

University of the Witwatersrand

Masters Research Report

Title:

Thorough-Bread? A Study of the System of Provision of Bread in South Africa

Student: Katharina van der Walt

Student number: 462142

Supervisor: Lotta Takala-Greenish

Research Protocol Number: CECN/1073

Word Count: 20 111 (excluding abstract, table of contents, reference list and appendices)

Date: 31 August 2016

Research report submitted to the Faculty of Commerce, Law and Management at the University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of Master of Commerce in Development Theory and Policy.

Declaration

I declare that the research report hereby submitted in partial fulfillment of the requirements for the degree of Masters of Commerce in Development Theory and Policy is my own independent work, except where I have explicitly indicated otherwise.

Katharina van der Walt

Date:

Acknowledgements

I would like to thank my supervisor for her time as well as the valuable guidance, insights and comments I received in our meetings and email correspondence; my sisters, parents, and grandparents for their patience, support and many conversations that have shaped my research interests; my current employer for the study leave I was granted in the final moments of completing my paper; and finally, my respondents for sharing their views and expertise.

Thorough-Bread? A Study of the System of Provision of Bread in South Africa.

Abstract:

Over one billion people in the world are under-nourished, and over two billion suffer from malnutrition of micro-nutrients – known as ‘hidden hunger’¹. This is largely due to the fact that two thirds of the world’s population depend on cereal or tuber based diets (e.g., wheat, maize, potatoes) which tend to satisfy energy demands but not essential micro-nutrients². The industrialisation of food production systems that occurs as part of the process of economic development has been linked to great improvements in access to food on the one hand, but this has also resulted in major transitions in population-level food consumption and lifestyle patterns. The changes affecting both dietary and physical activity have been termed the ‘nutrition transition’³, which signals the change from consuming large amounts of fibre and low amounts of fat, to a diet comprised of highly processed, high-energy foods. Developing countries now face a ‘triple burden’ in terms of overcoming under-nutrition of micro and macro nutrients, as well as addressing over-consumption related to the ‘nutrition transition’ that accompanies economic development⁴. Given this setting, this paper sets out to understand how the industrialisation of the wheat to bread chain in South Africa has influenced population consumption patterns and to what extent consumer interests have been marginalised in the pursuit of industrial efficiencies during the development of this chain. This will be done using a ‘Systems of Provision’ approach which enables a vertical analysis of the processes leading up to consumption, whilst allowing for the incorporation of historically defined, context-specific influences on chain development and consumption patterns, including political, socio-economic and cultural factors, which other vertical approaches, such as the Global Value Chain framework do not enable.

¹ Zhao & Shewry (2011, 594). Also Miller & Welch (2013, 115)

² Ibid.

³ A phrase coined by Barry M. Popkin

⁴ See Lentz and Barret (2013) and Miller & Welch (2013, 115)

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1 Introduction

Industrialisation⁵ is arguably the most important step in the process of economic development. It is largely promoted for the welfare-enhancing benefits that accompany structural changes related to increasing returns to scale in production. These benefits include a rise of GDP per capita accompanied by increased access to cheaper goods⁶, signifying improved purchasing power and the attainment of a better quality of life. However, there is a growing body of literature that is highly critical of the impact of industrialisation on the concentration of market power, as well as its adverse effect on health and the environment.

The effect of industrialisation on market concentration can be directly observed in the wheat to bread chain in South Africa, which over the years has become increasingly consolidated and vertically integrated (Cock 2009; 2014a; 2014b). The collusive behaviour that has transpired in the baking and milling industries is now being added to by a Competition Commission enquiry into the retail sector, which is equally dominated by a few large players. The concentration of the chain is important for the purposes of this study, because it means that the distribution, availability, quality and affordability of the country's most important staple foods are subject to the control of a handful of processors and retailers. Furthermore, the concentration along the chain was historically determined by the combination of a highly regulated environment from the 1930s to the 1990s and then exacerbated by deregulation and liberalisation in 1996 (Stanwix 2012). Although the development of the South African wheat to bread chain, its concentration, and cartel activities along the chain have been well-covered in the literature, there is still a gap in understanding the complex relationship between the industrialisation of the chain, concentration along the chain, innovation, bread consumption patterns and the health of consumers. Thus, this paper attempts to reach beyond the explanatory power of the price mechanism in understanding the supply and demand of bread in South Africa, by looking at the interaction of historically defined, context-specific factors that have shaped the evolution of production and consumption into what it is today.

⁵ For the purposes of this paper, industrialisation is understood as the changes in the structure of production that have taken place from what used to be largely uncommercial, home-based production to the emergence of industrial scale bread manufacturing.

⁶ Lewis (in Weiss 2015, 3) says that 'the whole point of development is that it brings down costs' and that one 'has therefore to think about the effects of industrialisation on costs when deciding what is the right policy to follow.'

Why the focus on bread? Bread is a commodity of great social, political and economic significance in South Africa. Not only is it the second-most consumed staple after maize, but it is the *most* processed of the staple foods, thus lending itself to be analysed for the effect of industrial processing on health. Bread is also a product of much political and economic controversy with each segment of the chain involved in production and processing persistently fighting for higher yields, complaining about too high input costs and too small shares in the retail price of bread, which has to be kept sufficiently low to cater for the majority of South African consumers (Randall, Interview 5, 2016). Consumers are equally concerned about the price of bread, as voiced in the recent ‘bread price must fall’ protests – a political expression of the social importance of bread. Furthermore, industrial bread production - especially white bread production – holds historically defined cultural and symbolic weight for a large part of the South African population, to the extent that health debates in the media have not had much of an impact on the average South African consumer and on production patterns in the wheat to bread chain.

Why the focus on health? While access to food has increased through the spread of distribution networks and retail chains, the most-consumed processed foods such as bread and maize lack essential micro-nutrients resulting in ‘hidden hunger’ (Zhao et al. 2011, 594). Furthermore, economic development-accompanying dietary changes have led to a significant increase in nutrition-related non-communicable diseases, including diabetes, coronary heart disease and other illnesses. Micro-nutritional content has become an increasingly important focus of food and health policy alongside food security. This can be seen in the increasing number of fortification programmes in developing and developed countries, especially with respect to micro-nutrient fortification of staple foods such as bread and maize in South Africa. Existing production and distribution networks are used as a vehicle for decreasing micro-nutrient deficiencies. This is quite ironic, as there is evidence that the very same production processes that are currently used as a vehicle for fortification were responsible for the reduction in essential minerals and vitamins found in cereals and vegetables. Modern agriculture and processing have been driven largely by producing higher yields at lower cost with little emphasis on the nutritional quality. This has resulted in the dilution of micronutrients brought about by higher yields (Zhao et al. 2011, 594). Additionally, even though staple foods such as cereals and tubers are not optimal for human health, their success in production has led to the displacement of legumes and pulse crops, which are much healthier. In the case of wheat, the extraction of the most micronutrient-rich parts of the

wheat kernel (the bran and germ) allows processors to significantly extend the shelf life of flour and bread.

These factors all point to the fact that the pursuit of economic efficiencies in the industrialisation of our food systems has shaped the very nature of our food systems, with dramatic effects on our consumption patterns and health. Fortification of staple foods is currently the primary vehicle for addressing micro-nutrient deficiencies. Other vehicles include supplementation; bio-fortification and cultivar breeding programmes to increase the nutritional content of staple foods; campaigns to change consumer behaviour; and encouragement to produce healthier foods through targeted commodity subsidisation schemes. South Africa is currently ‘fortifying by stealth’ – meaning that it happens without consumers being informed, because South African consumers have a history of reacting badly to this information to the extent that they have cut fortified foods out of their diets completely, as happened in the post WWII period. Thus, the underlying causes of unhealthy eating are often found to lie in historically defined, contextually embedded systems of provision of commodities and the cultural systems of consumption related to commodities.

The next section will provide an overview of the methodological approach and explores the challenges in investigating the impact of the production changes. This section also briefly reflects on previous research approaches to studying bread in South Africa. Section 3 will outline the wheat to bread value chain; Section 4 will provide a historical analysis of the chain taking into account technological innovations and recent media debates; Section 5 provides an overview of regulations pertaining to the wheat to bread chain and to what extent these alleviate consumer concerns; Section 6 provides the theoretical and literature review followed by my research findings in Section 7; and Section 8 concludes.

2 Methodology

An inductive research methodology was used in two ways. 1) In order to come up with a research question and 2) in order to find a theoretical framework that was best suited to answering the question being formulated. In the next section I will explain how 1 and 2 developed into the question and theoretical framework that I am answering in this paper.

The research question came from my personal interest in bread and from being exposed to media controversy around the quality of commercially produced bread, especially with respect to the use of supposedly unhealthy food additives, such as azodicarbonamide - a blowing agent commonly used in the production of plastics and, as was extensively covered in the media, in yoga mats. Furthermore, I read that these ingredients were banned in some countries, such as Australia, but not yet in South Africa, which gave the consumer in me cause for concern.

Given my educational background in development theory, I was aware of the vital role that industrialisation and value added manufacturing play in the economic development trajectory and of the possible tensions that might emerge in addressing the issue of the quality of bread produced on an industrial scale. Firstly, I thought that producers would surely not willingly incur costs on ingredients unless they performed an important function in the production process. And, if they were incurring costs on these fairly unconventional additives (when compared to traditional baking methods) then it must mean that these additives were essential for achieving certain qualities in bread (such as a soft foamy texture), without which bread would not be producible industrially, or a reduction in production costs. At the time, I thought that if industrialisation of bread production meant a decline in the quality and safety of staples such as bread, and if this could be applied more broadly throughout the food system, then maybe industrialisation is not such a good thing after all. I was also aware that most consumers who rely on bread as a staple, especially the poor, would not have access to the controversial information relayed to me through various media platforms. Thus many consumers would be worse off in two ways – one, not knowing that the bread they were buying was saturated in food additives, and two, not having the choice to switch to another staple food other than maize, which came with its own set of media controversy (regarding the debate around Genetically Modified Organisms). However, rather than exploring the widely discussed merits of industrialisation and scientific advances in production, my focus turned to the research gap(s) in understanding regulation instead. Based on this, my initial

research question was: ‘An inquiry into the factors that inhibit more progressive and internationally competitive food safety and labelling regulations along the South African wheat-to-bread value chain’.

Given this initial research question, and the fact that the media debates extended into the areas of wheat production and milling (with reference to herbicide residues and the removal of the most nutritious parts of the wheat kernel, respectively), I was immediately attracted to the Global Value Chain framework, in that it would allow me to analyse each aspect of the chain and map out production methods, inputs and outputs, as well as understanding the competitiveness and efficiency pressures along the chain, chain governance, and regulation pertaining to each chain segment.

Much of the above information was available online, though not readily packaged into the Global Value Chain framework, thus this needed to be adapted from various descriptive sources and data sets. The websites of the following industry associations, government and non-government bodies were useful sources of data and other information: the South African Grain Information Service (NPC); Southern African Grain Laboratory (NPC); the National Agricultural Marketing Council; the National Chamber of Milling; the National Chamber of Baking; Grain SA; Stats SA; the National Consumer Commission; The Department of Agriculture Forestry and Fisheries; The Department of Trade and Industry; The Department of Health; The South African Bureau of Standards.

For the empirical, qualitative aspect of my research, I set out to interview various industry experts from the above institutions, whom I hoped would tell me more about the chemicals and additives used, the regulations governing their use, and the extent to which consumers were made aware of the contents of their bread through labelling, so that they could at least make informed choices. One or two of my questionnaires can be found in the appendix. Initially, I also tried to contact some of the main industry players (e.g., Pioneer, Tiger Brands, Checkers). However, I was largely unsuccessful in making contact with them due to the information I needed being of a ‘sensitive’ nature. This is no doubt due to the recent Competition Commission findings and the massive fines incurred by Tiger Brands, for instance, as well as the current Competition Commission inquiry into the retail sector. Thus, based on this, it was very difficult to get to the ‘right people’ within the industry, meaning bakers, millers and retailers, and unfortunately I did not manage to contact any farmers.

However, I did speak to industry experts who interact with the big industry players on a regular basis and who could provide me with very useful information.

I decided against interviewing consumers, because I knew that I would not be able to interview enough consumers so as to have a representative sample that would allow me to generalise about the very diverse South African population as a whole, and felt that the information I needed from consumers was general: i.e., answers to questions such as ‘Are consumers aware of their rights in terms of the Consumer Protection Act?’; ‘Do consumers read labels before they buy food products in general, and bread, specifically?’; ‘Are consumers concerned about additives and processing?’. Instead, I approached the Deputy Commissioner of the National Consumer Commission to find out where the average South African consumer was in terms of the above mentioned questions. I also approached the South African National Consumer Union for these purposes. An online survey was considered but rejected, because I expected it would introduce too much bias in terms of representing only those consumers who had access to online surveys, (and who could afford to spend time on online surveys), as well as the fact that due to the nature of online surveys, (e.g. shared through social media) it would also introduce an age and network bias. As it turned out, neglecting to interview consumers introduced its own bias, because the organisations interviewed only represent consumers to a limited extent, more details of which will be covered in the analysis section. Thus, further research should be done to fully capture consumer perspectives in the research.

Potential respondents were identified in my initial survey of publically accessible producers, retailers, providers of inputs to production, industry associations, and key experts cited or interviewed in the media. The research targeted insights into production and consumption from different spheres (regulation, data gathering, food science, baking) so as to capture any variation in perspectives. Semi-structured interviews were conducted, using a set of pre-planned questions as a reference base. This was followed by a snowballing approach where respondents would be asked for comments on the important and different opinions to explore. Interviewees were provided with background information about the nature of the research. If they requested it, sample questions were provided. All interviewees were asked to formally consent to the sharing of their views and any requests for anonymity were taken into account. The list of interviewees contacted and completed as well as the introductory letter, and

sample questions are provided in the appendix⁷. In line with the inductive approach taken to forming the research question as well as the respondent list, the selection of respondents is useful for attempting to canvas the range of perspectives in the industry. It is important to note that the responses, whilst representing different views, is not a representative sample of all players/stakeholders in the industry. Details of further research are provided in the concluding chapter.

After having done a few interviews, I felt that perhaps my research question was addressing the wrong set of issues. It looked as if consumers were perhaps undereducated about the rigorous tests that food additives and other chemicals used in production have to undergo before they are released into the market. Furthermore, it is not uncommon for issues to be blown out of proportion in media coverage, as with the food additive azodicarbonamide. I also found that South African regulation is actually quite up to scratch with respect to food safety and labelling, and that the only area of concern might be in the implementation or enforcement of the regulations. In addition, I discovered that the quality of South African wheat is some of the best in the world, however, that a diet of only bread or maize does not provide essential micronutrients needed for physical and mental development.

The issue of fortification came up a lot in my interviews, which made me reflect on the irony that the nutrient-rich wheat bran and germ are removed in the milling process, and then added back to the flour in the form of a small yet concentrated dose of essential vitamins and minerals. Thus my research focus took a turn towards understanding the combination of technical innovations and consumer preferences that dictated that the most nutritious part of the wheat kernel should be removed from bread making. To answer these questions, I needed a suitable theoretical approach. My original research framework situated bread production within a Global Value Chain (GVC) approach. This was due to the ability of this theoretical and methodological structure to incorporate the different stages of production, the notions of value added and input-output linkages, as well as the possibility of incorporating aspects specific to the South African economy. However, this was not fully satisfactory, as the Global Value Chain framework does not fully capture the role of history and incorporate the social, cultural and political context of value chains⁸. In addition, the GVC focuses primarily on the allocation of costs/value and thus would not enable me to interrogate the interests of

⁷ Appendix 4

⁸ A significant amount of literature within the GVC school points to the shortcomings of the GVC framework in capturing the historical, cultural, social, and political context of value chains, and authors have attempted to correct these shortcomings in various ways. More on this in the theory section.

consumers in conjunction with the decisions of producers. The SA bread value chain is mainly connected to the global grain-to-bread industry through the inputs (such as wheat grain, inputs to agriculture, imported machinery, etc.) but the final product and consumption remains distinctly local/domestic. Finally, though the GVC approach generally focuses on ‘value-adding’ activities along the production chain, the type of ‘value’ that is considered does not reflect the particularities of the quality changes along the production chain. This leads to contradictions in the way in which different production stages understand ‘value’: for instance, both the removal of the bran/germ/nutrients, and attempts to return some of the nutritional value with additives and micronutrients at a later production stage are ‘value-adding’ activities; as are chemically-induced changes in texture - necessary in order to facilitate the mass production process, but also to produce white, fluffy bread (the perception of value in this case being historically defined).

The Systems of Provision Approach, though less used in the literature, functions as a meso-level theory that enables for a better investigation of the conjuncture/interaction between the production and consumption perspectives. My revised research question was formed after finding quite some literature addressing the effects of industrialisation on concentration in the food sector as well as the effects of industrialisation on consumer health through changes in food provision, respectively⁹. Initial reviews of the SOP framework enabled me to marry both these approaches in an analysis of the development of bread, within the specific South African historical and economic setting. The SOP framework and locating my research in the interaction of the consumer/producer perspectives presents an original contribution to research on bread production in South Africa.

I must acknowledge that the change in direction of enquiry and theory happened quite late in the research period. This reflects the inductive research approach employed for both the formulation of the research question as well as investigating different research methods. Though this study provides interesting insights into the production and consumption of bread, a more thorough examination of the SOP approach and its various applications remain beyond the scope of this research.

The approach used here is based on my interpretation of the SOP framework. A literature review revealed a comparatively smaller number of studies employing the framework (with a primary focus on utilities or investment goods e.g. water or housing as opposed to consumer

⁹ See Mather 2005; Lang 2003; Desmarchelier and Szabo 2008; Lentz and Barrett 2013

staples), and an absence of explicit methodological guidelines, in comparison to the GVC approach which has become widely used as a detailed methodological tool. The limited information about employing the SOP as a research framework was both an advantage and a challenge for this research. The main advantages were derived from being able to interpret and match the framework to the specificities of South African bread production. The lack of counterfoil or comparative application within a food production chain in a developing country context nevertheless presented an ongoing challenge for this research. However, a forthcoming PhD by Katherine Joynt on the ‘shifting power relations between different actors in the production, distribution and consumption of bread in South Africa’ could provide one point of comparison. Furthermore, looking at how quality concerns differ, not only between consumers and producers, but also amongst producers at different stages of production, could provide another counterfoil for the research.

Literature in adjoining fields, such as the effects of industrialisation and the globalisation of capitalism on labour/capital relations and tensions, gender issues, smallholder farming, food security, food chemistry, and land redistribution, remain beyond the scope of my research, however I will make reference to these where they are relevant to my study. When referring to industrialisation, I am aware that industrial policy approaches differ extensively - from narrow, price-led/competitive market conceptualisations thereof; to skills and technology development focused industrialisation; or structuralist approaches that conceptualise complex and cumulative linkages in the process of industrialisation. Two such dissimilar forms of industrialisation played a role in shaping the development of the South African wheat to bread chain, in that industry was initially highly controlled and subsequently deregulated. Further research areas that have emerged out of this research are discussed in the concluding chapter.

3 Theory

In the following section the SOP approach will be introduced, where after it will be applied in an attempt to explore the industrialisation of bread production in a new way.

The SOP approach came about as a result of a dissatisfaction with the way in which both orthodox economics and postmodern sociology conceived of the consumer and consumption patterns. Economic theory envisions the consumer as a rational individual, acting out of utility-maximising self-interest, restrained only by the depth of his pocket and the availability of the goods and services supplied on the market. Aggregated for all individuals, consumption is understood as equivalent to market demand (Fine 2004, 2). Further, orthodox economics assumes the existence of perfectly competitive markets in which information is readily available and shared by everyone. In this context the rational, utility maximising ‘homo economicus’, becomes a ‘noble sovereign’, ‘dictating what is produced and setting in place the efficient allocation of resources for society as a whole’ (Fine 2004, 1). Unfortunately, the underlying theoretical assumptions of the perfectly competitive market and perfect information do not correspond to reality. Neither do the highly simplistic understandings of what determines consumer choice and the mechanism that transforms consumer choice into market demand. The neoclassical economic view smuggles in the assumption that whatever is supplied must be a response to sovereign consumers’ demands.

On the other theoretical extreme are the postmodern theories of deconstruction, which focus on uncovering the relationship between the consumer and the consumed, as the consumer becomes ‘victim to the manipulative hidden persuaders in pursuit of what are deemed to be artificially created, even false, needs’ (Fine 2004, 2). It examines the manipulative and symbolically-loaded nature of advertising, its effect on the collective psyche, and how it feeds into and reproduces existing social relations and class stratification. Furthermore, the ‘postmodern consumer is subjectively capable of endless and unlimited reinvention of the objects of consumption and own identity. In this parallel universe to orthodox economics, reference to the material properties (and provisioning) of commodities tends to evaporate by giving way to deconstruction of the meaning of consumption to the consumer and the latter’s own inventiveness’ (Bayliss et al. 2013, 3-4). Thus postmodernist studies stand in stark contrast to the sovereign economic consumer, whose decisions are uninfluenced by factors other than those created by his own utility-maximising choice mechanism.

The above can be considered ‘horizontal approaches’ in that ‘they are drawn from within a discipline and applied across all consumption’ (Fine 2004, 4). ‘Horizontal analyses are usually contained within individual sciences, and they typically investigate specific problems - for example, the determinants of consumption - by applying one single explanatory factor across all goods (whether motor cars, fur coats or bananas) and all societies. These key ideas may include, for example, utility maximisation, status, ritual, or, alternatively, the pressures from the system of production, culture, or advertising. Paradoxically, these concepts are generally incompatible across disciplines, which limits the range of phenomena they can explain, and seriously weakens their claim to generality’ (Saad-Filho 2000, 210). Fine rejects horizontal approaches because ‘they over generalise the analytical significance of certain explanatory factors, they are blind to the (shifting) role of other determinants of consumption, and they cannot appreciate that the consumption of each good at each point in time should be explained by a (potentially shifting) combination of factors’ (Saad-Filho 2000, 210).

Thus, in opposition to horizontal approaches of understanding consumption, the System of Provision approach enables a vertical analysis of the chain of activities connecting production to consumption, in a way that is specific to each commodity (Fine 2013; Bayliss et al. 2013). ‘Such specifics involve tracing back from consumption and consumer through the material practices by which they are reproduced and transformed as an integral whole, or system’ (Fine 2013, 220). In applying this approach to the question of why UK consumers were not following healthy eating habits, one answer was that even though healthy products such as low fat milk were available at supermarkets, the fact that the agricultural system produced high fat milk meant that the excess cream had to go somewhere, and so it went into cheeses, desserts and other processed foods. It was found that the consumers who were the most likely to buy low fat milk were also buying the high-cream products. (Fine 2013, 221). Note the similarity between this example and the fact that millers whose processes were specifically designed to remove the bran and the germ from the wheat kernel now have to fortify flour by reintroducing the vitamins and minerals that were contained in the discarded bran and germ.

To expand on the previous point, the SOP claims ‘that each group of commodities is materially produced, and has its cultural significance determined, within a separate chain of activities that comprises its production, circulation, distribution and consumption’ (Saad-Filho 2000, 211). Thus, cultural significance and meaning associated with the good and its provision feature strongly as determinants of patterns of both consumption and production (Bayliss et al. 2013). Further emphasis is placed on the notion that consumption norms and

demand are historically defined by the activities that link production to consumption along the chain.

In using the SOP approach, it can be argued, for instance, that agricultural policy not only determines how much is produced but also how much is consumed, and that this plays a more powerful role on consumption patterns than factors such as healthy eating campaigns (Saad-Filho 2000, 211-212). Furthermore, the SOP approach reveals the fact that the forces underlying various systems of provision often work in favour of capital. For instance, the food System of Provision is complemented by Systems of Provision that provide post-consumption goods and services such as ‘fat-burning’ or anti-depression pills, or personal dieticians and trainers, depending on the cultural meanings that are attached to consumption.

Fine further argues that commodities are not only understood in terms of their exchange value – or price, but also in terms of their use value, which does not necessarily relate to how the good is used materially but to cultural and contextual factors. In addition to this, consumers are active collaborators in shaping the culture associated with commodities. They are reflexive, but not in circumstances chosen by themselves (Fine 2013, 226). Ten factors - ‘the ten C’s’ - are considered to shape the cultural systems attached to commodities which ‘interact with each other in complex and diverse ways’ (Bayliss et al. 2013, 6). These include that cultural systems are constructed, construed, commodified, conforming, contextual, contradictory, chaotic, closed, contested and collective.

Cultural systems attached to commodities are *constructed* in that they are influenced by the material practices specific to the SOP, yet go beyond the commodity’s material use value into associated meanings that are subject to change (Bayliss et al. 2013, 6). They are *construed*, because consumers respond reflexively to their context, endowing commodities with meaning derived from sources of knowledge and experiences (ibid; Fine 2013, 227). Furthermore, consumer culture is *commodified* ‘with the commodity form of consumption dictating flexibility around what is consumed and with what meaning but equally constrained by the imperatives of profit-making along the system of provision’ (Fine, 2013, 227). Cultural systems are *conforming* because as mentioned previously, consumers do not make choices in circumstances chosen by themselves. The meaning of their choices and of the commodities they consume are influenced and constrained by the circumstances of provision (Bayliss et al, 2013, 6). Consumer culture is *contextual* in that each SOP is shaped by material and immaterial factors specific to the environment within which it exists and the cultural systems

of meaning with which it interacts. It is also *contradictory* in that it is influenced by different forces of opposing nature that compete for giving content to cultural systems (ibid.). Cultural systems are *chaotic* in that they are ‘riddled with inconsistencies of belief and action’ (Fine 2013, 228). They are *closed*, because the dominant ways of constructing meanings, beliefs and actions prevent less dominant systems of meaning from taking shape in relation to them, although it is not prohibited. This indicates the unequal participation involved in SOPs and in constructing and differentiating cultures. Cultural systems can further be *contested* with regard to material practices that occur along the chain of provision or with respect to the meanings that are associated with those practices. The last characteristic of cultural systems associated with commodities is that they are *collective*, in that they communicate meaning through collective action, although this also happens on an individual reflexive level.

The benefits of the SOP approach include that, as opposed to horizontal approaches, it factors in the whole chain from production to consumption that is specific to each commodity, not relying on highly generalised analyses that are based largely on reductionist views of consumption. The vertical analysis ‘restores production to a position of prominence’ (Fine 2013, 233). In doing so it offers much more explanatory power in examining the links between production and consumption and how the chain of activities involved in the provision of a commodity determine consumption in ways not reducible to the orthodox understanding of supply and demand. This is where other vertical approaches, such as the Global Value Chain (GVC) framework are lacking¹⁰.

The GVC framework maps out each segment of the chain involved in a value-adding activity required for a good to be successfully produced and marketed. However, unlike the SOP approach, the GVC approach shows no regard for the embeddedness of chains in specific social, economic, political and historically defined contexts, nor does it see any relation between consumers, the commodity consumed and the activities along the chain that are involved in creating the commodity. Thus the cultural systems of meaning that exist along the chain are ignored. The GVC approach relies on codifying fixed, ideal types of chains, i.e., buyer-driven or retail-driven,¹¹ which do not necessarily correspond to reality (Fine 2013,

¹⁰ The GVC framework has been widely discussed. See for example Gereffi et al. (2011) for the description and use as a methodological tool. Critical literature on the GVC approach has commented on the absence of labour (Selwyn) as well as other critiques (Bair 2005; Palpacuer 2008; Newman 2012). Authors have attempted to address the fact that the GVC approach does not fully capture the role of history and incorporate the social, cultural and political context of value chain this through the Global Commodity Chain approach and the Global Production Network approach (Raikes et al. 2000; Henderson 2002).

¹¹ GVC literature discusses ‘upgrading’ as moving into higher value added parts of the chain or increasing the value of what is already being produced by a particular part of the chain. Some have talked about this as a form

229). Furthermore, the GVC approach lends itself to firms and policy makers to make decisions based largely on firm-level ‘upgrading’ through the improvement of processes, products, or other economic efficiency and competitiveness-motivated concerns, with complete disregard for how this will implicate consumers down the line, social actors involved in the chain, power relations along the chain and other market dynamics (i.e. displacing smaller competing firms). Many of the theoretical and contextual considerations which are lacking in the GVC approach are provided for in the SOP approach.

Another advantage of the SOP approach is that it is, to a certain extent, methodologically and theoretically open, although it does reject certain approaches like the demand theory of consumption mentioned earlier and other horizontal frameworks¹². There might be sellers and buyers who are participating in the current system who would not if information were freely available. So that for instance, you might have had more artisanal bakeries and fewer industrial bakeries, or more consumers demanding artisanal bread, or baking their own bread at home, rather than consuming industrial bread. The theoretical and methodological openness of the SOP approach lends itself to various research questions as long as the elements of the SOP that are of particular relevance to the question under consideration are clearly identified (Bayliss et al. 2013, 8).

The question of the effect of industrialisation on the system of provision of food and consequently on consumption patterns, draws on interdisciplinary literary sources, including media debates, that focus on the effect of industrialisation on health and the resulting implications for food and agricultural policy.

Other than in media debates, the link between industrialisation and the quality of commodities produced is addressed in the literature in various ways. Murdoch et al. (2000, 107) note that that ‘quality in the food sector, as it is being asserted at the present time, is closely linked to nature and the local embeddedness of supply chains’.

Maxwell and Slater (2003, 531-533) note that both the character of the food system and the nature of food policy are transforming in response the effects of urbanisation, technical change and the industrialisation of the food system on the way that food is produced, marketed and consumed. Awareness of the links between supply and demand was already on the food policy agenda in the 60s and 70s, however due to a rapid change in international

of industrial development (e.g. Millberg or Morris et al), although their focus is on the price aspect and fail to capture consumer concerns in a proactive way.

¹² E.g. Information Asymmetry (Akerlof 1970)

discourse in the 80s, the focus of food policy shifted from attempting to address changes in food supply, to addressing the demand side in terms of ‘food security’. It was only in the 1990s that concern for the commercialisation and industrialisation of food systems began to feature anew, as awareness of issues such as the environmental consequences of new technologies and mono-cropping, food safety, and the rise of nutrition-related illnesses started becoming more prominent. However, those who had been primarily concerned with famine and malnutrition, saw these issues as unnecessary. Maxwell and Slater note that even the poorest countries can no longer ignore the need for a new food policy as the cost of diet-related non-communicable diseases will soon equal if not exceed the cost of undernutrition in developing countries. This is already apparent in South Africa, as the number of people who are overweight is close to the number in the US (2003, 533, 537)¹³.

Lentz and Barret (2013) argue that the role of food assistance policies in addressing the delivery of macro-nutrients has shrunk while there is an increasing need to address micronutrient availability. They reason that this is so, because the rise of commercial food markets has increased the availability of foods high in protein, energy and fat. The distribution networks offered by commercial food markets are now being used to increase access to micronutrients¹⁴. Such interventions incur reasonably low costs, which firms can pass on to the consumer (Lentz and Barret 2013, 153-154).

In relation to bread, Cock (2009, 11) writes that ‘mass production, high-tech food-processing and the quest for a longer shelf-life have stripped bread of much of its former wholesomeness’. She adds that this is a result of the Chorleywood baking process which was introduced in South Africa in the 1970s and 80s, which uses chemicals and other additives to produce loaves of bread that contain ever more quantities of water and air, which is more profitable for the corporations that control the production of bread, because they can save on the most expensive aspect of baking – the flour. She explains that the deregulation of the bread industry not only led to higher concentration along the chain, but also to the withdrawal of quality controls, leading to an industry-wide shift towards selling bread of lower quality (with regard to lower mass and flour content.)

Desmarchelier and Szabo (2008, 121) note that while scientific and technological advances offer many potential benefits in food production, developments in science and technology

¹³ This relates back to the notion that agricultural (and food policy) determine not only how much is produced, but also how much is consumed, and that food *provision* has a greater influence on what people eat than for instance, healthy eating campaigns ((Saad-Filho 2000).

¹⁴ In the case of bread, this is done by adding a fortification mix to flour.

need to be guided by appropriate safety assessments and regulation ‘if risks are to be minimized and technologies are to be developed in a socially acceptable way’.

Risk information is brought to consumers through various platforms, such as media, print and broadcast which has increased consumer concerns about food safety (Henneberry 1998, 87). Henneberry further notes that the reasons for increased consumer concern have changed from poor sanitation and micro-organisms to chemical residues, anti-biotics hormones, irradiation and food additives. However, a lack of risk education and communication about these processes and the role of international food safety regulations derived from institutions such as the Codex Alimentarius Commission may cause undue consumer concern¹⁵ (ibid, 85-87). This view was also expressed in an interview with South African Food Scientist and consultant Nigel Sunley who emphasised that consumers are not aware of the stringent processes that chemicals undergo in order to determine their maximum residue limits (MRL’s) in food (Sunley 2016).

Despite the existence of these institutions and their rigorous method of determining food safety regulations, consumer advocates nonetheless believe that the acceptable levels of certain substances in food (for instance food additives) are set too high and fail to protect the consumer. Thus, governments face increasing tensions between achieving a balance in reducing consumer concerns, protecting public health and protecting the interests of food suppliers (Henneberry 1998, 88)

Though there are in fact many food safety problems associated with the industrialised food system, these are not necessarily the ones consumers perceive to be the most serious (Maxwell & Slater 2003, 537). While the public perceives pesticides, chemical residues, and veterinary drugs (i.e., antibiotics in meat) to be the main sources of risk, contamination by bacteria, protozoa, parasites, viruses and fungi or their toxins are more common sources of contamination (ibid.)

It is argued that while food policy has historically been the domain of Ministries of Agriculture, supported by Ministries of Health, it will increasingly move onto the agenda of Ministries of Trade and Industry, of the Environment and competition authorities (Maxwell and Slater 2003, 539).

¹⁵ Also see Haukenes, A. (2004). Perceived health risks and perceptions of expert consensus in modern food society. In *Journal of Risk Research* 7 (7–8), 759–774 (October–December 2004).

Though food policy is becoming more prominent, it still competes with food security. For instance, Lentz and Barrett (2013) argue that ‘any public food assistance policy or program must be designed to integrate effectively with the private food production and distribution system’ and that the ‘performance of the private food production and distribution systems matter more to food security than do national food assistance policies and programs’ (160). While on the one hand this indicates the commitment to ensuring that increasing the micro-nutrient content of food does not come at the expense of access to food, it also indicates the extent to which industry is protected, despite the notion that industry is partly to blame for the fact that nutritional content is lacking in the first place.

Given that the food chain, from producer, retailer and consumer is highly interconnected and dynamic, it is essential that cooperative linkages be formed between government, industry and the consumer in addressing the delivery of safe, healthy and nutritious food (Desmarchelier & Szabo 2008, 121). Unfortunately, consumers are mostly left out of negotiations between government and industry. The authors call for a co-regulatory approach to address this issue. (ibid).

The following section will outline the wheat to bread chain in general and in the South African setting.

4 The Wheat to Bread Value Chain

This section provides an overview of the different stakeholders, connections between them as well as some key production (and consumption) statistics in South Africa between 1997 and 2016. Rather than describing each subsection of the chain in full, I will focus on the aspects of each chain segment that are important for the research question, especially with regard to cost and quality considerations, and other tensions that can be identified within the chain.¹⁶

The South African wheat to bread value chain consists of wheat farmers, grain silos, millers, bakers, retailers and consumers as well as various goods and service providers that facilitate the chain's operations. These include, for example, providers of machinery and equipment necessary for each segment of the chain; providers of trading, freight and logistics services along the chain; and other input providers for each segment of the chain, such as fertilizers, seed, herbicides and pesticides in the farming sector.

Figure 1 The South African Wheat to Bread Value Chain



Source: Author's compilation from publically available sources

¹⁶ For Price related information see Appendix 2

Figure 1 above depicts the wheat to bread chain in South Africa, with information on the main activities which characterise each chain segment as well as the relevant industry players.

4.1.1 Farming

Input providers into farming include machinery and equipment, fertilizers, seed, herbicides, pesticides and fuel/energy, however, research and biotechnology also increasingly serve as inputs into farming (NAMC 2003, 159). Wheat farming forms part of the ‘primary industry’ which involves the provision of raw materials for processing in the ‘secondary industry’, which includes millers and bakers.

Wheat is the second most consumed source of energy (kilojoules) in South Africa after maize and, is available in 97% of food stores and cafes across South Africa according to the South African Chamber of Bread (SACB website). Although small quantities of poorer quality wheat are sometimes used for stock feed, this is no longer predominant given that grain storers mix different quality wheat in order to grade it (NAMC 2003, 158; Louw, 2016).

Since wheat is a winter cereal, South African wheat is primarily produced in the Cape winter rainfall area, although it has been cultivated in the Free State summer rainfall region since the 1970s, as well as under irrigation in other regions (NAMC 2003). Currently the Western Cape, Northern Cape, and Free State are the biggest wheat producing provinces in descending order of importance.

South Africa is not self-sufficient in wheat production (i.e., South Africa is a net importer of wheat), although the country was relatively self-sufficient in wheat production in the 70s and 80s (Randall, Interview 2016). More than half the wheat consumed has recently been imported from Russia, Germany, Canada and the Ukraine at an import tariff of R911/t (originally R269/ton in 1999) (SAGIS, 2016c; SAGIS 2016d; NAMC 1999; Fourie & Sihlobo 2016). Thus, the South African bread chain can be said to be a ‘global’ value chain.

Given that a large part of the South African population is poor, and rapidly urbanising, consumers require more ready-to-eat foods such as bread (ibid). This is proven by the fact that Gauteng, though smaller than other provinces, consumes the most flour and wheaten meal products which correlate strongly with population density (ibid).

In 2003, the number of commercial wheat farmers in South Africa was between 5000 and 6000 (NAMC 2003, 159), though more recent reports note a substantial decrease to between 3800-4000 farmers (NDA Wheat Fact Sheet).

The total supply of wheat for the 2015/2016 marketing season is projected to be 4031838 tons, of which 1 425 015 tons is estimated for local production and 2 000 000 tons will need to be imported. Demand for the season is projected to be 3 310 000 tons, 3 150 000 of which is projected for human consumption (NAMC 2016a, 5).

4.1.2 Milling

The milling industry converts wheat into flour used for various baking purposes. The products include white bread flour, brown bread flour, cake flour, whole-wheat flour and bran. Over the period of July'15 - Jan '16, South African Mills manufactured on average 262 388 tons of wheaten products per month, constituting of 46,73% bread flour, 27,14% cake flour, 20,31% bran, and 5,82% other products (SAGIS, 2016a).

The extraction rate for one ton of wheat is 0.81 tons of brown bread flour and 0,76 tons of white bread flour, respectively. One ton of brown bread flour can produce 2 275 standard 700g loaves of brown bread, while one ton of white bread flour can produce 2 135 700g loaves of white bread (NAMC 2016a, 2).

The milling industry forms part of the secondary (manufacturing) industry leading into the baking industry, also in the secondary manufacturing sector.

4.1.3 Baking

The baking industry is characterised by four types of bakeries: wholesale industrial/plant bakeries; in-store retail bakeries; independent stand-alone bakeries; and franchise bakeries.

Ronquest-Ross et al. 2015 note that 'simple, convenient food solutions (especially in the form of packaged food) is currently a major global food trend (2015, 6). In 2012, the South African bakery sector was the largest category in the packaged food industry in terms of per capita consumption, contributing to 43 kg per capita/year (ibid).

Over the period of July '16 – Jan '16, South African bakeries produced on average 167 million units of bread per month, of which 48,19% is brown bread, 50,13% is white, 1,6 % is whole-wheat, and the rest is 0.09% (SAGIS, 2016b).

4.1.4 Retail

The primary retailers in South Africa are Shoprite/Checkers, Pick'n Pay, Woolworths and Spar, who have their own in-store bakeries as well as supplying bread from the major plant bakeries (except for Woolworths).

South African wheat consumption has increased by 1.8% from 1994 to 2009, with its primary substitute, maize, seeing a decline of 4,6% over the same period (Ronquest-Ross et al. 2015, 3). During the same period, there has been a large increase in artisanal bread consumption per capita (27,9%) and a decrease in industrial bread consumption per capita (-9,3%) (ibid). This is an interesting trend to watch given that international health concerns and awareness of food labelling are expected to play an increasing role on bread consumption patterns in South Africa (Euromonitor, 2014).

White bread remains the most popular bread type, according to Ronquest-Ross et al. (2015), 'because of its appeal with lower income consumers' (6), however, brown bread is also increasing in popularity. A number of new speciality breads have been launched in South Africa, however these account for less than 2% of total bread production in the country (Ronquest-Ross et al. 2015, 6; SAGIS 2016b).

Since deregulation, consumer prices can be set freely by bakers and retailers, subject to competition dynamics and consumer willingness to pay constraints. Since bread is a staple food for many poor South Africans, increases in the price of bread affect many households adversely.

4.2 Cost and Quality Considerations

'There's four, maybe five important criteria in the whole of the wheat chain: yield, yield, yield, yield and yield. **The farmer** wants a greater yield, but that doesn't necessarily mean that it will be a better wheat for the miller or for the baker. **The miller** wants a greater yield; by that he means more flour out of the same quantity of wheat. That doesn't mean it's going to be better for the baker. **The baker** wants more yield; he wants to know how many loaves of bread he can get out of a sack of flour' (Interview with Philip Randall, 2016)

The above quote demonstrates the primary focus of farmers, millers and bakers in the wheat to bread chain: to increase their yield, however there is also a tension in that the characteristics needed for maximising yield are different for each segment of the chain. The

following section will briefly outline how each chain segment attempts to increase its yield, bearing in mind quality and cost considerations.

4.2.1 Breeding

Farmers, millers and bakers rely on breeders to produce new cultivars which perform well in each segment of the chain. Thus, breeders have to take into account the diverse quality needs of farmers, millers and bakers (Randall, Interview 6, 2016). For these purposes, the milling and baking indexes are used to judge wheats before they can be released into the market. The farmer wants high-yielding wheat varieties with high protein content. The miller needs the right degree of firmness, because if it's too soft or too hard it will impact on the milling performance. Bakers look for consistency in the flour (ibid.).

4.2.2 Farming

According to an interview with the General Manager of SAGIS, Nico Hawkins (Interview 7, February 2016), South African wheat production is drastically decreasing due to the fact that other commodities like maize and soya are easier and more profitable to produce than wheat. Furthermore, fuel and electricity costs are a major problem for each segment of the chain. Further costs incurred by farmers are allocated to fertilizers and pesticides, labour and capital costs, as well as interest on capital costs (Hawkins, Interview 7, 2016)

In another interview it was mentioned that though South African farmers have economies of scale, the exchange rate has impaired their ability to buy equipment, which is exacerbated by rising interest rates and wages, as well as all other input costs (Randall, Interview 5, 2016). Whilst producers are facing higher input costs, the bread price acts as a natural ceiling, so that there is downward pressure on the price, increasingly felt by farmers but also everyone else along the chain (ibid; Fourie & Sihlobo, 2016).

Since deregulation, the blending of different wheats is no longer done under controlled conditions, so that so that farmers have started blending their wheat before sale to get a better price for it (Anonymous, Interview 3, 2016). This is so because there are different price grades for wheat based on protein content. If a farmer produces wheat of 12.1 % protein content he receives a top price, if he produces wheat with 11.9-11% protein content he gets a lower price, and then again even lower for 10.9-10% protein. The lowest price is received for wheat of 9.9% protein content. However, according to an interviewee, (Anonymous,

Interview 3, 2016) such wheat is no longer seen on the market, even though everyone knows it is still being produced.¹⁷

4.2.3 Silos/Storers

In between the farming and milling segments of the chain, grain storers play a vital role in maintaining the quality of the wheat during storage. This requires managing the temperature and humidity of the grain stored. The optimum storage conditions are demonstrated in the figure below. Anywhere between 0–20°C and 0-12% moisture content is ideal for long term storage, whilst temperatures between 20-32°C and moisture content of between 12,5-23% moisture lead to mould and pest risk, thus only adequate for short-term storage. Temperatures and humidity levels above this are not advisable, as these lead to increased mould and pest risk, deteriorated germination, and deteriorated grain quality. Thus grain storers run a tight ship in terms of regularly rotating the grain and managing temperature and moisture levels within the silo tower, where humidity and heat can build up rapidly at the top of the silo (Louw, Interview 6, 2016).

Furthermore, silo owners make their margin by mixing and grading different batches of grain to order. Storage space becomes very difficult for them to manage with smaller orders, where they have to keep different batches of grain apart, but don't have enough space to take more orders.

Figure 2 Effect of Temperature and Moisture on Stored Grain

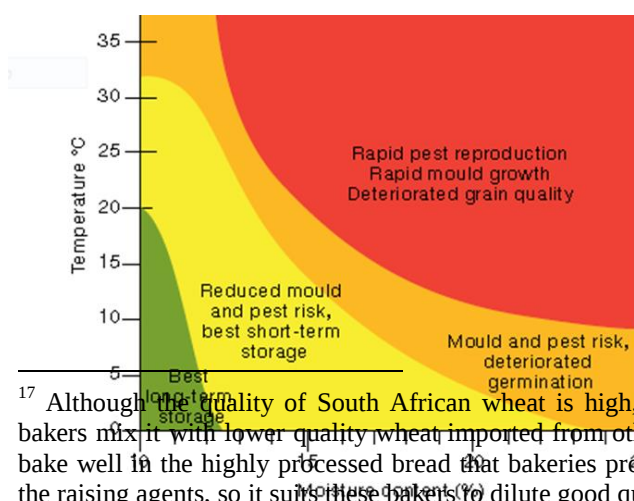
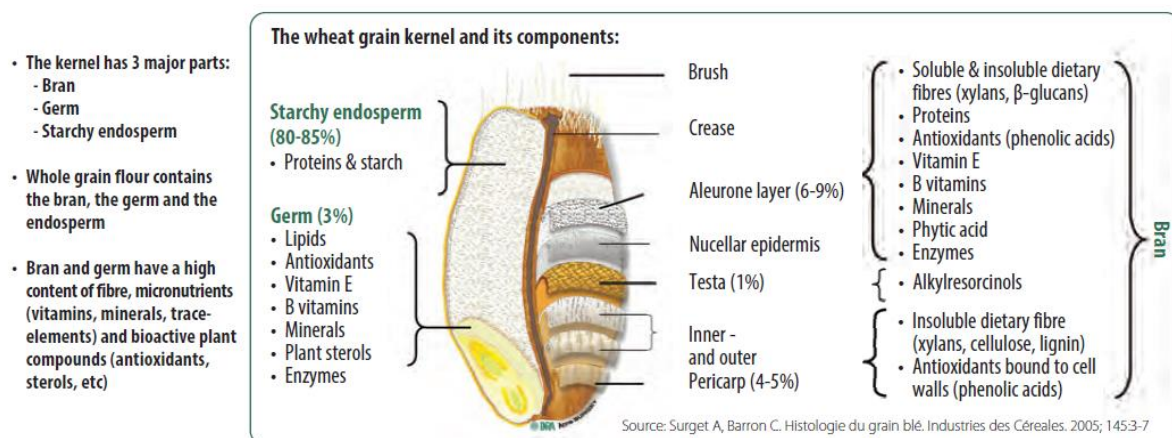


Image source: Wiana Louw (2012), Summary of Wheat Moisture Versus Mycotoxin Levels. Unpublished. (Original Source of Figure: CSIRO Ecosystems Sciences)

4.2.4 Milling

The miller's main consideration is the extraction rate, which determines how much flour can be taken from a kernel of wheat. The figure below shows the composition of the wheat kernel. The starchy endosperm is the part of the kernel from which flour is produced, while the germ and bran are removed. Their incorporation would significantly decrease the shelf-life of bread. As mentioned earlier, the extraction rates per ton of wheat for brown and white bread flour, respectively. According to Randall, this is about as far as extraction rates can be pushed, especially for white bread, otherwise the colour of the white flour begins to be affected.

Figure 3 The Wheat Grain Kernel and its Composition



Source: Gibson et al. 2013/2014, p26.

4.2.5 Baking

According to an interview with the previous owner of a small industrial bakery in Gauteng, other than energy requirements, the most expensive baking inputs are: flour, yeast and improvers (additives) (Di Pascale, Interview 2, Feb 2016). According to Di Pascale, improver can affect the price of bread a lot, and the better the quality of the improver, the higher the cost per loaf, which is why Albany bread is so expensive (they use a good improver).

In order to cut costs, bakeries have progressively dropped the weight of a loaf of bread from 1kg to 900g, to 800g and now to 700g. However, according to Nico Hawkins, the General Manager of SAGIS, the price of bread in South Africa never drops (Hawkins, Interview 7, 22 February 2016, Pretoria).

The large plant bakeries have to compete with the in-store bakeries of major retail outlets, who can attract customers with the smell of fresh bread. Although in-store bread is around R7 per loaf, it will be stale the next day, whereas the plant bakeries use expensive preservatives (around R2000/kg) that prevent bread from going stale and inhibit bacterial development, so that bread can last for 5 to 7 days (Di Pascale, Randall and Hawkins; Interviews 2, 5 and 7, 2016). However, according to Interview 2, even Albany only has a shelf life of 4-5 days because of cost concerns¹⁸. Any additive that costs more than 3-5 cents a loaf is too much (Interview 2, 2016). Furthermore, flour management (dry storage) is vitally important, because if one leaves flour too long microorganisms start to develop, which can ruin the quality of the flour (Interview 2, 2016).

The production processes in plant or industrial bakeries are standardized to the second, which means that the characteristics of the flour have to be 100% consistent. ‘You cannot expect to mix the dough for 7 minutes and end up having to mix it for 10 minutes, because that significantly increases your energy costs and adds time delays’ (Hawkins, Interview 7, 2016). According to the baker interviewed in Interview 2, one cannot do much about the cost of energy consumption other than switching to lower priced energy sources such as paraffin or gas. For instance, one can operate at 30% of the cost of electricity by using paraffin (Di Pascale, Interview 2, 2016).

Because flour is the most expensive aspect, bakers also try to cut down on flour consumption by increasing the water content of their dough, however, under normal circumstances the water-flour ratio is 60:100 - 60l water per 100kg flour (Di Pascale, Interview 2, 2016). However, additives are increasingly being used to boost the water content in bread. One

¹⁸ For example, at the time of writing a 700g Albany loaf cost between R 11.75 (“Superior White Sliced Bread”) and R 16.99 (“Superior White Low GI”) at Pick ‘n Pay, while a 600g “Instore White Bread” cost R 7.49.

baker managed to increase the water-flour ratio to 80l per 100kgs of flour, which leads to significant cost savings since water is practically free (Interview 3, 2016)¹⁹.

South Africans generally like very soft and spongy bread. In order to achieve this, fat pellets are usually added to the bread mix (Di Pascale, Interview 2, 2016).

4.2.6 Retail

Though retailers make most of the profits in the bread chain, their cost and quality considerations are the most insignificant and yet their gains are the highest. According to Hawkins (Interview 7, 2016) the retailers are reaping all the profits. In an interview with Thezi Mabuza, the Deputy commissioner of the National Consumer Commission, she said that the only issue retailers face is to manage sell-by dates (Interview 1, January 2016). ‘It’s for the supermarkets to manage how they pack their shelves - they can keep the crates of fresh bread at the back until everything is sold and then start repacking, which they do’ (Di Pascale, Interview 2, 2016).

4.2.7 Consumption

According to Randall (Interview 5, 2016) with regard to cost and quality considerations, poor consumers are expected to gradually move towards lower priced breads (i.e., in-store baked breads), and bakeries will increasingly try to minimize their costs by reducing bread weight. Many bakeries are already selling bread that weighs 500g but looks like the 700g loaf, although in terms of sales those that are selling at 700g are still doing better (Randall, Interview 5, 2016). As Randall pointed out, ‘you may be able to confuse the eye but you can’t confuse the stomach’ (Randall, Interview 5, 2016).

On the other end of the spectrum, health and nutrition are increasingly playing a role in the decision-making processes of high-income consumers (Euromonitor, 2014). ‘This group is generally better educated about the benefits of healthier ingredients and nutrition, as well as having higher disposable income levels. Manufacturers are thus ensuring that their more premium offerings cater to this group’s demands in order to support value growth.’ (ibid.).

¹⁹ Though it is now outdated, in 2003 the cost of producing a 700g loaf of white bread, (excluding packaging and distribution costs) was 193.16 c/loaf and thus, the related % cost-breakdown of ingredients was as follows: flour (65%), other ingredients (14%), labour (11%), operating expenses (i.e. machinery and electricity) (10%) (NAMC 2003, 166; own calculations). It would be interesting to track the changes in input costs per loaf over time, to see how the invention of the Chorleywood process and other food technological innovations would have impacted this cost breakdown. It might also illuminate whether production decisions were influenced by cost or quality considerations. Further research on consumer awareness and perspectives about the risks associated with cost/quality trade-offs in production would be interesting.

However, in terms of volumes, affordability plays a major role, thus the lower priced, standard white loaf is expected to continue to outperform the sale of other breads.

Even though there are health trends emerging, consumption of unhealthier processed staple foods such as white bread and highly refined maize are performing better than the healthier options (Hawkins, Interview 7 2016). This is not only attributable to cost, because brown bread actually costs less than white bread (STATS SA).

The above section has highlighted the various cost and quality considerations in each segment of the chain. It is clear that yield is the primary driving factor for each segment, even though the means of achieving higher yields vary widely and that the pursuit of higher yield in one segment of the chain might have implications for the quality and yield in the next segment, overall creating a system of provision focused on efficiency rather than quality.

5 Historical Development, Technological Innovations and Recent Media Debates

In the following section, the South African wheat to bread value chain's historical development, technological innovations, recent media debates and corresponding regulations will be outlined. In doing so, I will show how the highly regulated environment from the '30s to '90s as well as the subsequent de-regulation of the wheat to bread chain led to increased concentration of the SOP of bread, and that technological innovations aided this concentration by enabling increased efficiency through practices that required economies of scale, thus shaping the structure of the industry that we see today. However, these conditions also led to the debates that are currently surfacing in the media, around the safety of these processes and additives, as well as political issues around control of food supply, which are addressed in existing food safety and labelling regulations. This section relates to the broader research question, in that current producer-consumer-regulation dynamics and tensions can be made sense of in the context of the evolution of the chain.

5.1 Historical Development of the Chain

The merger between the Port Elizabeth Stream Milling Company and Cape Town's Atwell's bakery in 1981, was the first of a long series of mergers and increased consolidation through co-operative formation that would shape the structure of the South African wheat to bread chain over the next century²⁰. Urbanisation relating to the discovery of diamonds in 1868 and gold in 1886 led to the development of more commercial bakeries, but South Africa was only producing half the flour it consumed in the period following Union (1910). Thus, high import prices were hurting local production as well as causing uncontrolled price fluctuations (Stanwix 2012). Given that more than 50% of South African members of parliament were farmers, they could effectively lobby for a regulatory environment beneficial to themselves (Lipton 1985, 258 referenced in Kirsten et al. 1994, 44). Thus, consolidation was facilitated by the political and regulatory environment at the time, which became focused on protecting wheat farmers and millers, and promoting economic development, self-sufficiency and cheap and reliable food supplies.

Regulatory changes which aided the consolidation of the wheat to bread chain include the 1913 Natives Land Act, which restructured the agricultural sector through territorial

²⁰ See Appendix 3 for a timeline with more details on these mergers and acquisitions, and other important historical factors that happened alongside regulatory developments.

segregation of white and black farmers (Kirsten et al. 1994). In addition to this, restrictions on the importation of wheat, meal and flour in the early 1930s facilitated a doubling of local wheat production in the period between 1931 and 1936 (Stanwix 2012). The wheat industry control board was established in 1935, to stabilize the wheat price, as farmers were previously left to their own devices in setting prices. The culmination of all these calls for increased government intervention was the 1937 Marketing Act, which gave the Wheat Board complete and only authority over the wheat to bread chain. The Wheat Board set prices at each level of the chain including retail prices, so that there was no price risk, however this meant there was also no real competition (NAMC 2003, 162). The Board also controlled sale quantities and regulated this by enforcing restrictive registration of millers and bakers with the Wheat Board. In the interests of greater efficiency, the Wheat Board began closing smaller mills and bakeries, and consolidating these industries around urban centres (Stanwix 2012). The ‘wheat police’, agents of the Wheat Board, would go around enforcing the new legislation (Randall, Interview 5, 2016). At the same time, the Co-operative Societies Act of 1939 served to ‘exclude’ other categories of farmers such as smallholder black farmers and part-time farmers (Kirsten et al. 1994). Already in the 1940s, United Party members raised concerns about large millers profiting at the expense of small millers, who were increasingly having to exit the market and later a parliamentary debate ensued around the issue of large milling companies buying up the small bakeries and spreading their market power into the baking industry (Stanwix 2012,14).

The United Party introduced war-time bread rations for 7 years in the 1940s. These rations consisted of a replacement of white bread by the ‘standard loaf’, produced from flour using a higher extraction rate in order to increase the yield, resulting in a much coarser loaf than the traditional whole-wheat or brown loaf (Stanwix, 2012). In 1946 bread sales were banned on Wednesdays and on every other day between 3pm and 4am (Stanwix, 2012). However, despite these restrictions, the government subsidised the bread industry. Just between 1947 and 1960, the bread subsidy would amount to 3,5% of the national budget (Stanwix, 2012, 18)

As all these regulatory changes were shaping the structure of the wheat to bread chain, the National Party came to power in the 1948 general elections. In their election campaign they had promised the return of white bread (Stanwix, 2012, p14).

Out of concern for the level of malnutrition observed in the black population, the Department of Health released the ‘enriched loaf’ as part of the national fortification programme in 1953. However, the black population was reluctant to consume fortified bread because it was suspicious of the apartheid government’s motives. Fortification was abandoned when two separate studies reported that the enriched bread had no real nutritional benefit compared to standard brown bread (Stanwix, 2012, 21)

Despite consumption steadily increasing, South African wheat farmers were able to meet the increased demand. The country was almost completely self-sufficient in wheat production for 25 years from 1964 to 1989. The Chorleywood baking process developed in Britain in 1961 was taken up by bakeries in South Africa during the 70s and 80s (Randall 2016, Wiana 2016). This increased productivity in the baking industry, although it also changed the nature of bread produced (more on this later). This shift in the baking industry was accompanied by technological changes in the commercial agricultural sector, leading to ‘increased mechanisation of commercial farming and the resultant substitution of capital for labour around 1970’ (Kirsten et al. 1994, 20).

The 1980s saw the steady withdrawal of government support for agriculture (NAMC 1999; NAMC 2007). In 1990, coinciding with a global trend to liberalise markets worldwide, the National Party started a broad process of deregulation in South Africa. Price and other controls on wheat producers and processors were being lifted, whilst the bread subsidy was being phased out (NAMC 1999; Stanwix 2012; Kirsten et al, 1994, 34-36). In 1997 the new ANC government completely liberalised and withdrew from the wheat industry. The Wheat, Milling and Baking Cluster Atlas was released mapping the future of the bread chain. In this document, bread price increases and weight decreases were discussed as ways of maintaining the profitability of producers, who would now no longer be subsidized (Stanwix 2012, ACB 2014, NAMC 1999).

Deregulation had the following effects on industry: Previously, if farmers could not afford to produce at the Wheat Board-designated price level, they would be subsidized by the government (Randall, 2016). After 1997, farmers were exposed to international market competition, and wheat prices were determined by SAFEX. Recently, the number of farmers and the total area farmed have substantially decreased. The average wheat area planted per season from 1985 to 1997 was 1 497 000 hectares, compared to the period after de-

regulation, where the average area planted dropped to 714 000 hectares from 1998 - 2014²¹. In an interview with the author, Louw (2016) explained that this was due to high production costs and that wheat farmers are switching to more profitable crops to avoid going out of business. It could also be seen as the natural outcome of the market mechanism, causing ‘uncompetitive’ farmers to exit. However, productivity has increased considerably in the period from 1985 to 2014 - average yield in the period before deregulation was 1.48 tons per hectare, which increased to an average of 2,74 tons per hectare in the period after deregulation.²²

As mentioned, the milling industry became more concentrated and vertically integrated in the period prior to regulation. Even though deregulation led to a supposed increase in competition in milling by way of the entry of small millers, the total number of milling units actually dropped from 137 to 109, and the six largest milling firms dropped to four, and to this day control most of the market share in milling (NAMC 2003, 160). Since deregulation and the increase of small mills, capacity utilisation of South African mills dropped from 92% to 78%, decreasing the country’s relative competitiveness in global markets, especially given that South African mills have to compete with subsidised products from the US and EU (ibid).

The baking sector has seen a considerable boom since deregulation – where there were 3000 registered bakeries in 1997, six of which controlled 80% of bread production in the country, in 2003 there were already 7900 bakeries, four of which controlled 60% of the market (NAMC 2003, 161). Currently, Pioneer Foods is the leader of baked goods, with a value share of 26%, followed by Tiger Brands with a 22% share, in-store ‘artisanal’ products holding third place with at 18%, and Premier Foods ranking fourth with a 13% share (Euromonitor 2014). Deregulation also had an effect on the mass of bread – allowing for a drop in mass from 800g to 700g (NAMC 2003, 162).

In 2007 a national bread and milling cartel was exposed by the Competition Commission, involving the four biggest producers of bread in the country: Premier Foods, Pioneer Foods, Tiger Brands and Food Corp. Very heavy fines were imposed, especially on Pioneer Foods, as it denied involvement in the cartel. Despite these findings, the snowballing of mergers and acquisitions continued and in 2015, the Competition Commission launched a market enquiry into the grocery retail sector, the result of which is expected in May 2017.

²¹ own calculations based on DAFF (2015, 10).

²² Ibid.

5.2 Technological Innovations

The above section showed that the wheat to bread chain was able to become increasingly concentrated as a result of the regulatory environment of the 1900s. The next section will show how technological innovation enabled a move in the same direction, having largely been geared at increasing yields through mechanisation and improvement in efficiency through economies of scale. Such changes can only be achieved by larger industry players, resulting in smaller players becoming uncompetitive by default. This section is important for the analysis, because it demonstrates that the technological innovations which shaped the SOP of bread were firstly for the benefit of producers and were only afterwards adapted to meet consumer concerns.

5.2.1 Farming Technology

Wheat farming became more mechanised in the 1970s which meant that there were fewer jobs available on farms (Kirsten et al. 1994, 20). Increased use of tractors, combine harvesters, chemical fertilizers, irrigation and the building of huge grain silos helped to achieve this shift which significantly enhanced productivity and the extent to which quality could be controlled in large scale production (Jones, 2002, 1).

Furthermore, farmers have for a long time relied on cross-breeding programmes of seed-providers for ever higher-yielding wheat varieties. Such projects take about 20 years from start to finish and are very expensive, as each variety has to be attuned to the diverse needs of the farmer, miller and baker (Louw, interview 6, 2016). This includes the ability to increase yield (production per area planted) for the farmer, enable a higher extraction rate for the miller and have the right baking qualities required by the baker (relating to texture, colour, consistency). According to Nico Hawkins (Interview 7, 2016), without the recent advances in GM technology, one would not be able to produce nearly enough to feed the world. However, this also brings up difficult ethical questions about long-term sustainability, relating to the research question in terms of the impact that changes in the food system has had and will have on human health. What will the long term consequences of trying to feed the world be? Because of technological advances, people are getting older and the population is growing, however as one interviewee noted, ‘if we had famine more often, our population growth would be a bit lower. It's harsh to say but if there's no food, there's no population growth’ (Hawkins, Interview 7, 2016).

Today, few mechanical innovations are taking place in farming. Instead, the latest innovations make use of computerised tractors, which can calculate exactly how much fertilizer to disperse on each incremental piece of land, based on the mapping of soil nutrients and the help of GPS systems (Louw, Interview 6, 2016).

5.2.2 Milling Technology

According to Philip Randall, who headed the Wheat Board in the 80s ‘there haven't been that many changes in the milling industry since the Egyptian times (...), the main change has been going from stone milling to roller milling’ (Interview 5, 2016).

However, the ability to recover the endosperm from the bran has improved with the use of ‘bran finishers’ that scrape away just the last little bit of endosperm (white, starchy part of the wheat kernel) from the bran, without putting the bran into the flour (Randall, Interview 5, 2016). This has led to the extraction rate we see today (77-78% for white bread flour). Although this is a great step forward in terms of increasing the flour yield, Randall believes that commercial extraction has gone beyond the point of where it should be – since anti-nutrients and anti-baking factors are higher in the outer part of the wheat kernel, which then get added to the flour as the extraction rate increases. Apparently this is ‘why they have to add some chemicals, to [the bread] -because they've got more reducing agents coming from the bran, they now have to put in a number of oxidizing agents to be able to prove²³ things.’ (ibid).

In addition to increased extraction rates, an improvement in the milling process has been the availability of laboratory equipment to check that the flour coming out of the milling process is of a consistent quality. ‘Process control all became tighter and tighter, because that involved money’ (Randall, Interview 5, 2016).

According to an educational manual for small millers, there are five kinds of additives that are added to flour around the world: oxidising agents, reducing agents, emulsifiers, acidulants and bleaching agents (Randall 2008, 1).

Oxidising agents are used to artificially age the flour, having a hardening effect on the gluten. Slowflake’s ‘too fresh to flop’ slogan is in fact quite misleading, as fresh flour actually *does*

²³ Proving is a step in the baking process where the dough rises

flop - especially with the current rate of consumption where the turnaround time from mill to bakery is merely a few days - which is why oxidising agents are used (Randall, 2008; Randall, Interview 5, 2016). Ascorbic acid is the most common oxidising agent, whilst enzyme-active soy flour, potassium bromate (now largely banned) and azodicarbonamide (the ‘yoga mat chemical’) have also been used, although soy flour was more used for its bleaching than for its aging effect (Randall 2008). In South Africa the yoga mat chemical seems to have been largely phased out by the major players in the milling and baking industry (this already happened in the UK in the 90s), as a response to consumer concerns rather than changes in legislation (NABIFM 2011, 2).

Reducing agents are used to relax the dough so that it can expand sufficiently during baking. Cysteine and sodium metabisulphite are some of the more common ones, however the latter is known to destroy Vitamin B (Thiamin) and so is increasingly being substituted with enzymes (Randall 2008, 2).

Emulsifiers such as lecithin derived from soy, or its artificial equivalent, DATEM, help to bind ingredients, especially water and oil with various benefits, including better machinability, prolonged shelf life, heightened bread volume, increased dough stability and fermentation tolerance (Randall 2008, 2).

Acidulants can be used to counteract the effects of dough made from sprout-damaged wheat (i.e. low falling number), which results in a stickier dough that compromises loaf volume and shelf life (Miller 2013). However, the use of acidulants is not a popular method, as it requires a lot of time and skill, and consumer acceptance is low. Instead, damaged wheat is often mixed-in with higher quality wheat to balance out the quality (Randall 2008).

Despite increased awareness of the importance of roughage, minerals and vitamins, ‘there is still a demand for a very light coloured crumb in most wheat products’ (Randall 2008, 5). For this purpose, bleaching agents such as benzoyl peroxide and enzyme-active bean flour are used.

One very important innovation in the chain with respect to health has been fortification of wheat flour. Even though fortification failed in the past, it is an essential vehicle for addressing micro-nutrient deficiencies. In 2002, South Africa embarked on a fortification programme, involving mandatory fortification of wheat flour and maize with essential

vitamins and minerals²⁴. Mistakenly, it was assumed that cake flour should be excluded from fortification on the basis that poor people do not consume it, however a household survey later revealed that 80-90% of consumers buy cake flour (Randall, Interview 5, 2016). Furthermore, the industry was concerned that fortification would cost them a lot and that it would change the colour and texture of the fortified foods. Both these concerns have been addressed: fortification costs only about R25 per ton and, at least in the case of bread, does not change colour, texture, nor shelf life (Randall, Interview 5 2016; Sunley, Interview 4, 2016). The major difficulties faced when fortifying flour are that the vitamin and mineral sources that are used need to have a high degree of bio-availability, so that they can be fully absorbed when consumed. In the previous round of fortification, there were problems with the iron source, which has now been corrected. Another problem is getting a relatively small amount of highly concentrated fortification mix to spread throughout tons of flour, since many loaves tested did not have identifiable quantities of the mix. However, it has been accepted that the fortification mix eventually does reach consumers, just not in equally dispersed quantities, so that one loaf may have nothing and the next more than it should (ibid).

5.2.3 Baking Technology

Baking technology around the world has benefitted immensely from one primary innovation in the last 60 years - the Chorleywood baking process. As mentioned in the history chapter, it was developed in the UK in the 1960s and involved changes in the use of machinery accompanied by increased reliance on various food additives.

The Chorleywood process uses high-speed, high-energy mixers to shorten the dough-mixing and development (fermentation) stages of baking (NABIFM 2011, 2). The invention of this process has led to incredible improvements in efficiency through economies of scale, as it allows bakers to produce much larger quantities of bread, reducing the cost per loaf to the supposed benefit of consumers (ibid.). Furthermore, it has increased the shelf life of bread, 'which is a key requirement for today's busy lifestyles as people tend to shop at a supermarket weekly' as opposed to daily (NABIFM 2011, 1).

²⁴ Including Vitamin A, Thiamin (Vitamin B1), Riboflavin (Vitamin B2), Niacin, Folic Acid, Pyridoxine (Vitamin B6) Minerals: Iron, Zinc

According to Randall (Interview 5, 2016) prior to the Chorleywood process, industrial scale bakers used many large paddle mixers, mixing between 6 and 10 bags of flour at a time, whereas the Chorleywood mixers can mix half a ton of dough in about 3-4 minutes. Nevertheless, the new technology does come with its own drawbacks - requiring the use of chemicals. This is because one cannot generate enough energy into mix the dough properly, without thereby raising the temperature of the dough (and compromising quality), which means that the gluten is not being developed sufficiently. 'The estimate was that about 60% of the doughs produced in South Africa were underdeveloped' (Randall, Interview 5, 2016). This is because there is a further trade-off in mixing the dough for longer: having a more developed dough can retain more water (a cost-saving), but also incurs more energy-related costs. In order to develop the dough, enzymes are added, instead of waiting for them to be naturally released via slow fermentation (NABIFM 2011, 3).

Some bakers use relatively inexpensive combining chemicals (emulsifiers) to make water and oil bind together, and remain that way during the baking process. This means that water usage can be pushed up to 80l of water per 100kg of flour (Interview 3, 2016). Another respondent mentioned that bakers add chemicals 'because it makes economic sense to them. It produces a quality loaf which can sell in the market place' (Randall, Interview 5, 2016).

'Since the Chorleywood process, not much has changed apart from the ability of bakers to get hold of improvers that will blow a loaf up, literally' (Randall, Interview 5, 2016). 'Many small companies have gone into the business of mixing and blending enzyme cocktails specifically for small bakeries, so bakers have become a little bit more aware of what they can do with chemicals' (ibid).

Most product innovations in the bread, bakery and pasta are related to health, pleasure and convenience, where 'convenience largely relates to changes in the social habits, increased working hours for women, and changing household structures. Consumers have no time to cook, shop, or prepare their foods' (Cauvian and Young 2006, cited in Martínez-Monzó, J. et al. 2013, 57).

The above chapter demonstrates the importance of innovations in food technology for the functioning of the industrial wheat to bread chain as well as for the modern lifestyle. However, there are also causes for concern as will be shown in the next section. Some of

these concerns have been translated into changes in the regulation for wheat and bread, which will be covered in Section 5.

5.3 Media Debates

‘In an ideal world we would all eat artisanal bread out of your corner bakery, but life is not like that. They are a lot more expensive than manufactured products and don't keep as well’ (Sunley, Interview 4, 2016).

Industrial food production does not have a clean track-record when it comes to bread production. Despite its many benefits in terms of cost, convenience and increased variety, various incidents have made consumers weary of simply trusting the industrial food system by default. Potassium bromate was widely used as an additive in industrial bread production, until it became banned internationally²⁵. There have been several debates in the media in recent years raising cause for concern regarding the implementation of modern technology (processes and additives) in bread production. In these debates, the current production processes in farming, milling and baking are said to result in bread that is much unhealthier compared to its traditional predecessor. The mistrust created by previous food scandals and the fact that consumers have no control of the processes that connect them to the food that they eat, has led to a call for augmented labelling, so that consumption can to some extent be based on choice (with respect to nutritional information, macro and micro ingredients, origin, and processes). Furthermore, international media debates increasingly call for traditional bread alternatives, such as sourdough, although these alternatives are more expensive and largely unavailable, thus not an option for the majority of South Africans, especially those who rely on bread as a staple.

5.3.1 Chemical Additives and Modern Processing

Some of the debates in the media²⁶ directly link the industrialisation of bread production to the loss of its quality in terms of flavour and nutritional value (Jabr 2015; Sillito 2011). The Chorleywood process and additives are also increasingly associated with health problems, although it is difficult to prove. ‘Professor John Warner of the Imperial College in London

25 In the UK, before 1875 there were no controls over the content and quality of food and drink, and food adulteration with poisonous additives was common. With regards to bread, bakers added Alum and chalk to flour to whiten bread; plaster of Paris, mashed potato, pipeclay and sawdust to increase the weight of bread, and the taste of stale flour in bread was disguised by adding ammonium carbonate (Coley 2005).

²⁶ For media debates in South Africa, see for instance the following news reports: Lotter 2015; ‘Modern bread is full of harmful additives’; Ismail, 2015. ‘Is bread killing South Africans?’; For media debates internationally, see for instance: ‘Could sourdough bread be the answer to the gluten sensitivity epidemic?’ (Oksman 2016), and ‘Supermarkets cash in on sourdough bread craze as popularity surges’. (Mesure 2016).

says that “there has been a marked increase in allergies and intolerance of wheat and bread over the last 50 years” (Sillito 2011). This can be seen by the rise of ‘gluten free’ products available on supermarket shelves. The period of increased gluten sensitivity roughly coincides with the period that the Chorleywood Process has been around. However, according to Mackenzie and Venter (2010, 1), most of these allergies are self-diagnosed²⁷.

Paul Barker, a baker interviewed by Sillito (2011) went back to the traditional way of baking after being involved in the industrial Chorleywood baking process. Barker is amongst other bakers and bread campaigners who believe that the Chorleywood process is ‘behind the growth in the number of people who struggle to digest bread’ and that the bread produced using modern processes does not have any flavour because it is not given enough time to develop (Sillito 2011).

Gerald Di Pascale shared this view, having previously owned a small industrial bakery in Gauteng: ‘In industrial bread making everyone is using tons of additives. It doesn't look like a ton, because it's 0,3%, 0,2% 0,1%, but in the end (...) a lot of them are not really good for the end consumer. But the way we are making bread in South Africa is not really good for people in any case. We do not add any enzymes [that help break down the yeast], like in France. Yeast in your body continues to work’ (Di Pascale, Interview 2, 2016).

According to Barker, people who usually have trouble consuming industrial bread have no problem consuming traditionally produced bread. ‘Every day I have people who say they have given up eating bread and then find they don't have a problem with bread that's been allowed to develop slowly. My sourdough takes more than 70 hours to make’ (Barker, cited in Sillito 2011).

Another respondent in the food industry, who preferred not to be named, mentioned that the emulsifiers used in industrial baking are ‘bad products’, because the chemical properties remain in the bread after baking. ‘If you eat anything like this and you feel bloated afterwards, it's because you have water retention’ (Interview 3, 2016).

However, food scientists consulted for the purposes of verifying this information were not too concerned about the use of chemical additives, saying that the media debates are sometimes based on fear or motivated politically, rather than based on real scientific evidence (Sunley, Interview 4, 2016). Just because a substance is used in yoga mats does not mean that it cannot

²⁷ Mackenzie and Venter note that 20% of adults think they suffer from food allergies or intolerance, when the real number is actually less than 2 %, thus people are avoiding wheat for no sound medical reason (2010, 1).

be safely consumed. Chemical additives used in food undergo stringent testing before being released, and the maximum quantities permitted are often far below the levels that would cause harm to human beings even after long term consumption (ibid). Furthermore, consumers often make matters worse by searching for corroborating evidence on the internet against food additives and controversial processes - of which there is a lot -, instead of looking to find a more balanced perspective (Hawkins, Interview 7, 2016).

These additives are also seen as having come about as a result of consumer demand – ‘it produces a loaf that the consumer wants (...). Bakers would not add the stuff, nor would millers add it to the flour, unless the consumer liked the end product’ (Randall, Interview 5, 2016).

Modern processing techniques such as the use of roller mills that remove the wheat germ and endosperm for increased shelf life have been criticised for leading to the loss of nutrients, which then have to be added back through fortification. ‘In the 1940s, to compensate for these nutritional deficiencies, flour producers started fortifying white flour with iron and B vitamins, a ubiquitous practice today’ (Jabr 2015).

Other debates in the media surrounding the idea that bread is unhealthy relate to the salt and genetically modified soy content.

5.3.2 Salt

South Africans consume salt at levels of 8.1 g/day which is nearly double the World Health Organisations recommended daily limit of 4–6 g/day (Ronquest-Ross et al, 2015, 2). Although it is a real health concern, it is essential in the bread baking process. ‘Industry is working on and has managed to reduce the salt used in bread to a certain extent, but two things happened. We couldn't make a change, the consumer immediately notices if you change the salt content of bread too much, so they're gradually acclimatizing the population to a lower salt level. The other is that salt has a very functional role within the whole process. You'd just end up with the taste of unleavened bread. It tastes bloody awful, because it hasn't gone through the fermentation process’ (Randall, Interview 5, 2016)’. Thus, the government has a fairly difficult role to play in balancing consumer and producer interests.

5.3.3 GMOs

The increased use of biotechnology in food production has led to concerns about the safety of their long term consumption. There have been scares about their effect on digestion, causing ‘leaky gut’, being carcinogenic, etc. At the moment, there is only one GM wheat variety and it is in a test lab. According to Randall (Interview 5, 2016) ‘if that ever gets released there'd be all hell to pay’ (Randall, Interview 5 2016). This is because wheat is a cross-fertilizing plant, meaning ‘we wouldn't have any control over what genetic modifications could occur later down the line’ (ibid.).

A recent media controversy in South Africa addressed the use of unlabeled genetically modified Soy in bread by almost all major bread producers (ACB 2014). Soya flour is used by many of the large producers as it improves bread texture (Sunley, Interview 4, 2016).

Unfortunately, these media debates and consumer concerns are often met with ridicule by industry experts. This was apparent in some of my interviews, where the concerned consumers were seen as indulgent or bored, having the luxury to waste time on such issues, whilst others are battling to put bread on the table. ‘When you're working 10 hours a day just to get food on the table – it doesn't matter what food - you haven't got time to think about all this nonsense.’ (Interview 7, 2016).

The next section will provide a brief overview of the South African food safety and labelling regulations that are relevant to the wheat to bread value chain, in order to ascertain whether or not they adequately address the needs and concerns of consumers and producers alike.

6 Regulation

The previous three chapters related to the research question in presenting the tensions between consumer concerns (whether real or imagined) and the technological innovations that are essential for ensuring the provision of bread to a growing population. This chapter will outline the relevant regulation pertaining to the wheat to bread chain to help assess whether it adequately reflects consumers' needs and concerns.

The following regulations govern various aspects of the wheat to bread chain: The Agricultural Product Standards Act of 1990 (Act no 119 of 1990), which regulates the grading, packing and marking of wheat products intended for sale in the Republic of South Africa; the Marketing of Agricultural Products Act of 1996 (Act 47 of 1996); the Fertilizers, Farm Feeds, Seeds and Remedies Act of 1947 (Act no. 36 of 1947) regulating for instance the amount of pesticide residues that are allowed in agricultural products; the Foodstuffs, Cosmetics and Disinfectants Act of 1972 (Act no. 54 of 1972), regulating the use of food additives, the limits of pesticide residues that may be present in foodstuffs, fortification of foodstuffs, and the labelling and advertising of foodstuffs; the Trade Metrology Act, with regulations on the mass of bread; the National Health Act, regulating for instance the salt levels allowed in bread; the Consumer Protection Act of 2008 (Act no 68 of 2008), regulating for various consumer concerns; and the Government Notice R.884 - Establishment of Statutory Measure - records and returns in respect of maize products and wheaten products. The various government departments that are responsible for the implementation of these acts are the Department of Agriculture, Forestry and Fisheries; the Department of Health; and the Department of Trade and Industry (the National Consumer Commission).

According to the various experts interviewed, South African regulations along the wheat to bread chain are very advanced and subscribe to internationally accredited standards (Randall 2016; Sunley 2016; Louw 2016).

As consumers are becoming more aware of what goes into food, processors are facing an increasing list of challenges (De Villiers 2009, 11). However, 'food labelling should provide most, if not all, of the answers to consumers' questions' (Nigel Sunley cited in De Villiers 2009, 11).

'In view of the new legislative and regulatory environment, as well as the ever more litigious society we live in, food manufacturers, wholesalers, retailers, restaurants, and the entire food supply chain need to sit up and pay attention to product liability issues in the food industry'

(De Villiers 2009, 14-15). ‘Typical matters which could be the subject of a civil matter include food poisoning, foreign objects in food, long term effect of additives and the like, and labelling issues, although many other causes of action may also exist or be created in the future’ (Janusz Luterek cited in De Villiers 2009, 14-15).

According to Luterek (in De Villiers 2009, 15), anyone along the supply chain can be liable for criminal conduct, however, criminal liability is often overlooked in South Africa, because the Department of Health and many local authorities have not been enforcing the laws and their criminal provisions, and there has also been a degree of neglect by inspectors.

Unfortunately, the author was not able to attain any interviews with government officials in the Department of Health (despite trying to get through to them persistently). According to Nigel Sunley, the Department of Health is in a complete mess, which might be why they were inaccessible (Interview 4, 2016).

However, in their respective interviews, Sunley, Louw and Hawkins (Interviews 4, 6 and 7) expressed the view that there is no immediate concern when it comes to food additives and chemical residues, and that there are more important things that can go wrong along the wheat to bread chain, such as the developments of microorganisms and toxins. Sunley mentioned that consumers are not educated in food science and food technology, and that anyone who is studied in this field will know that ‘every substance is toxic, but it’s the dosage which makes the poison’ – referring to the Paracelsus Principle (Interview 4, 2016).

South African food safety legislation is based on the Codex Alimentarius International Food Standards, which are determined by a Joint Expert Committee on Food Additives between the UN Food and Agriculture Organisation and the World Health Organisation who undergo very strict procedures for setting the maximum permitted residues of food additives, pesticides and other contaminants, as well as the safety of biotechnology (i.e. GMOs) (Sunley, Interview 4, 2016; Codex Alimentarius 2016)

In a Department of Trade and Industry Seminar on Food Safety and Labelling where the author was in attendance, it was mentioned a few times that South Africa does not have enough accredited laboratories to give food safety the attention it deserves. This was confirmed in interviews with Nigel Sunley and Thezi Mabuza the Deputy Commissioner of

the National Consumer Commission, however denied by Ina Wilken of the South African National Consumer Union (Wilken, Correspondence, 2016).

This becomes problematic when combined with the fact that the average South African consumer is still largely unaware of his/her consumer rights and that consumers who are most likely to raise an issue with the National Consumer Commission come from the more affluent circles (Mabuza, Interview 1, 2016). This is proven by the budget of the NCC currently being predominantly allocated to education and awareness campaigns rather than action against the industry (ibid.).

Most complaints raised against the bread industry relate to the bread going off before its sell-by date or because bread is underweight (Mabuza, Interview 1, 2016; Randall, Interview 5, 2016).

However, there are other bodies that do rigorous food safety tests, such as the Southern African Grain Laboratory, which tests local as well as imported wheat. According to Wiana Louw, the General Manager of SAGL, there are currently no concerns relating to pesticide residues in South Africa even though these have been tested for (Interview 6, 2016). Furthermore, South Africa produces some of the best quality of wheat in the world – so there is not really a concern about quality (ibid.).

Given serious concerns about South Africans consuming too much salt, the Department of Health has established strict deadlines for salt reductions in foodstuffs, with bread having to comply with a limit of 400mg per 100g by 30 June 2016, and 380mg per 100g by 30 June 2019. Although this may not seem like a big drop over a period of three years, regulators have to consider the interests of industry, as consumers are highly sensitive to reductions in salt and would likely switch to other foods if the taste they are used to is not there (Louw, Interview 6, 2016).

It is interesting to note that regulation is focused on addressing consumer concerns post-production, in the sense that industry is made to comply by, for instance, labelling their inputs, as opposed to changing their production methods, hinting at the power of industry in relation to consumers. Producers can change processes to suit their cost/production/yield needs, but are reluctant to change these very same processes when it comes to consumer concerns or when it would inhibit their costs minimisation strategies. And so, the needs of the consumer are left to be represented by the media and regulatory bodies, for producers to react

to but not to be proactive in shaping, so that the existing structure of the industry and production methods seem to be more or less cast in stone.

I have also shown that although regulation does attempt to address consumer concerns as best as possible, however, looking at regulation is not enough – it is what *is not regulated* that is equally, if not more important, and contributes to maintenance of the current structure of the sop. Furthermore, there is scope for improvement in terms of enforcement.

The previous sections helped to contextualize and describe the nature of bread production and consumption in South Africa. They started by explaining the contemporary consumption patterns and production characteristics of the chain, whilst highlighting the various social, cultural, economic and political factors which played a role in shaping the historical trajectory of the wheat to bread chain and consumption of bread. The structure and content of the preceding chapters were inspired by the interdisciplinary focus of the ‘systems of provision’ (SOP) approach of Fine and Leopold (1993) which offers various benefits in analysing the links between production and consumption.

In the next section I will analyse the System of Provision of bread, in order to answer the question of how changes in the production processes brought about by technological innovations and the industrialisation of the bread chain impacted consumption patterns of bread and how this relates to patterns and outcomes observed more broadly in the industrialisation of food systems of provision. Uncovering the main political, social, cultural, and economic forces that exist around and interact with the bread system of provision will be done by drawing on key elements that presented themselves in the preceding sections, as well as in interviews. These include the concentration along the bread SOP; the technological innovations that determined the production process and quality changes in bread; the historically defined symbolic significance of bread; the attempts to fortify bread in the context of mal-nutrition; changing cultural perceptions around the SOP of bread as represented in the media; changing power dynamics between consumers and producers, and the way in which what *is*, and what *is not* regulated, plays a role in shaping the SOP; which relates to the role of food policy, which is currently still dominated by questions of food security, neglecting to consider food policy implications for the process of industrialisation, for consumers, and for the power dynamics between consumers and producers. In analysing these elements, some of the ten C’s of cultural systems attached to commodities will be highlighted as they come up.

7 Research Findings

In line with the Systems of Provision approach I have, in the preceding chapters, presented a vertical analysis of the chain activities that connect the production and consumption of bread and locate them contextually. I have attempted to draw out the historical determinants of patterns of consumption and production of bread focusing on the nature of industrialisation, regulation, innovation, various production considerations, and media debates that have shaped their development, and the cultural systems of production that surround them. I will now analyse the system of provision of bread in terms of some of the 10 C's in order to shed light on the nature of the South African SOP of bread, and its implications for health.

With respect to consumption I have found that historical and political factors, such as the discontinuation of white bread during WWII, play a role in the perception that white bread is a luxury, pointing to the notion that cultural systems of meaning attached to commodities are *construed*. This perception is added to by the fact that the price of white bread is higher than brown bread, as well as that South African consumers have a taste for highly refined staple foods.

On the other hand, there is a split in consumption patterns of bread, with a gradual increase in healthier bread consumption²⁸, due to increased consumer awareness, though this movement is still small and largely found in the more affluent parts of the South African society. Since these breads fall into a higher price range, they are not available as alternatives to poor consumers. To the poor they figure as 'luxury products', yet for wealthier individuals, they still form part of their daily food intake. In addressing the matter of access to healthy bread alternatives, the issue of consumer mobilisation needs to be addressed. When wealthy consumers are in the know, and poor consumers 1) lack the information and, 2) lack the resources to address the quality of their staple, the burden of this should fall on wealthy consumers to lobby for change. However, industry has managed to negatively label consumers who do address this issue, the general accusation being 'how dare they question the quality of the food supply, when the majority of the South Africans struggle to afford their daily bread'. The fact that industry plays the 'food security card' when affluent consumers complain about quality, is testament to the dominance of food security in food

²⁸ Not referring to processed brown bread, but rather wholegrain, low GI bread varieties.

policy, as emphasised by Maxwell and Slater (2003). There is also an obvious problem with this argument, in that it discredits the person rather than the facts²⁹.

The way in which industry belittles valid consumer concerns about additives and production processes points to the unequal power dynamics between consumers and industry³⁰. In labelling concerned consumers as snobbish and superior, industry presents itself as selfless, providing bread for poor consumers out of seemingly humanitarian concerns, when in fact, in developing country contexts where highly-processed bread is a staple, it is extremely lucrative to be the provider of that staple. The implications of this can form the basis of a study in its own right: Are poor people or the working class merely victims of industrialisation? If so, what does this mean for the economic development trajectory of developing countries going forward, since industrialisation is commonly understood to be the most essential step for a country's successful economic development.

The above also relates to the often conflicting role of the state in protecting its citizens whilst creating an enabling business environment. In my interviews with the Department of Trade and Industry's National Consumer Commission, it was evident that the state does not have much leverage in lobbying for the consumer, other than educating them about how to effectively direct their complaints. The same is true for the South African National Consumer Union. The prescribed route of escalating concerns via call centres or emails to low-tier management remains laborious and time consuming. Core methods that are ingrained in large-scale production processes, are not likely to be successfully addressed through generic consumer complaint routes, instead they should become an issue for food and industrial policy, and for the state to mitigate consumer and industry concerns.³¹

The above relates to the notion that cultural systems are contradictory, in that different forces compete to give meaning to consumer culture. Also, cultural systems attached to commodities such as bread are *contested*, and *closed*. They are *contested* with respect to the

²⁹ Argument ad hominem (logical fallacy) – an irrelevant appeal to characteristics of the person who makes an argument, rather than addressing the content of the argument directly

³⁰ Jacklyn Cock explores the power of the concentrated bread industry vis-à-vis workers (who are bread winners and bread consumers) in detail (2014b and 2009).

³¹ This becomes especially difficult when the state has historically assumed a pro-market and minimal interventionist stance, so that, for instance, the National Competition Commission's aim is to promote fair competition so that the market can function optimally; the National Consumer Commission's goal is to direct complaints effectively, and the National Consumer Union represents consumers but is also in favour of the free market. None of these state and non-governmental institutions have the power or mandate to meaningfully facilitate structural change.

meanings relating to the material practices that occur along the chain and they are *closed* in that the dominant way of constructing meanings prevents less dominant ones from taking shape in relation to them. This does not imply that consumers are right about all the dangers and quality implications of food additives and, but merely that their opinions are being discredited rather than addressed with clear scientific information. This is also clear in the fact that ‘fortification by stealth’ is the now motto – a decision taken by industry to deliberately keep consumers out of the loop, in case they react badly to the information. Given that consumers can be kept in the dark about fortification, it could be argued that bread is an ‘experience good’ with the characteristic that consumers obtain *imperfect* product specific information through consumption (Wolinsky 1983, 647). This would mean that consumers could mistake the bloating caused by certain chemicals for gluten intolerance, leading to inaccurate self-diagnosis.

To some extent, uninformed online media hype has contributed to a widening gap in understanding and trust between consumers and producers, and as a result, to a worsening of the power relations between them. This is proven by the fact that consumers are now no longer informed about fortification programmes. The rise of the internet and social media has endowed consumers with more power to organise/mobilise than ever before. Going forward, consumers need to take into account the misperceptions that exist with regard to food additives and the dangers of online campaigns. One misinformed ‘hashtag’ gone viral can wreak havoc in an industry, thus consumers need campaign responsibly in order for their concerns to be taken seriously.

With regard to production, I have found that cost-saving, efficiency and yield considerations have played - and continue to play - a fundamental role in shaping activities along the chain, which in turn shape the nature of bread provided in the market place and eventually consumed. These economic considerations were initially at least partially constrained from influencing production processes or related practices, but some of these constraints fell away after the wheat industry was deregulated and the ‘wheat police’ were no longer strictly monitoring the quality and price of bread. Industrialisation can come in various forms, with diverse implications for product quality and price, impacting consumers and the power relations between consumers and producers in meaningful ways.

As mentioned earlier, farmers want higher yields, but that does not mean the resulting wheat will be better for millers; the millers want higher yields, but that does not necessarily mean

the flour will be better for bakers; and bakers want higher yields, but that does not mean it will be better for consumers (again recall the removal of bran and germ for shelf-life purposes – signifying the *contradictory* nature of systems of provision). The innovations in production geared at increasing yields also point to the *commodified* nature of cultural systems in that they are severely constrained and shaped by the imperatives of profit-making, even if it comes at the expense of quality. These production dynamics have been enhanced by innovations along the bread chain, and the historical regulatory environment in which the SOP of bread was shaped. The contradiction in different policies supporting or hindering certain aspects of production also reflects the tensions between actors in the chain. The issue of trust also becomes important, because consumers have little reason to trust an industry that has deceived them for more than ten years (re the price fixing in the bread cartel).

Though rigorous scientific analyses have thus far not ruled against the use of food additives (except for a few, now banned), it must be acknowledged that such additives are primarily there to reduce costs along the chain. Thus, even though they are not particularly unhealthy, they are also not necessarily health-enhancing. Producers present their use of such chemicals as being a response to consumer demand. However, it is important to ask what came first – the provision of chemically-induced soft bread, or the demand for it? And is there really a demand for chemically-induced softness, or is it merely demand for the price at which soft, sliced bread can be bought? The producers' use of orthodox economic theory disguises the fact that information asymmetries exist in the market for bread, such that most consumers do not actually know that the bread they eat is chemically enhanced for softness, colour, and other properties that ultimately benefit producers in terms of getting more loaves out of the same amount of flour (i.e. higher profits). If perfect information were available, the market might have evolved differently from the start. Furthermore, 'if consumers cannot tell the difference when they make their purchase decisions, there is no immediate commercial incentive to provide better quality' (Vickers 2003, 1). This explanatory weakness of orthodox economic theory is addressed by the systems of provision approach in the observation that consumer culture is *conforming* – consumers do not make choices in circumstances chosen by themselves – instead their decisions are limited to what is produced/available.

Moreover, the concentration along the wheat to bread chain has an exacerbating impact on the unequal power dynamics between consumers and producers and the extent to which cultural systems of meaning surrounding bread are closed. This has important implications

for the extent to which consumer interests can be represented in policy debates and will depend on how effectively consumers can collectively mobilize and lobby for change.

Though smaller producers are increasingly being encouraged to take part in the economy, this has not yet translated into increased competition.

An example of this is the current debate around decreasing the quality of wheat in order to increase yields³².

There are real problems in that South Africa is not producing enough wheat, and a compelling argument exists in the notion that if the country will be importing lower grade wheat at high prices, it might as well produce lower grade wheat, in order to protect consumers from the having to bear the burden of the price hike. However, the decline in area planted has to be seen in the context of historical development of the SOP of wheat, for instance the withdrawal of government support for farmers, the context of land reform and the current drought. Furthermore, it must be acknowledged that while the area planted decreased since the 80s, production managed to stay about the same, indicating that yields have been increasing anyhow. A drop in wheat quality is not the only factor that should be considered as a means to increasing production and yield. This new development in the South African agricultural policy landscape bears further testimony to the fact that cultural systems of meaning attached to commodities are closed and that it is very hard to question the dominant system once it is established.

The above analysis has demonstrated that the positive effects of industrialisation of the bread SOP in terms of cost reductions have been accompanied by changes in quality (nutritional; health-related). These changes in quality have led to tensions between producers and consumers which cannot be captured by mainstream (horizontal) economic analyses, nor by vertical economic analyses such as the GVC framework. The SOP framework has enabled a better understanding of these tensions by providing an analysis of the interactions and power dynamics between the cultural systems associated with the production and consumption of bread.

³² See Van der Merwe (2015) 'Quality, pricing and the performance of the wheat industry in South Africa' and 'Mokhema and Janse Van Vuuren (2015). Lower quality wheat will boost production'.

8 Conclusion

I have demonstrated that the industrialisation of the SOP of bread (understood as the changes in the structure of production that have taken place from home-based production to the emergence of an industrial scale manufacturing sector) has encompassed various activities that have to some extent compromised consumer interests in the pursuit of industrial efficiencies and cost minimisation. I have pointed to a potential danger in devising agricultural and industrial policies, or implementing cost-saving innovations, without considering their broader quality implications, especially if these have negative effects on health.

The main contributions of the report have been 1) to add to the literature on the effects of industrialisation on consumption patterns and health, by providing an in depth study of a specific commodity, and in doing so 2) to flag the fact that industrialisation³³ has exacerbated the unequal power relations between producers and consumers, in this case, especially poor consumers/workers, and that more research and analysis is required to make sense of what this means for the promotion of industrialisation as a means to achieving economic development going forward; 3) that there are significant discrepancies in the concentration and distribution of power along different segments of the production chain; 4) there are vast differences in access to information, perception of risks, and ability to organise within producer and consumer groups; 4) to add to the understanding of the South African wheat to bread production, by providing an analysis of cost constraints and linking these to changes in technology, quality and consumer concerns; 5) to add to the theoretical debate on how to frame consumer-producer interactions, 6) to add to methodological debates with an attempt to apply the SOP approach to a particular developing country commodity context. In general, it is noteworthy that South African bread production is under-researched, especially from more historical and context-specific perspectives and from the industrialisation perspective that takes into account competing interests and tensions between consumers and producers, and the role of the state in mitigating these.

The SOP approach has enabled a vertical analysis of the wheat to bread chain, as well as the historical, political and cultural embeddedness of the chain, which the other theoretical approaches I explored would not have enabled. In being a meso-level theory, it enables a view in which ‘scaling-up’ is not as simple as shifting from one industry to industrialisation,

³³ Especially in its more deregulated form (though the industry had in many ways been fundamentally shaped prior to deregulation).

as in orthodox economic theory. Instead, it highlights the complex development and path dependence of a specific industrial sector or system of provision and the complexity of linkages between production and consumption. However, a weakness of the SOP is that it does not consider other types of linkages (i.e. across sectors, movement of labour/skills/technology, consumption linkages through employment). Similarly, it fails to distinguish between different producers and their divergent needs, and how food/industrial/production policy promotes or demotes their interests in relation to one another, let alone in relation to those of labour, consumers, and for instance providers of production inputs (e.g. seed companies).

The gaps in this particular study lie in 1) not having a counterfoil for my research; 2) not exploring the main interests and debates surrounding regulation/deregulation of the wheat to bread chain and the South African market in general³⁴; 3) it missing a more extensive survey and analysis of the consumer and producer awareness and perceptions with regard to the various aspects of the system of provision of bread that have been explored; 4) there being scope for further research: drawing comparisons with bread SOPs in other developed and developing countries or similar sectors in South Africa.

Furthermore, I would like to strengthen this research by conducting interviews with consumers, adding a more detailed overview of food science and food policy perspectives; as well as more information on the policy construction/design process, which would shed light on the extent to which (and with what weight) producer and consumer interests are represented in this process.

Some further research questions that could address the above gaps, but that also follow from the research findings³⁵ could include the following: What are the different consumer concerns? (i.e. test the perception that high-income consumers are more concerned about quality than lower income consumers); how do different consumer groups access information about bread quality and nutritional value; what is the general level of consumer awareness about the processes underlying the production/provision of bread; how do consumers perceive choice with respect to the staples they consume (and how does this question link to

³⁴ Some of these have been revealed in interviews and policy history but not systematically shown in the research.

³⁵ Initially, given limited time and resources, I did not set out to interview consumers, believing that consumer representative bodies could answer most of my questions, but this turned out not to be the case as I found that these have their own mandates which may be in conflict with 'pure' consumer interests (having to mitigate conflicts between industry and consumers).

SOP theory in terms of how provision determines consumption); what channels of influence do consumers have and how do these differ across consumer groups; to what extent can consumer views influence food/production/industrial policy; what are the areas of alignment in interests between consumers and producers in different chain segments; how have input prices changed over time (imports) and is there an incentive to produce these locally (technology, seed, fertilizer).

Further questions that arose from my research findings and examiners' comments include exploring in more detail the theoretical discussions around the concept of industrialisation, especially the different ways in which regulated/deregulated industrialisation attempts have influenced the unique development of the systems of provision of different commodities.³⁶ The transition from traditional to industrial systems of provision of commodities and the economic and non-economic gains and losses that have occurred as a result (in terms of the broad categories such as quality, price, production processes, and power) can be applied to the production of other commodities, with emphasis on consumer/producer perspectives and interests, which may or may not have implications for industrial/food policy going forward.

³⁶ Further research can also be done on the extent to which bread can fulfil the structuralist definition of industrialisation (i.e. formation of linkages within the chain as well as other types such as technology linkages, fiscal linkages, or transfer of skills/knowhow to other sectors).

9 Bibliography

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9.1 Interviews

- Interview 1: Thezi Mabuza 2016, 13 Jan, 10am, Centurion - Deputy Commissioner, National Consumer Commission
- Interview 2: Gerald Di Pascale, 2016. 23 Jan, Previous Owner of Small Industrial Bakery
- Interview 3: Anonymous 2016, Feb, Food Industry Expert
- Interview 4: Nigel Sunley 2016, 5 Feb, 3pm, Johannesburg - Consulting, esp. Fortification
- Interview 5: Dr Philip Randall 2016, 12 Feb, 12:30, Pretoria - Head of Technical Laboratory Services of the Wheat Board (in the 80s)
- Interview 6: Wiana Louw 2016, 22 Feb, 12:30pm, Pretoria - General Manager South African Grain Laboratory
- Interview 7: Nico Hawkins 2016, 22 Feb, 3pm, Pretoria, General Manager South African Grain Information Service
- Interview 8: Ina Wilken 2016, email correspondence Feb-March.

Appendix 1

Table 1 Changes in Cereals Consumption in SA since 1994.

Food item	FAOSTAT FBS (kg.capita/year)				
	1994	1999	2004	2009	% Change (1994–2009)
Total cereals, excluding beer	182	182	187	182	0.4
Wheat	59.8	60.3	56.9	60.9	1.8
Rice (milled equivalent)	10	13.3	15.7	14.8	48.0
Barley	0.1	0.1	0.1	0.1	0.0
Maize	109	106	112	104	-4.6
Rye	0.1	0.1	0.1	0.1	0.0
Oats	0.6	0.6	0.8	1.1	83.3
Millet	0.3	0.2	0.1	0.1	-66.7
Sorghum	1.9	1.5	1.6	1.5	-21.1
Cereals, other	0.1	0.1	0.1	0.1	

Source: Ronquest-Ross et al. 2015, 3.

Table 2 Consumption of Packaged and Unpackaged Bread in SA since 1999

Food item	Euromonitor PFBC (kg.capita/year)				
	1999	2004	2009	2012	% Change (1999–2012)
Bakery	40.4	36.0	39.2	43.0	6.4
Baked goods	38.6	34.1	36.9	40.4	4.7
Packaged/industrial bread	22.6	17.9	18.2	20.5	-9.3
Unpackaged/artisanal bread	14.0	14.4	16.7	17.9	27.9

Source: Ronquest-Ross et al. 2015, 7. Original data from Euromonitor Packaged Food and Beverage Consumption)

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Appendix 2

Farmers receive the ‘wheat producer price’ or the ‘farm gate price’ of wheat, which equal to the SAFEX price minus the farmers’ transport cost to the silo, as well as the handling and storage costs (NAMC 2016a, 2).

The Farm Value Share (FVS) and Farm to Retail Price Spread (FTRPS) published by NAMC on a quarterly basis since 2015 seek to provide insight into the factors that drive commodity and food price margins (NAMC 2016b, 2). The FVS is the value of the farm product’s

equivalent in the final food product purchased by the consumer (farm value/retail value), and the FTRPS is the difference between what the consumer pays and the value of the farm product used in that product (NAMC 2016a, i). In Jan 2016, the Real FVS was reported as being 18, 29% for brown bread and 18,78% for white bread. Whilst the Real FTRPS is R17 184,15/ton of flour for brown bread and R17 723/ton of flour. The year-on-year Real FTRPS has decreased by 2,09% for brown bread and 2,59% for white bread, whilst the year-on-year Real FVS has increased by 8,03% for brown bread and 8,44% for white bread (NAMC 2016a, 2), indicating that farmers experienced a greater real share in the final product purchased than the previous year, whilst somewhere between farming and retail there was a loss in real value shared.

The Baker's Wholesale Price is roughly determined by the following costs: flour (47%); packaging (4%); other raw materials (11%); labour (3%); distribution (19%); overheads (9%) (NAMC 2003, 164).

The Retail Value is calculated by multiplying the price of white bread and brown bread by the number of loaves that 1 ton of flour produces (2 135 and 2 278 respectively) (NAMC 2016a, 2)

Since deregulation consumer prices can be set freely by bakers and retailers, subject to competition dynamics and consumer willingness to pay constraints. Since bread is a staple food for many poor South Africans, increases in the price of bread affect many households adversely.

Appendix 3³⁷

Historical Timeline of the South African Wheat to Bread Industry

1600s - introduction of wheat planting and harvesting in South Africa soon after arrival of Dutch settlers

1826 - control of imports of foreign wheat and flour

³⁷ The coloured lines are adapted from ACB 2014, the normal text from Stanwix 2012, and the italics from NAMC 1999.

1891 – The Port Elizabeth Stream Milling Company registers the Snowflake brand and merge with Cape Town's Atwell's bakery to form the South African Milling Company Limited (SAMCO)

1900 - growing market for bread in tandem with development of towns, urban centres, increased economic activity through discovery of gold and diamonds, and along transport routes

1910-20- throughout the decade following Union, SA was only producing half the bread it consumed, arguments developed around protection of wheat farmers and millers, promotion of economic development self-sufficiency and cheap and reliable food supplies.

1912 - farmers in the Western Cape's major wheat farming area - Swartland - formed a co-operative (**Wesgraan**) in Malmesbury

1920 - Department of Agriculture says highest ever seen interest in agricultural co-operation

- farmers in the Swartland establish milling company **Bokomo**

- establishment of **Tiger Brands**

1930 - Act passed restricting importation of Wheat

- farmers involved with Wesgraan and Bokomo established Sasko, a central marketing co-operative that would attempt to stabilize the wheat price

1931 - Act passed restricting the importation of meal and flour

- **Woolworths opens its first store**

1930s - Local production averaged 200000 tons per year

1931-1936: Wheat production more than doubled

1935 - Increased call for government to intervene and stabilize wheat price - establishment of wheat industry control board

1937 - Marketing Act: enabled the Wheat Board to have sole authority over the wheat to bread chain

- stabilisation of prices

1938 - Wheat board controls import and export of wheat and wheat products,

- prohibits the sale of to anybody other than the Board and its agents,

- prohibits the sale of wheat, flour, and bread for prices other than those fixed by the Board,

- enforces restricted registration of millers and bakers

- NP campaign on consumer welfare, election manifesto promises supporters a thorough investigation into the cost of living, assistance to the farming industry

1940s - United Party introduces war time bread rationing

- In the interests of greater efficiency, the Wheat Board began closing smaller mills and consolidating the milling industry around urban centres, which was also extended into the baking industry, as the wheat board favoured large bakeries over small bakeries

- A member of the UP Western Cape complained that ‘The shares of milling concerns are rising enormously, they are making huge profits and closing down small mills everywhere’. (SA, 1947: 5722; Stanwix 2012, p14)

1941 - (5 May) white bread officially withdrawn from production, introduction of the standard loaf, coarser and darker than traditional brown of whole-wheat loaf, using high extraction rate, meaning one loaf could be produced from a given amount of wheat (this was the only loaf to be available for the next 7 years, 6 pence a loaf, 300 million loaves sold a year)

1944 - Tiger Brands incorporated with the National Milling Company Limited and listed on the JSE (ACB, 2014)

1946 - Following bread rationing example set by the UK, sieving of meal types 1 and 2 forbidden (no cakes and biscuits allowed)

- Hotels forbidden to serve toast
- Limits on individual purchases of bread and meal to 8 ounces of bread or 6 ounces of wheat meal
- Prohibition of use of bread between 3pm and 4am and sale of all bread outlawed on Wednesdays
- Between 1947 and 1960 the bread subsidy would amount to 3.5% of the national budget (Stanwix, 2012, 18)

1948 - General Elections: NP came to power, election campaign ‘Vote National. Protect The Worker’ and promised the return of white bread. After election victory, a pamphlet was published reading ‘The National Party takes care of the worker. Here is the proof: There is bread, white bread, brown bread, that takes care of worker’s health. To keep the price of bread low for our workers the National Party pays a subsidy out of State funds’ (quoted in SA, 1948a:358)

- October all wartime restrictions were lifted

1948/9 – a total of 360 million loaves were bought (more than 20% of previous year, 90% of which was the resurrected white loaf, selling for one pence more than the brown equivalent)

- A debate in parliament addressed the issue of large bakers and millers being favoured by the wheat board: ‘Some years ago the Wheat Board decided that the existing capacity of ovens in the baking industry was all that was needed [...]. The result of this is that we find all the small bakers are being bought up by the big milling companies. The big milling companies are holding a monopoly, not only in milling but in the baking trade as well, and it is impossible for any small man to increase the capacity of his ovens. He is not permitted to do so!’ (SA, 1948b: 5722; cited in Stanwix, 2012, p14)

1953 – Minister of Finance, Nicolaas Havenga, proposes an increase in the price of bread. (p20-21)

- Wheat Board recommends the subsidy be decreased or minimized, as it was becoming costly, especially as the black population was beginning to consume bread, the consumption had doubled since
- Due to large scale public outcry price increase abandoned, until 20 years later

- The 'enriched loaf' or Bremer Bread, named after then minister of Health, Dr Karl Bremer, is introduced under the national bread fortification scheme as part of a long term study (initiated in the 1920s) by the Department of Health on the level of malnutrition within the black population (ingredients added to standard brown loaf: groundnut meal, buttermilk powder, skimmed milk powder, calcium carbonate), Pre-mixed packages were delivered to all registered bakeries around the country.

1959 - Two separate studies on the nutritional value of Bremer Bread conducted by the department of nutrition reported no significant nutritional benefit when enriched bread as compared to the standard brown loaf. After 4 million pounds spent on the fortification scheme, Bremer bread was discontinued in 1959 leaving South Africans again with the regular white and brown government loaves (Stanwix, 2012, 21)

1960s – consumption and production of wheat continued increasing

- SA was almost self-sufficient in wheat production for 25 years from 1964 to 89)
- SAMCO merges with Premier Milling, continues to expand, building wheat and maize mills in other locations

1962 – Six wholesalers gained the exclusive rights to the SPAR brand in SA (Spar was formed by Adriaan van Well in the Netherlands in 1932 to counter the increasing power of grocery chains (ACB, 2014). Ironically the international Spar group now operates around 12000 stores in 33 countries.

1967 – Raymond Ackerman acquires four small stores in Cape Town for R620000

1968 – PNP goes public and lists on the JSE. In the first year of trading it reaches a turnover of R5 million.

1976 - 23 marketing boards preside over more than 90% of South Africa's agricultural output

- *Commission of Enquiry into the Marketing Act (The Wenzel Commission)*

1978 – Tiger Oats acquires Spar WC and Southern Transvaal, Tiger Oats acquires a 30% shareholding in the Brown Group (created through mergers of a number of wholesalers)

- *Working Committee re the economic position of the farmer and agricultural financing in general (Jacobs Committee)*
- *Interdepartmental Committee re the establishment of bakeries (Brand Committee)*

1979 – The Shoprite Group started with the purchase of OK Bazaars

1980s - beginning of government withdrawal of support for agriculture

1983 – Shoprite buys 6 food stores from Ackermans

PnP Turnover exceeds R1bn

- *The BEPA Report regarding the costs, advantages and financing of protection in SA (Bureau of Econ Policy and Analysis)*

1985 – *The Commission of Investigation into the Government Subsidy on Bread (Davin Commission)*

- *The Competition Board Investigation into the milling and baking industry*

1986 – Shoprite lists on JSE with a market capitalisation of R29 million

- *The National Marketing Council Investigation into the operation of the Winter Cereal Scheme*

1988 – Tiger Brands acquires the entire shareholding of the Brown Group

PNP opens its 100th store

1989 – *Investigation into control over and support to the wheat and wheat processing enterprises abroad: a comparative study by Prof IJ Lambrechts, Mr NF Alberts, Mr JF de Villiers and Mr LH van Staden*

1990 - NP deregulation

Report of the Committee of investigation into phasing out the Bread Subsidy (Bignaut Report)

1991 – Shoprite acquires the Checkers Chain

1990 Kwikspar stores launch

1991 – The Brown Group changes its name to the SPAR Group Limited

1992 – *Report by the BTT into the price mechanism in the food chain with recommendations for its improvement*

The Report of the Commission of Enquiry into the Marketing Act

1994 – *Reports titled A Framework for a future agricultural marketing policy for the RSA and the implementation thereof (Basson Committee or AMPEC)*

1995 – Shoprite acquires Sentra, a central buying org that acted as a buying group for 550 owner-manager supermarket members, allowing Shoprite to enter the franchising field, expanding massively internationally from here on (largely through acquisitions)

1996 – Bokomo converts from cooperative to private company

Business Plan of the Wheat Board

1997 - ANC deregulation and withdrawal

- Bokomo merges with SASKO to form Pioneer Foods
- *Wheat, Milling and Baking Cluster Atlas*

1998 – Premier Milling is purchased by General Food Industries and merged to create Premier Foods Limited

2002: Pioneer Foods acquires SAD Holdings, increasing its share of the cereal market to 44%

2004 - SPAR Group Limited unbundled from Tiger Brands Limited and listed on the JSE

2007 - exposure of national bread cartel

2012 – Tiger Brands acquires 60% of Dangote Flour Mills.

2012 – Premier acquires controlling stakes of Mr Bread and Swaziland United Bakers, both in Swaziland (which together control 75% of Swaziland's bread market)

2013 – Brait (the private equity arm of the South African Investment Bank) owns 79,9% shareholding of Premier Foods. The chairman and controlling shareholder of Shoprite holdings, Christo Weise, owns 185 share in Brait, being the single largest shareholder

- Premier Foods acquires Manhattan's from Kraft Foods (Manhattans has manufacturing plants in Port Elizabeth, Botswana, Swaziland, Kenya, Johannesburg and Namibia)

2014 – Woolworths owns 400 stores in 18 countries

2014 – Deloitte's Global Powers of Retailing ranks the Shoprite Group as the 94th largest retailer in the world. The group trades with 1525 corporate and 377 franchise outlets in 16 countries across Africa and the Indian Ocean Islands. It has a total number of 1902 stores and is worth about R82 billion.

References:

Stanwix, B (2012), 'Wheat, Bread, and the Role of the State in Twentieth Century South Africa', Research Paper, The History Project: <http://www.histproj.org/about.html>

ACB (2014), 'GM Contamination, Cartels and Collusion in South Africa's Bread Industry'. ACB Report. The African Centre for Biosafety. Melville, Johannesburg.

NAMC (1999). Section 7 Committee Evaluating the Deregulation Process. The Wheat to Bread Value Chain.

Appendix 4

Sample Introductory Letter

-----Original Message-----

From: Katharina Alexandra [mailto:katharina.alexandra@gmail.com]

Sent: 28 January 2016 04:13 PM

To:

Subject: Questions/Interview for Wits Masters Student

Dear ,

I hope you are well. Prof referred me to you.

I am a Masters student in Development Theory and Policy at Wits, and am doing comparative research on food safety and labeling regulations along the South African wheat to bread value chain. It would be incredibly helpful to have an expert opinion on the function of some of the chemicals used along the wheat to bread value chain, as well as on the question of safely consuming their residues.

I am not sure where you are based (I will be in Pretoria from Feb), but would you be available for a short +/- 30 min interview in February, or be willing to answer some questions over email?

Your contribution would be invaluable to my research.

Hoping to hear from you soon.

Kind regards,

Katharina

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M.Com Candidate in Development Theory and Policy

Cell: ...

Sample Questions

1. What are the primary difficulties SANCU is facing in promoting consumer awareness and consumer rights?

2. What are the primary difficulties SANCU is facing in achieving any other of its objectives?
- 2.1. Of the above mentioned obstacles, which are the most important?
3. Another issue that came up at the Seminar was the fact that there is a shortage of accredited national laboratories to conduct food safety and other food quality related analyses. What is SANCU's perspective on this?
4. What are the most common consumer issues that you deal with?
- 4.1. Which of the above are most important in your opinion? Please explain.
- 4.2. Which of these are least important in your opinion? Please explain.
5. If you were to rate the status of labelling of food additives in South Africa, what rating would you give it? (as a number out of 10)
6. Have you had any consumers complain about food additives in bread. If so, please explain their concern (s).
7. If you answered positively to Q7, please explain how you addressed this (these) consumer concern (s).
8. Have you had any general complaints bread or the bread industry? Please explain.
9. Have you had any general complaints about flour? Please explain.
10. What rating out of 10 would you give the average South African's awareness for in terms of
 - i) Looking out for ingredients on food labels?
 - ii) Looking out for ingredients in bread specifically?
11. Out of 10, where would you rate the average South Africa's knowledge in terms of their consumer rights provided in the Consumer Protection Act?
12. Please explain the average South African's use of their consumer rights and give this a rating out of ten?
13. Which consumers are most likely to raise an issue with SANCU?
14. Which consumers are least likely to raise an issue with SANCU?

15. Out of 10, what rating would you give South African producers/industry in terms of ethically labelling their goods.
16. What would you say are industry's main concerns with regard to (ethically) labelling their products? Please answer in general and particularly re bread.
17. Please explain how the new draft labelling regulations will affect the consumer and the industry respectively.
18. What, if any are the regulations for marketing a product as 'artisan'? (I found regulations on 'traditional', 'original', 'natural', etc, but artisan does not seem to be included in the list and is currently being used quite liberally it seems.)
19. What is your approach to alleviating conflicts between consumers and producers? (i.e. explain how consultation before confrontation works by using an example in the food industry if possible).
20. Additional Comments?