packaged, processed, including additives or hormones and cheap beef. However, scholars are questioning whether changes in diet or health awareness are the only reasons for the decrease in red meat consumption. Undoubtedly, another factor was the outbreak of BSE which reduced global beef consumption tremendously. BSE (Bovine Spongiform Encephalopathy), which is commonly known as Mad Cow Disease, occurred first in Britain in 1985. Since then the disease has been found to be incurable and deadly to both humans and cattle. As a result, consumer confidence in the whole beef supply chain decreased largely which had negative consequences for the beef industry, especially in the UK, France and Germany. Countries with confirmed cases of BSE were not allowed to export beef and on top of that also incurred the financial burden of killing BSE infected or thought to be infected cattle (Pickelsimer, 2002). Due to the emergence of these diseases, ethical and environmental concerns more than ever affect food consumption, especially regarding

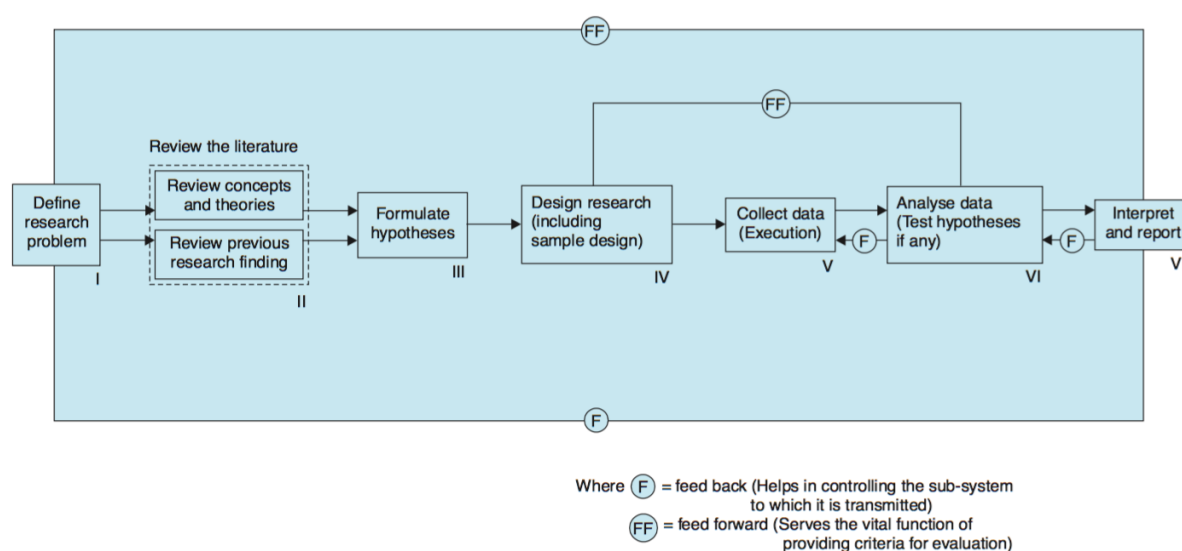
the rearing, transportation and slaughter. European consumers, due to the BSE outbreak, are particularly concerned about animal welfare and value that cattle are treated in an ‘animal welfare friendly’ manner (Santich, 2014). Consumers that are motivated by health and the environment may tend to purchase beef with specific characteristics, like being grass-fed or branded according to origin. For example, US consumers are to a greater extent willing to purchase forage- or grass-finished beef and would pay a premium for that. Similarly, US consumers pay a premium for production systems that do not use extra hormones or antibiotics (Santich, 2014).

The trends outlined above show that long-established patterns of beef consumption have changed over the last decades. Dietary, health and environmental concerns have lead many people from Western countries to rethink their beef consumption. Research as well has shifted from producers’ needs and problems to what consumers currently value most. For the survey in the following section, ‘quality beef’ is defined as beef described as healthy and fresh by consumers.

7. Survey Research

7.1. Purpose of Survey

Figure 4: Research Process Flow Chart



Source: Kothari, 2004

Figure 4 provides a summary of the research process. After having defined the research problem, a review of previous literature has shown that European consumers are changing their beef consumption patterns by focusing on beef that is labelled as ‘healthy’ and comes from a transparent production process. This development has its origin in the outbreak of diseases such as FMD or BSE which caused great uncertainty among consumers. Since Brazil exports 60% of its beef to the European Union (Malau-Aduli & Holman, 2014), this change in buying behaviour of European consumers cannot be ignored. Therefore, this study examines how Brazilian beef is perceived by consumers in Germany, France and Italy. It is tested whether consumers associate Brazilian beef with attributes such as ‘healthy’ and ‘fresh’ which they tend to increasingly value and which determine beef quality. It is essential for Brazilian beef companies to align their internal focus to the expectations of the consumer. Therefore, the attributes consumers associate with Brazilian beef reveal strengths and weaknesses, and identify potential points of improvement. Moreover, the effect of traceability on the perception of beef quality is analysed. It is assumed that traceability increases consumers’ perception of animal health, hence traceability is seen by consumers as positive and increases beef quality. Additionally, it is investigated whether Brazil’s image in general has an influence on how European consumers perceive Brazilian beef. In a nutshell, these two hypotheses are tested:

1. *Cattle traceability has a positive effect on the quality perception of Brazilian Beef.*
2. *Brazil’s image as a country has a positive effect on the quality perception of Brazilian beef.*

7.2. Research Approach

There are two basic approaches to research, namely the qualitative and the quantitative approach. Both the qualitative and quantitative approach assess attitudes and opinions, however, they differ in the form on how these are gathered. The quantitative approach usually gathers attitudes and opinions via focus group or in-depth interviews (Kothari, 2004). On the other hand, the qualitative approach aims to survey a large number of individuals and applies statistical techniques to identify overall patterns. Within the quantitative approach, there are different sub-

classifications (Kothari, 2004). One of these classifications is the inferential approach that aims to generate a data base from which to establish relationships or characteristics of a population. This type of research usually includes survey research where a sample of a population is examined by means of questionnaires to determine certain characteristics. The results for that sample are then used to infer characteristics for the whole population (Kothari, 2004). The research in this dissertation uses the inferential approach to test the above mentioned hypotheses.

Before elaborating on the research design, it is important to explain the difference between research methodology and research methods. The methodology concerns the science of systematically solving a research problem by employing the correct procedures. This means that the methods used for the research are properly tested and utilized, and have a logic behind them. Fundamentally, the methodology enables the researcher to conduct research in a proper way (Kothari, 2004). Research methods refer to all techniques that the researcher uses in conducting his/her research to arrive at a solution for a defined problem. These methods refer to the collection of data, use of statistical methods to establish relationships between data and/or evaluation of the accuracy of obtained results.

7.3. Research Design

7.3.1. *Sampling Design*

The sample targeted for this survey are students from Germany, France and Italy. This group of students is an interesting segment for companies because it is assumed that these students will work in higher-paying jobs compared to the average, with more disposable income to spend on food. Additionally, targeting this customer segment at a young age can lead to a potentially loyal customer base at a later stage. Moreover, this sample group is more connected to the internet (Hargittai & Hinnant, 2008) and therefore more likely to fill out online surveys. A higher number of filled-out surveys increases the sample size and makes the findings more robust.

7.3.2. *Measurement and Method of Data Collection*

Since the defined research problem requires newly collected data (primary data that is data collected for the first time), the research method used for this dissertation is the online survey method. This form of research method has several advantages. Firstly,

it is possible to reach a large number of respondents in a cost-effective way because the survey is sent via the internet to students. This eliminates the printing and mailing of surveys. Secondly, the advantage of electronic surveys is that responses are returned in an electronic format which saves time and costs (e.g. to analyse responses of mailed surveys, data has to be put in an electronic format first). Another general advantage relates to the fact that data of surveys can be analysed more ‘objectively’ due to the quantitative nature compared to the data of other research methods. Kaplowitz, Hadlock and Levine (2004) compared the response rates of web and mail surveys. The scholars found out that both survey types achieve equal response rates, especially when the target group is younger (like in the case of this dissertation). Online questionnaires may suffer from self-selection bias because participants who respond may be specifically motivated or interested in the topic, thus causing a potential problem of sample representativeness. However, self-selection is not more problematic in online surveys than in normal mail or phone surveys.

Regarding data collection, the online survey was created via google survey. The link of this online survey was then posted in the facebook group *CEMS Worldwide*, a group of 5,639 international students that study International Management at one of the 30 CEMS academic members. CEMS is a Global Alliance of Management Education, a cooperation of 30 business schools and universities, multinational companies and NGOs.

The following tables show the 15 questions asked in the survey and display the scale used to measure the respondents’ answers. The scales used are nominal (e.g. categories) and interval (e.g. distance relationships). All answers are mutually exclusive and collectively exhaustive in nature.

Including questions about the characteristics of the population allows the researcher to divide all survey responses into data groups (based on these demographics). Additionally, it becomes possible to create cross tabulations and compare the survey data across multiple demographics. Since this study focuses on German, French and Italian students, these demographic questions help to isolate this focus group from the population.

Table 1: Demographic questions

| Question | Scale |
|--|---|
| What is your gender? | Male Female |
| Where were you born? | Germany, France, Italy, etc. |
| What is your age? | under 12 years old 12-17 years old 18-24 years old 25-34 years old 35-44 years old 45-54 years old 55-64 years old 65-74 years old 75 years or older |
| What is the highest degree or level of school you have completed? <i>If currently enrolled, highest degree received.</i> | <ul style="list-style-type: none"> - No schooling completed - Some high school, no diploma - High school graduate, diploma or the equivalent - Some college credit, no degree - Bachelor's degree - Master's degree - Doctorate degree |

The next four questions focus on the image of Brazilian beef. By asking questions about the healthiness and freshness of Brazilian beef, one can derive conclusions about the quality image of Brazilian beef.

Table 2: Questions about the general product image of Brazilian beef

| Question | Scale |
|--|--|
| Have you ever purchased Brazilian beef? | Yes No I am not aware |
| Do you consider Brazilian beef as fresh? | I fully disagree I fully agree 1 2 3 4 5 |
| Do you consider Brazilian beef as healthy? | I fully disagree I fully agree 1 2 3 4 5 |
| Do you consider the cattle-raising methods in Brazil as sustainable? | I fully disagree I fully agree 1 2 3 4 5 |

The next list of questions aims to measure whether consumers think that traceability increases beef quality (e.g. make it safer) and asks additional questions on how consumers assess traceability.

Table 3: Questions about traceability

| Question | Scale |
|---|--|
| Traceability makes beef safer | I fully disagree I fully agree 1 2 3 4 5 |
| I trust the traceability information on labels and packages | I fully disagree I fully agree 1 2 3 4 5 |
| I am willing to pay a bit more for beef that is traced | I fully disagree I fully agree 1 2 3 4 5 |

There are at least 30 research papers that have studied ways of measuring country image. This paper adopts the ‘general country attribute’ variables of Pisharodi and Parameswaran (2002) that previous literature has described as being high on reliability and validity (Guina & Giraldi, 2012).

Table 4: Questions about country of origin image (Brazil)

| Question | Scale | | | | |
|---|-----------------------|---|---|--------------------|---|
| Brazilian people are hard working | I fully disagree 1 | 2 | 3 | I fully agree 4 | 5 |
| Brazilian people are well-educated | I fully disagree 1 | 2 | 3 | I fully agree 4 | 5 |
| Brazil is economically similar to my country | I fully disagree 1 | 2 | 3 | I fully agree 4 | 5 |
| Brazil plays a significant international role | I fully disagree 1 | 2 | 3 | I fully agree 4 | 5 |

7.4. Processing and Analysis of Data

The collected data was analysed with the help of computer programs, such as Microsoft Excel and SPSS. In total, the survey had 95 valid responses which were collected over 4 weeks in July 2016. To be more specific, 48 respondents came from Germany, 31 from France and 16 from Italy. Looking at other demographic criteria, the ratio of male and female respondents was almost equal (50 male, 45 female) and the majority of respondents were between 18-34 years old at the time the survey was conducted (53%). Moreover, almost all respondents stated that they graduated with a Bachelor’s or Master’s Degree from University (89%), which shows that the group of respondents can be considered to have an academic background.

Looking at the responses regarding the product image of Brazilian beef, only 53% of respondents stated that they have purchased Brazilian beef in the past. The other 47% have either consciously not purchased Brazilian beef or were unaware that they did so. When asking the respondents to assess Brazilian beef in terms of quality, freshness and healthiness, the following results were achieved:

Table 5: Results – Quality assessment of Brazilian beef

| Question | Scale | | | | |
|--|------------------|---|---------------|---|---|
| | I fully disagree | | I fully agree | | |
| Do you consider Brazilian beef as fresh? | 1 | 2 | 3 | 4 | 5 |
| Avg. response of German respondents | 2.9 | | | | |
| Avg. response of French respondents | 2.8 | | | | |
| Avg. response of Italian respondents | 3.1 | | | | |
| Do you consider Brazilian beef as healthy? | I fully disagree | | I fully agree | | |
| | 1 | 2 | 3 | 4 | 5 |
| Avg. response of German respondents | 2.6 | | | | |
| Avg. response of French respondents | 2.8 | | | | |
| Avg. response of Italian respondents | 3.2 | | | | |

It can be seen that respondents differ in terms of their assessment, depending on where they come from. Italian consumers perceive Brazilian beef to be of better quality than German respondents do. The assessment of French consumers is somewhat in-between. However, respondents of all three countries seem to have a rather neutral assessment of Brazilian beef quality, since their answers on average move around the middle of the interval of ‘I fully disagree’ vs. ‘I fully agree’. Therefore, no clear answer can be given to the hypothesis *European consumers perceive Brazilian beef as being of good quality*.

Nevertheless, an interesting finding is that respondents that have not purchased Brazilian beef in the past or were unaware that they did so, scored on average significantly lower on the assessment concerning the product image of Brazilian beef, that is their responses tended more towards ‘I fully disagree’ (see Appendix C & D). Compared to respondents that purchased Brazilian beef in the past, they perceived Brazilian beef to be less fresh and to be less healthy.

When asked about traceability, nearly all respondents stated that traceability positively affects the safety and quality of beef. When considering all responses, the statement ‘Traceability makes beef safer’ scored a high average of 3.9 - 4.0 across all three countries (see Appendix E). Moreover, all respondents on average trust traceability information on labels and packages (3.5 - 3.7). Based on the answers given in this section of the survey, one can confirm the hypothesis that *Cattle traceability has a positive effect on the quality perception of Brazilian Beef*.

The last 4 questions asked respondents to assess the general image of Brazil. Overall, the image of Brazil is seen as neither positive nor negative. Hence, the hypothesis *Brazil's image as a country has a positive effect on the quality perception of Brazilian beef* cannot clearly be confirmed. However, similar to the first hypothesis regarding the 'healthiness' and 'freshness' of Brazilian beef, a few interesting differences can be identified when filtering for other variables. For example, respondents that think Brazilian beef is not of good quality (that answered this question with 1 or 2), have a relatively negative image of Brazil. Vice versa, respondents that think Brazilian beef is of average or good quality (that answered this question with 3, 4 or 5), see the image of Brazil in a more positive light.

The Multiple Regression analysis output below shows this relationship. In this case, the different x-variables regarding the image of Brazil (statements) indicate whether respondents think that Brazilian beef is healthy (y-variable). The adjusted R Square of this Multiple Regression is 62%, which means that 62% of y is explained by x. Checking if the results are statistically significant, one has to look at Significance F and p-values of the x-variables. In fact, one x-variables are significantly higher than the cut-off point of 0.10 and thus not reliable as explanatory factor ('Brazilian people are hard-working'). The other three x-variables provide a good prediction on whether people think that Brazilian beef can be considered healthy.

Table 6: Statistical summary output – Country of Origin Impact

SUMMARY OUTPUT

| Regression Statistics | | | | | | | | |
|-----------------------|-------|--|--|--|--|--|--|--|
| Multiple R | 0.80 | | | | | | | |
| R Square | 0.64 | | | | | | | |
| Adjusted R Square | 0.62 | | | | | | | |
| Standard Error | 0.55 | | | | | | | |
| Observations | 95.00 | | | | | | | |

| ANOVA | | | | | | | | |
|------------|-------|-------|-------|-------|----------------|--|--|--|
| | df | SS | MS | F | Significance F | | | |
| Regression | 4.00 | 47.81 | 11.95 | 39.94 | 0.00 | | | |
| Residual | 90.00 | 26.93 | 0.30 | | | | | |
| Total | 94.00 | 74.74 | | | | | | |

| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95.0% | Upper 95.0% |
|---|--------------|----------------|--------|---------|-----------|-----------|-------------|-------------|
| Intercept | 0.85 | 0.22 | 3.81 | 0.00 | 0.41 | 1.29 | 0.41 | 1.29 |
| Brazilian people are hard working | 0.13 | 0.10 | 1.26 | 0.21 | -0.07 | 0.33 | -0.07 | 0.33 |
| Brazilian people are well-educated | 0.66 | 0.11 | 6.19 | 0.00 | 0.45 | 0.87 | 0.45 | 0.87 |
| Brazil is economically similar to my country | -0.18 | 0.10 | -1.85 | 0.07 | -0.37 | 0.01 | -0.37 | 0.01 |
| Brazil plays a significant international role | 0.25 | 0.11 | 2.39 | 0.02 | 0.04 | 0.47 | 0.04 | 0.47 |

8. Implication of Results

Regardless of the fact that the survey results could not clearly confirm the two hypotheses, there are two other takeaways that provide valuable insights. Firstly, the majority of respondents never purchased Brazilian beef or were not aware that they did so. Secondly, there is a correlation between the 'healthiness' perception of Brazilian beef and the country image of Brazil. These two takeaways show us that Brazilian beef lacks brand equity. It seems that Brazilian beef does not yet have a special meaning to consumers. This can be the result of insufficient marketing programs over the years or just simply because consumers haven't had pleasant experiences with the product in the past. Having a strong brand equity attached to a product is very important for companies. If consumers recognize a brand or at least have some knowledge about a product, their process of thought is much shorter before purchasing a product. Hence, brands provide consumers with the benefit of lower search costs.

8.1. Application to Brazilian Beef

The Brazilian government and Brazilian beef companies have already made an effort in introducing traceability programs to adhere to certain quality standards. However, these efforts must also be extended to the branding of the products. For example, if consumers are not aware that Brazilian beef companies have implemented a traceability program to increase safety and health aspects, they cannot charge a premium for it. As the survey results have shown, European consumers stated that traceability positively affects the safety and quality of beef, and more importantly, are willing to pay a premium for it.

Beef in general can be considered an experience good, meaning that the quality of beef can only be accurately judged after having experienced the product. However, the Total Food Quality Model has shown that consumers also perceive quality based on the expectations before the purchase. Hence, consumers need some sort of a signal before the purchase to evaluate quality. These signals can be labels, packaging or simply the price. Additionally, with more products competing for shelf space, it is important for Brazilian beef to set itself apart from competition. In the past, brands were purely a label of ownership but nowadays are more focusing on what they do for the consumer (benefits are more important than features). Based on consumer ideals

and demands for particular attributes of beef, Brazilian beef producers should shift their focus to a few commonly marketed branded beef attributes.

One of these attributes is certified organic. Beef production systems that are certified organic implement standards in their production and processing that follow an organic principle. For example, production systems avoid the use of pesticides, feed additives, antibiotics or growth stimulators.

| | |
|--------------------|---|
| Growth stimulators | <ul style="list-style-type: none"> • Natural hormones (e.g. estrogen, testosterone, progesterone) • Synthetic hormones (e.g. zeranol, trenbolone acetate) |
| Antibiotics | <ul style="list-style-type: none"> • Therapeutic antibiotics (in response to actual illness) • Subtherapeutic antibiotics (e.g. tetracycline, tylosin) |

Based on global demand trends for beef production (see section 5), consumers tend to have a stronger awareness of health. In a study, European consumers described ‘unhealthful’ beef as including additives or hormones. Similar, the term ‘free from’ is often used when branding a product to indicate that the product does not have attributes that are undesirable to the consumer.

To move from the actual attributes of beef, marketers use the concept of a ‘local story’. This means that marketers build a story around cattle that are specifically raised and highlight characteristics that make the consumers feel good about the product. For example, the label on the package states where the cattle come from, the way they are raised and by whom. This is often done by focusing on ‘value propositions’ which are elements important to the consumer (e.g. locality, safety, fair treatment of cattle, etc.)

Another issue particular to Brazilian beef producers is the deforestation in the Amazonas region. The deforestation in Brazil that started in the 1960s was mainly caused by cattle farmers and cattle ranchers that burned Brazil’s rainforest for land. However, over the last decade this trend has been reversed and Amazon deforestation has decreased by 70% since 2005. To show environmental stewardship and demonstrate to consumers that the beef they are buying is not responsible for destroying Brazil’s rain forest, beef producers should display that their production methods have become more sustainable and adhere to environmental standards. This

can be done by demonstrating how Brazilian beef producers have contributed to the decline of deforestation in the Amazonas region. Moreover, it can be stressed that beef production has constantly consumed less energy and produced less waste.

8.2. Steps in Brand Development (Recommendation)

All of the above mentioned branded beef attributes should be linked to main marketing principles. The efforts must capture the product's uniqueness and catch the attention of target markets. Furthermore, Brazilian beef companies have to build an image around their products that makes them unforgettable. At the same time the product must deliver on its simple attributes such as quality. This section suggests a few key steps in order to develop the brand:

1. Brazilian beef companies need to determine how they want to differentiate their products from other products in the marketplace (especially in commodity markets like beef). This paper suggests that emphasis can be put on “certified organic”, “free from...”, building a local story and/or expressing environmental stewardship. Research has shown that these attributes are increasingly important to consumers. At the same time, an in-depth market research should be conducted in order to determine how the product fits into the market. Thereby, Brazilian companies should investigate which branding strategies competitors use and identify what the market currently lacks in terms of consumer demands.
2. Brazilian beef companies are advised to define their brand by formulating a statement of the overall role of the brand. To create uniqueness, a specific brand name, logo and tagline should be developed. The name, logo and tagline need to be simple, but highly memorable. It is important to develop the three at the same time in order to reduce confusion, but instead show a consistent image.
3. After the “preparation phase”, it is time to launch the brand with a well-thought plan. This plan intends to introduce the brand to the market place. Awareness should be created by advertising and promotions. Since the target group of this study were millennials, a focus should be put on new advertising

platforms, such as social media. The increasing importance of advertising channels like facebook or instagram opens up new possibilities for effective branding. For example, with the hashtag #brazilianbeef, Brazilian beef companies could start promoting their beef via instagram and include descriptions of recipes for a unique dinner experience.

Picture 1: Example of #brazilianbeef



4. Lastly, Brazilian beef companies need to manage the brand. Managing the brand means to ensure that a consistent message is conveyed to consumers. Additionally, competitors may attempt to copy successful elements of the branding strategy. Hence, it is important to stay up-to-date with new consumer demand trends in order to “modernize” the brand or extend it to a different target group.

Furthermore, the Brazilian government and ABIEC (Association of Brazilian beef exporters) should play a role in promoting the brand of Brazilian beef. The survey has shown that respondents that think Brazilian beef is not of good quality, have a rather negative image of Brazil. The government and ABIEC should work on improving Brazil’s reputation abroad by launching initiatives via Brazilian institutions in the respective markets (e.g. Brazilian Chamber of Commerce). For example, ABIEC could start a “World Best Beef” campaign to support the brand development of Brazilian beef. Similar, the Brazilian government could establish a “Brazil Image Council” that polishes Brazil’s image abroad.

9. Conclusion

This paper provided a description of the Brazilian beef industry and looked in detail at animal traceability and the low perception of animal health. To answer the research question *Do Europeans associate Brazilian Beef with Quality Attributes?*, a study was conducted to investigate whether European consumers associate Brazilian beef with quality attributes such as ‘healthiness’ and ‘freshness’. Additionally, it was investigated whether traceability and country-of-origin have a positive effect on the quality perception of Brazilian beef. The survey shows that European consumers overall do have a relatively neutral assessment of the quality of Brazilian beef. When evaluating whether Brazil’ image as a country has an effect on the perception of Brazilian beef, the results also showed no clear trend.

However, when one divides the survey sample into two groups (one group that has purchased Brazilian beef in the past and the other group that has never purchased Brazilian beef or was not aware of doing so), it can be overserved that respondents that have purchased Brazilian beef in the past tend to give Brazilian beef a better assessment in terms of quality. Vice versa, respondents that stated to have never purchased Brazilian beef or were not aware of doing so, rated the quality lower. If one divides the survey sample again into two groups, this time separating people that have a positive image of Brazil from people that do not, another interesting observation can be made. Respondents that have a more positive image of Brazil tend to more likely assess the freshness and healthiness of Brazilian beef as positive. Vice versa, respondents who have a negative image of Brazil tend to more likely regard the freshness and healthiness of Brazilian beef as low.

The two observations above make two things very clear: People that have never bought (or experienced!) Brazilian beef, have subconsciously a negative impression of the quality of Brazilian beef. This shows that Brazilian beef lacks brand equity. The product does not seem to have a special meaning to consumers. Additionally, Brazilian beef seems to suffer from the country-of-origin effect, meaning that the image of Brazil has an effect on how consumers perceive products coming from the country (like Brazilian beef). Coming back to the research question, one can clearly see from the survey results that cattle traceability increases the quality perception of

Brazilian beef by European consumers. However, it is important to note that other factors are influencing the decision to buy Brazilian beef as well.

Brazilian beef companies have been very successful in recent years due to several factors. One factor is the favourable climate in Brazil that provides sufficient rainfall in agricultural production areas and has a winter that is generally mild in temperatures. Moreover, Brazil has tremendous natural resources, such as an abundant supply of water and cheap farmable land. Economically wise, Brazil's beef industry benefitted from cheap labour, reduced trade barriers and a favourable exchange rate that promoted exports. However, these external advantages seem to have caused Brazilian beef companies to neglect sufficient marketing programs. Better marketing programs are needed in order to make the competitive advantage, which Brazilian beef companies enjoy through favourable external conditions, more sustainable. It can serve as a form of protection against times when external factors may worsen.

Since the beef industry is very important to Brazil's economy and contributes a significant amount towards the GDP, the Brazilian government is advised to support these marketing programs. Together with ABIEC, initiatives should be launched that aggressively promote Brazilian beef and enhance the reputation of Brazil. Competition in the beef industry is becoming increasingly fierce, hence it becomes more important to differentiate and establish a unique selling position. Beef should no longer be marketed as a commodity, but rather as a 'delicacy' with distinct attributes.

10. Limitations

Concerning the limitations of this study, one can argue that the target population does not reflect all major markets that Brazil does business with, such as the U.S. or China. Additionally, the target population mainly consisted of highly educated students, in particular Bachelor or Master students that are not representative of the general population of their respective countries. Hence, their country-of-origin evaluations might differ from the evaluations of less educated individuals. For example, it can be assumed that individuals from the target population travel more than the 'average' individual. Individuals from the target population might have even travelled to Brazil, which implies that their assessments of country-of-origin are more based on rational

facts, rather than stereotypes. Moreover, the survey questions did not specifically ask respondents if they would be willing to pay a premium for Brazilian beef products. This would have allowed to extend the research to analysing whether a country's image and the willingness to pay a premium are correlated.

Another limitation refers to the use of online questionnaires. Although it is relatively easy to generate large sample size with online surveys, representativeness remains an issue since not all people have access to the internet nor is it possible to randomly select a sample (like dialling random digits for telephone surveys). Additionally, web-based surveys are exposed to the risk of multiple responses or non-serious responses, which result from the lack of control over who responds to the survey.

Although this dissertation has methodological limitations, it contributed to the understanding of how a lack of branding and the country-of-origin effect influence a consumer's decision to purchase Brazilian beef. Further research could study this topic in more detail by using a more diverse sample and looking at different dimensions of quality perceptions. This could deepen the discussion and conclusion presented in this dissertation.

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Appendix

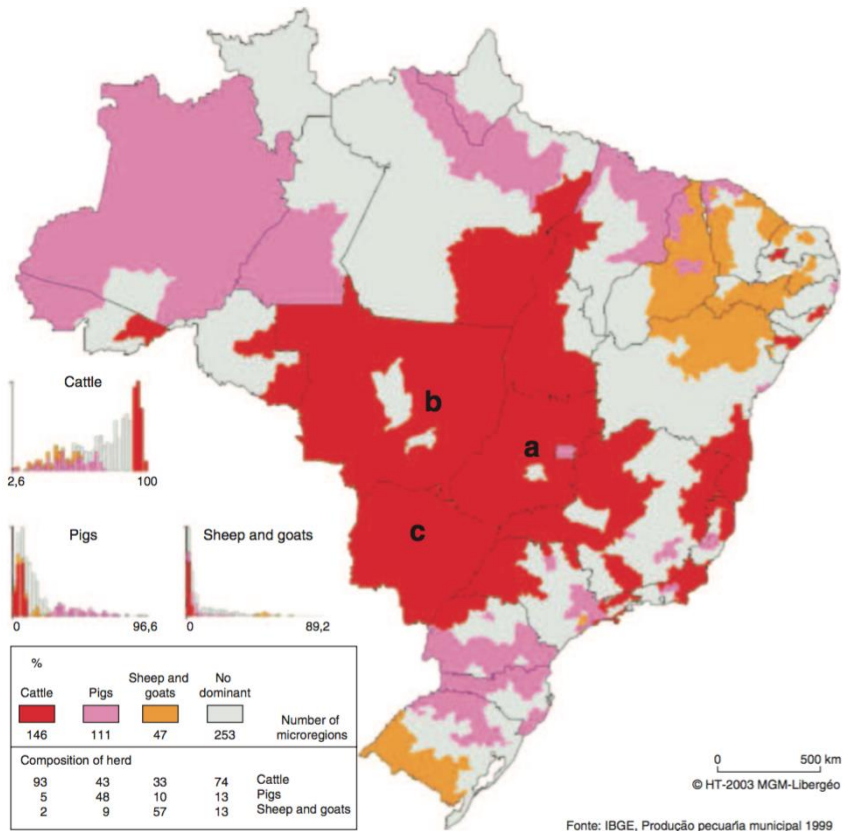
Appendix A: Paulino & Duarte, 2014

Total area used for beef cattle (ha)

| States | Total area (thousand ha) | Participation (%)* |
|--------------------|-----------------------------|-----------------------|
| Mato Grosso | 22 715 | 13.89 |
| Minas Gerais | 20 437 | 12.49 |
| Mato Grosso do Sul | 18 019 | 11.02 |
| Goiás | 14 986 | 9.16 |
| Pará | 14 386 | 8.80 |
| Bahia | 12 822 | 7.84 |
| Tocantins | 10 232 | 6.26 |
| Rio Grande do Sul | 8562 | 5.23 |
| São Paulo | 7798 | 0.00 |
| Maranhão | 7138 | 4.36 |
| Paraná | 5344 | 3.27 |
| Rondônia | 5291 | 3.23 |
| Santa Catarina | 2035 | 1.24 |
| Acre | 1338 | 0.82 |
| Amazonas | 1121 | 0.69 |
| Roraima | 959 | 0.59 |
| Amapá | 353 | 0.22 |
| Others | 17 816 | 10.89 |
| Brazil | 163 562 | 100 |

Appendix B: Paulino & Duarte, 2014

Most important states in terms of cattle production (in red)



Appendix C: Survey Results on Image of Brazilian Beef

| Question | Scale |
|---|---|
| Do you consider Brazilian beef as fresh? | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of Germans that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.4 |
| Avg. response of French that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.3 |
| Avg. response of Italians that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.4 |
| Do you consider Brazilian beef as healthy? | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of Germans that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.2 |
| Avg. response of French that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.5 |
| Avg. response of Italians that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.3 |
| Do you consider the cattle-raising methods in Brazil as sustainable? | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of Germans that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.0 |
| Avg. response of French that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.1 |
| Avg. response of Italians that stated “No” or “I am not aware” regarding purchase of Brazilian Beef | 2.2 |

Appendix D: Survey Results on Image of Brazilian Beef

| Question | Scale |
|--|---|
| Do you consider Brazilian beef as fresh? | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of Germans that stated “Yes” regarding purchase of Brazilian beef | 3.5 |
| Avg. response of French that stated “Yes” regarding purchase of Brazilian beef | 3.3 |
| Avg. response of Italians that stated “Yes” regarding purchase of Brazilian beef | 3.5 |
| Do you consider Brazilian beef as healthy? | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of Germans that stated “Yes” regarding purchase of Brazilian beef | 3.2 |
| Avg. response of French that stated “Yes” regarding purchase of Brazilian beef | 3.3 |
| Avg. response of Italians that stated “Yes” regarding purchase of Brazilian beef | 3.5 |
| Do you consider the cattle-raising methods in Brazil as sustainable? | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of Germans that stated “Yes” regarding purchase of Brazilian beef | 3.4 |
| Avg. response of French that stated “Yes” regarding purchase of Brazilian beef | 3.3 |
| Avg. response of Italians that stated “Yes” regarding purchase of Brazilian beef | 3.4 |

Appendix E: Survey Results on Traceability

| Question | Scale |
|---|---|
| Traceability makes beef safer | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of German respondents | 4.0 |
| Avg. response of French respondents | 3.9 |
| Avg. response of Italian respondents | 4.0 |
| I trust the traceability information on labels and packages | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of German respondents | 3.7 |
| Avg. response of French respondents | 3.5 |
| Avg. response of Italian respondents | 3.6 |
| I am willing to pay a bit more for beef that is traced | I fully disagree I fully agree 1 2 3 4 5 |
| Avg. response of German respondents | 3.9 |
| Avg. response of French respondents | 3.9 |
| Avg. response of Italian respondents | 3.8 |