

University of São Paulo
“Luiz de Queiroz” College of Agriculture

The evolution of green food products and retailers’ eco-strategizing and
green competitiveness in the Danish and Brazilian grocery sector

Marcelo Fernando Mazzero

Thesis presented to obtain the degree of Doctor in
Science. Area: Applied Economics

Piracicaba
2017

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Bachelor of Economic Science

**The evolution of green food products and retailers' eco-strategizing and green
competitiveness in the Danish and Brazilian grocery sector**

versão revisada de acordo com a resolução CoPGr 6018 de 2011

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Dados Internacionais de Catalogação na Publicação
DIVISÃO DE BIBLIOTECA – DIBD/ESALQ/USP

Mazzero, Marcelo Fernando

The evolution of green food products and retailers' eco-strategizing and green competitiveness in the Danish and Brazilian grocery sector / Marcelo Fernando Mazzero. - - versão revisada de acordo com a resolução CoPGr 6018 de 2011. - - Piracicaba, 2017.

176 p.

Tese (Doutorado) - - USP / Escola Superior de Agricultura "Luiz de Queiroz".

1. Economia verde 2. Alimentos orgânicos 3. Alimentos de comércio justo 4. Varejo 5. Estratégias 6. Capacidades dinâmicas 7. Modelo de negócios 8. Eco-inovação 9. Mercado verde 10. Economia evolucionária I.
Título

Dedication

To God and my beloved family.

Acknowledgements

Firstly and gratefully, I thank my beloved family here at the physical plane and there at the spiritual one, who supported and inspired me throughout all these years to persevere in my path. Also, I thank all my friends worldwide, who shared a piece of their lives with me during my journey of discoveries and new experiences.

Secondly, I thank all my colleagues and support staff at ESALQ/USP, especially my advisor Professor Sílvia Helena Galvão de Miranda, who provided me freedom of thinking and more than scientific guidance to my professional career. Also, I thank my colleagues and support staff at MAN/DTU, especially my co-advisor Senior Researcher Maj Munch Andersen, who inspired me by her evolutionary “green framework” and guided me on this new horizon of possibilities, besides her fearless optimism in any adversity.

Thirdly, I thank the Brazilian funding agencies CNPq and CAPES, which financially supported my PhD studies and by contract gave me the necessary strength to finish it one way or the other.

Lastly but not least, my many thanks to all reviewers and authors who provided their time and knowledge so that I could work and build my thesis.

With you all, I walk close to giants. Once more, thank you.

Biography

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Epigraph

Der er ingen genveje til et sted der er værd at nå til. (Anonym)

“There are no shortcuts to any place worth going.” (Anonymous)

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Resumo

A evolução dos produtos alimentares verdes e das eco-estratégias e competitividade verde dos varejistas no setor supermercadista dinamarquês e brasileiro

Seguindo uma abordagem evolucionária para sustentabilidade ambiental, esta tese agrega uma compreensão das dinâmicas de esverdeamento da economia, particularmente destacando o aspecto negligenciado da demanda no esverdeamento dos mercados. Desde o surgimento dos mercados de alimentos verdes nas décadas de 1980 and 1990, este estudo investiga o papel dos principais grupos varejistas no desenvolvimento do mercado de alimentos verdes na Dinamarca e no Brasil. Dessa maneira, a taxa e a direção do processo de esverdeamento nesses mercados são investigados, bem como a convergência e o impacto da estratégia dos varejistas no setor supermercadista. Usando o quadro de análise das capacidades dinâmicas, esta tese investiga o por que, como e quando as estratégias, performance e competitividade dos grupos de varejo co-evoluíram com o desenvolvimento dos mercados de alimentos verdes dinamarquês e brasileiro. Ainda, este estudo contribui de forma inovadora em pelo menos mais três aspectos. Em primeiro lugar, avança-se a literatura existente complementando-a com dados longitudinais qualitativos e quantitativos ao nível da empresa, que são analisados ao longo do tempo através da proposição de um conjunto de indicadores das dimensões macro (nível de mercado), meso (nível setorial) e micro (nível da empresa) para análise do mercado verde. Em segundo lugar, prove-se as perspectivas dos varejistas e stakeholders de suporte do mercado entrevistados, que atuam nos mercados de alimentos verdes dinamarquês e brasileiro. Em terceiro lugar, estima-se o volume de vendas dos alimentos verdes do setor varejista brasileiro. Embora esta tese conclua que os principais grupos varejistas na Dinamarca e no Brasil não foram os pioneiros do mercado de alimentos verdes, estes em colaboração com produtores especializados em alimentos orgânicos e stakeholders de suporte do mercado foram centrais para tornar o mercado de alimentos verdes um caso de negócios viável. Tais grupos de varejo tiveram um papel decisivo no aumento da escala do volume de negócios dos mercados de alimentos verdes dinamarquês e brasileiro. Ademais, esses varejistas sentiram o potencial do mercado de produtos alimentares verdes já nas décadas de 1980 e 1990, e particularmente da década de 2000 em diante; e conseguiram através de estratégias específicas dimensionar e transformar o mercado de alimentos verdes na Dinamarca e no Brasil. A elaboração de estratégias e a construção de capacidades específicas desses varejistas foram fundamentais para as mudanças inovadoras em seus modelos de negócios, que se tornaram claramente mais verdes neste período devido ao papel deles no desenvolvimento dos mercados de alimentos verdes dinamarquês e brasileiro. Finalmente, como a Dinamarca está em um nível mais alto do que o Brasil no consumo de alimentos verdes, isto sugere um estágio mais maduro da economia verde dinamarquesa.

Palavras-chave: Economia verde; Alimentos orgânicos; Alimentos de comércio justo; Varejo; Estratégias; Capacidades dinâmicas; Modelo de negócios; Eco-inovação; Mercado verde; Economia evolucionária

Abstract

The evolution of green food products and retailers' eco-strategizing and green competitiveness in the Danish and Brazilian grocery sector

Grounded in an evolutionary approach to environmental sustainability, this thesis adds an understanding of the dynamics of the greening of the economy, particularly highlighting the neglected demand side aspect of the greening of markets. Since the emergence of green food markets in the 1980s and 1990s, this study investigates the role of retail groups in the development of the green food market in Denmark and Brazil. Accordingly, it investigates the rate and the direction of the greening of this process in those markets as well as the convergence and the impact of retailers' strategizing in the grocery sector. Using the dynamic capabilities framework, it examines why, how and when the strategizing, performance and competitiveness of grocery retail groups co-evolved with the development of the Danish and Brazilian green food markets. This thesis contributes innovatively to the literature on at least three more aspects. Firstly, it advances the existing literature in adding combined qualitative and quantitative longitudinal firm-level data, which is analysed over time through a proposed set of macro (market-level), meso (sectoral-level), and micro (firm-level) dimensions' indicators of green market analysis. Secondly, it provides the perspectives of the interviewed retail groups and market support stakeholders operating in the Danish and Brazilian green food markets. Thirdly, it provides an estimate of the green food sales in the Brazilian retail sector. Even though this thesis concludes that major retail groups in Denmark and Brazil were not the pioneers in the green food market, their collaboration with specialized organic food producers and market support stakeholders were rather central in making the green food market a viable business case. These retail groups were key players in the evolution of the green food market as they have played a vital role in scaling up the Danish and Brazilian green food markets to higher turnover levels. Furthermore, these retailers sensed the market potential for the green foods in the 1980s and 1990s, and particularly in the 2000s and onwards, and through strategizing have been able to size and transform the green food market in Brazil and Denmark. These retailers' strategizing and related capabilities building have been key to the innovative changes in their business models, which have become markedly greener in this period due to their role in the development of the Danish and Brazilian green food markets. Finally, as Denmark is at a higher level of green food turnover than Brazil, it suggests a more mature stage of its green economy.

Keywords: Green economy; Organic foods; Fairtrade foods; Retail; Strategizing; Dynamic capabilities; Business models; Eco-innovation; Green market; Evolutionary economics

1 General introduction and objectives

From an evolutionary perspective on environmental sustainability, this thesis sheds light on the “chicken-or-egg” causality dilemma related to the emergence of green markets, when in the beginning there were none or very few expensive green products available. How can firms eco-strategize when there is none or very little “green demand” and hence none business case?

Throughout the thesis, our understanding of environmental sustainability is shaped by the Lisbon principles of sustainable governance, which are responsibility, scale-matching, precaution, adaptive management, full cost allocation, and participation, formulated by (COSTANZA et al., 1999). Green products are understood as those having less impact on the environment than their conventional counterparts, or being fair trade.

As the green economy is still in development (UNEP, 2015) and green markets are not yet mature, green business cases are often limited (POTTS et al., 2014; GEORGESON; MASLIN; POESSINOEW, 2017), especially in the retailing sector (UNEP, 2013). Inquiring into the creation of variety and selection related to economic evolution (DOSI, 1982; NELSON; WINTER, 1982; DOSI; NELSON, 1994; DOSI; NELSON; WINTER, 2000) has been neglected in the context of the green economy (ANDERSEN, 1999, 2009), particularly markets’ selection aspects (ANDERSEN, 2012).

By green economy, we understand the thorough integration of environmental parameters into the economic process driving to economic development (ANDERSEN, 2012). Eco-strategizing means the firm’s eco-innovative process of purposely adopting environmental sustainability into the corporate competitive strategy. Further, corporate competitive strategy means that green food sales are explicitly considered as a source of competitive advantage. Also, eco-innovation implies that firms entice green value on the market (ANDERSEN, 2012).

The greening of the grocery sector is an interesting case because green food¹ products are costlier to conventional food counterparts (OOSTERVEER; GUIVANT; SPAARGAREN, 2007; POTTS et al., 2014; SMITS et al., 2014). We found that “green food” is understood broadly among retailers as including sustainable, environmentally-friendly and responsible food products, as the latter also includes the environmental aspects. In the case of organic or Fairtrade food products, the production is often more costly than others due to the third-party certification (POTTS et al., 2014; WILLER; LERNOUD, 2017) or the licence fees (JACOBSEN; HANCOCK, 2015).

¹ If not otherwise stated, “food” means food and beverage products.

Due to lack of data, we investigate only the third-party certified green food products, such as organic food products and the Fairtrade food products. Organic food products are obtained by an organic agricultural production system or derived from sustainable extractive processes. Fairtrade food products are marketed socially and fairly and obtained preferably by environmentally sustainable farming and production techniques. Fairtrade producers are also encouraged towards to the organic certification.

The main research question that we address in this thesis is: how do green markets take shape while green business cases and green business models (co)evolve? By exploring the greening process that has been occurring in the Danish and Brazilian food markets, we build an understanding on another fundamental part of the dynamics of the greening of economies, the greening of markets by retailers' "green demand".

In spite the fact that the green food market is growing faster than its conventional counterparts, the market share of green food products remains relatively small (OOSTERVEER et al., 2014; WILLER; LERNOUD, 2017). For instance, in 2015, Denmark reached the second highest market share of green food products, accounting for 9.2% of its total food market – only 0.2% less than Switzerland, the highest market share with 9.4% (WILLER; LERNOUD, 2017).

Moreover, many years of sustainable marketing of organic, Fairtrade, and other eco-labelled products have not yet reflected in a mainstream consumption pattern (SCHMIDT et al., 2009; WILLER; LERNOUD, 2017). In other words, the food market is extraordinarily difficult to become green. Hence, it consists on a highly interesting case about the difficulty of achieving a green economy. Even though the sales of green products today amount to small percentages of market shares in most sectors worldwide, it is still the case of early market developments.

To reach the promotion of sustainable consumption and production agreed at the 2002 World Summit on Sustainable Development, the challenge still remains to improve the overall environmental performance of products throughout their life-cycle, to increase the demand for greener production technologies and greener products, and to enable consumers in making more sustainable choices (EUROPEAN COMMISSION, 2008; ARDEN-CLARKE; FARAH, 2010). The retail sector may play a key role in facilitating changes towards more sustainable consumption and production patterns (EUROPEAN COMMISSION, 2008; ARDEN-CLARKE; FARAH, 2010; STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012; UNEP, 2012; DAWSON, 2013).

As the grocery retail sector is increasing its market concentration level with fewer and larger retail groups (DAWSON, 2013), especially in Denmark (AASRUP et al., 2010) and

Brazil (DE BARCELLOS; BASSO; ESPARTEL, 2014), they are increasing their scope, scale and hence their power over producers (GRAHAME; CROSSLEY, 2014) and consumers (GUNN; MONT, 2014; COLES; XHELILI; KESSLER, 2016).

As “gatekeepers” between producers and consumers, retail firms have the potential to shape multiple levels of production and consumption behaviours (STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012) in a manner that no other economic sector is able to (EVANS; DENNEY, 2009; GRAHAME; CROSSLEY, 2014). This key position of retailers enables them to potentially play an active role to affect the direction and rate of the greening of the market, by focusing strategically in increasing the market share of sustainable products (SCHMIDT et al., 2009; ARDEN-CLARKE; FARAH, 2010; STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012; UNEP, 2012). The proposition explored here is that major retail groups in Denmark and Brazil are greening their food markets by strategizing, which is entailing changes to their business models. By strategizing, we mean an evolutionary process *par excellence* and an emergently deliberate strategy kind. We propose three types of strategies exploited by retailers: i) “making available” green products (only available to customers); ii) “actively promoting” green products (well-marketed to consumers); and iii) green sales are explicitly considered as “corporate competitive strategy” (source of competitive advantage).

Denmark is chosen because it is a developed economy and considered an early mover in developing green technology and promoting the green economy. In fact, Denmark is ranked as the top performer in the recent European eco-innovation scoreboard (EIO, 2016). Furthermore, the Danish domestic market is considered mature for organic products (WILLER; LERNOUD; KILCHER, 2013), which market share accounted for 8.4% of the whole food market in the country (WILLER; LERNOUD, 2017).

By way of comparison, the Danish per capita consumption of green food products in 2015 was €209 (WILLER; LERNOUD, 2017), and the Brazilian per capita consumption in 2016 was only €3.1, according to our estimate. The Brazilian domestic market is still at an initial stage of a massive organic market formation (WILLER; LERNOUD; KILCHER, 2013), hence lacking behind advanced economies, such as Denmark. Nonetheless, retail groups’ strategic interest in both countries have been increasing since the 1980s, and according to the perception found in this research it is expected to reach a level of very important (more than 70%) in the period 2016-2020.

Furthermore, in Denmark, the green food market is well centralized on grocery retailers since the 1990s. In Brazil, grocery retailers are not the only channel for selling green food with significant market share. Although retailers have been leading the organic food sales at least since 2003, the other organic food sales channels, e.g. farmers' markets and government food procurement, still have a significant share of this market. Indeed, these other channels still play an important role in the development of the organic food market in Brazil.

However, our main objective is the analysis of grocery retailers' role in the evolution of the market for green food products in both Denmark and Brazil. We also understand that institutions also play a key role in it. Still, we focus on the analysis of the firm, not in the institutional environment.

Accordingly, the specific objectives of this thesis are threefold:

- Describing the progress of the green food market in Denmark and Brazil from the strategic perspective of major retail groups (Chapter 3 and Chapter 4). It deviates from the previous studies (GUIVANT, 2003; OOSTERVEER; GUIVANT; SPAARGAREN, 2007; HINDHORG, 2008; AERTSENS; MONDELAERS; HUYLENBROECK, 2009; SCHMIDT et al., 2009; EVANS; DENNEY, 2009; JONES; COMFORT; HILLIER, 2009; STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012; DAWSON, 2013; DALCIN et al., 2014; GUNN; MONT, 2014; OOSTERVEER et al., 2014; WIESE; ZIELKE; TOPOROWSKI, 2015; LEHNER, 2015) in applying an evolutionary approach, using the dynamic capabilities framework, and exploring the qualitative and quantitative data gathered through a novel set of indicators of green market analysis.
- Evaluating the relationship between major retail groups' strategizing and its green turnover over time (Chapter 3 and Chapter 4). It is novel since it is the first attempt using firm-level longitudinal data collected through interviews and questionnaires from major retail groups and market support stakeholders.
- Comparing the evolution of the green food market in Denmark and Brazil (Chapter 5). It is also novel since it compares in depth these two countries through the macro (market-level), meso (sectoral-level), and micro (firm-level) dimensions' indicators of green market analysis. The set of indicators of the dimensions comprises a new framework of analysis in this literature, and hence another contribution of this thesis.

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2 Literature review on the concepts of eco-innovation, green products, eco-strategizing, green business models, and green dynamic capabilities

This chapter introduces the most important concepts, theoretical background, and the adopted definitions related to eco-innovation and the greening of the economy and its sectors. It does not intend to be comprehensive in coverage but rather to focus on the most the relevant concepts and theories to ground our argumentation throughout the thesis.

2.1 Evolutionary approach

Focusing on how firms and the economy changes over time (DOSI, 1982; NELSON; WINTER, 1982; DOSI; NELSON, 1994; DOSI; NELSON; WINTER, 2000), the evolutionary economic theory seeks to explain the co-evolution of organizations (firms), science, technology and economic development (NELSON; WINTER, 1982; DOSI; NELSON, 1994). Understanding the linkage between variety creation through innovation at the firm level on the one hand and selection processes at the macro level on the other hand is core to the analysis (NELSON; WINTER, 1982; DOSI; NELSON; WINTER, 2000). Firms are considered heterogeneous agents and have a distinctive way of doing things, while also showing strong elements of continuity (DOSI, 1982; NELSON; WINTER, 1982).

The related “dynamic capabilities” theoretical field unfolds the strategic implications of such an evolutionary perspective on the economy. The heterogeneity of resources across firms and the imperfect mobility of these resources, which makes the heterogeneity persistent over time, is the basis of firms’ competitive advantage (PENROSE, 1959; WERNERFELT, 1984; BARNEY, 1991; TEECE; PISANO; SHUEN, 1997). Resources enable or limit the firm’s choices to perform better than others in the marketplace (BARNEY; KETCHEN; WRIGHT, 2011; WANG; AHMED, 2007).

To the “V.R.I.N framework”, firm’s resources are categorized as valuable, rare, inimitable, and non-substitutable (BARNEY, 1991; BARNEY; KETCHEN; WRIGHT, 2011). However, any resource advantage that the firm might have, may not be sufficient (TEECE; PISANO; SHUEN, 1997; EISENHARDT; MARTIN, 2000; WINTER, 2003). Rather, the firm needs to hold unique capabilities to use wisely its resources (PENROSE, 1959).

Capabilities are linked to routines, norms, values or learning an ability that come into existence when individuals or firms possess tacit knowledge (LEONARD-BARTON, 1992; ZANDER; KOGUT, 1995; COLLIS, 1996; TEECE; PISANO; SHUEN, 1997). Routines are seen as units of firm activity with a repetitive character and building blocks of firm capabilities (GRANT, 1991; COHEN et al., 1996; ZOLLO; WINTER, 2002; TEECE, 2012). Experience, knowledge and skills are embedded within the firm's routines, and they are regular patterns of activity of the firm (WINTER, 2003).

Firms build their capabilities in an institutional environment where capabilities themselves show slow patterns of change (ZOLLO; WINTER, 2002; WINTER, 2003; HELFAT et al., 2007). The decisions made by the firm shapes its path, as well as the stock of assets that it holds (EISENHARDT; MARTIN, 2000; ZOLLO; WINTER, 2002).

Presuming economic development to be strongly cumulative, path-dependency “not only defines what choices are open to the firm today, but [...] also puts bounds around what its internal repertoire is likely to be in the future” (TEECE; PISANO; SHUEN, 1997, p. 515). This suggests that the learning process plays a significant role in the evolution of firm's dynamic capabilities (WANG; AHMED, 2007). The level of firm's environmental change, organizational processes or routines, resources configuration, managerial decision making, and learning mechanisms are the main components defining dynamic capabilities (ALBORT-MORANT et al., 2017).

2.2 Analytical framework

Figure 1 presents the proposed analytical framework that interrelates the concepts of eco-innovation, green products, eco-strategizing, green business models and green dynamic capabilities, and its outcomes on the green market. This figure is arranged in such a way to be comprehensible connecting all the concepts that are discussed in this chapter and used throughout the thesis.

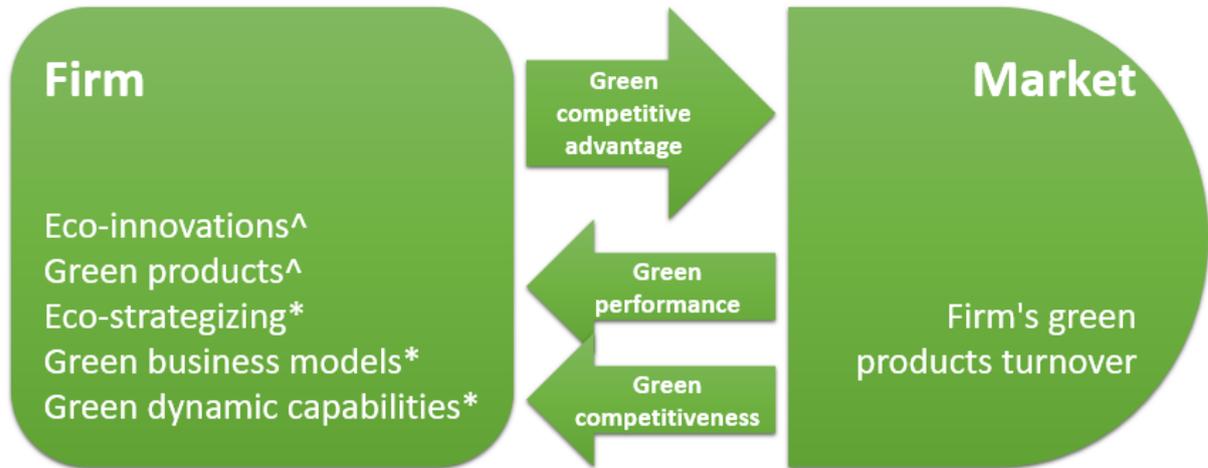


Figure 1 – Proposed analytical framework of the determinants of firm-level performance and competitiveness on the green market

^Built-in or purchased. *Built-in.

We proposed that the concepts in Figure 1 have influence directly and indirectly on the evolution of the green market while firms appropriate green value through their green products sales. Nonetheless, firms may entice green value through their other green activities (DAHLSTROM, 2011; EUROPEAN COMMISSION, 2015). By green activities we refer to eco-strategizing and other specific eco-innovation activities, such as sustainable marketing, choice editing, choice influencing, green demands on suppliers, or green partnerships with suppliers and other stakeholders. As shown below, eco-innovation is a type of innovation, which aims at or results in environmental gain, and it covers technical, organizational and marketing innovations.

2.3 Eco-innovation

Table 1 shows the evolution of the innovation paradigm, from the environment as a burden to the integration of environmental parameters into the economic process. The concept of eco-innovation has been evolving in this context.

Table 1 – Evolution of innovation paradigm from an environmental perspective

Period	Level		
	Firm	Market	Economy
Up to the 1990s	Environment as a burden	Emergence of thin green markets*	Environmental degradation co-occurs with economic growth
From the 2000s onwards	Environment as a business opportunity	Development of growing green markets	Assimilation of environmental parameters into the economic process

*At least in the case of food markets (from our findings).

Source: adapted from (ANDERSEN, 2012a).

The eco-innovation concept ranges from environmentally motivated innovations to unintended environmental innovations (ARUNDEL; KEMP, 2009). Moreover, the effects of eco-innovations on firm performance ranges from changes in productivity and efficiency to changes in sales and market share (OECD; EUROSTAT, 2005).

The concept of eco-innovation as a type of innovation with environmental purposes (OECD; EUROSTAT, 2005) was first introduced in the 1990s (OECD, 2009a). However, the idea of the concept comes from the 1960s (RIZOS; BEHRENS; TARANIC, 2015) along with the increase in the environmental movement that took place after the publication of Rachel Carson's book, *Silent Spring*.

Firstly, the eco-innovation term appeared related to technologies to control pollution (curative solutions), aiming to smooth the negative impacts of firms' production systems on the environment; and then related to cleaner processes (preventive solutions) taken by firms (ARUNDEL; KEMP, 2009; RIZOS; BEHRENS; TARANIC, 2015). That is, the whole idea behind eco-innovation was to fit it into firms to reduce their negative environmental impacts. However, other benefits achieved count on firms' adoption of eco-innovations (ARUNDEL; KEMP, 2009).

The positive side-effect of other environmental goals goes beyond the reduction of firms' costs (ARUNDEL; KEMP, 2009). Eco-innovation is much wider than this idea and covers organisation eco-innovations and marketing eco-innovations. For instance, changes in governance, management, organisation's structure, values, knowledge, and standards are called institutional innovations (OECD, 2009b).

In this sense, eco-innovation can be defined by "the creation of new, or significantly improved, products (goods and services), processes, marketing methods, organisational

structures and institutional arrangements which – with or without intent – lead to environmental improvements compared to relevant alternatives” (OECD, 2009b, p. 21). Still, this definition originates from the Oslo Manual that has a broader concept of innovation.

According to the Oslo Manual, innovation is “a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations” (OECD; EUROSTAT, 2005, p. 46). Further, “innovation can consist of the implementation of a single significant change, or of a series of smaller incremental changes that together constitute a significant change” (OECD; EUROSTAT, 2005, p. 47).

Although the Oslo Manual’s definition of innovation is the most accepted, it faces some controversies. On one hand, according to this definition almost all firms can be considered innovating (ARUNDEL; KEMP, 2009). On the other hand, the Oslo Manual’s definition has advantage as it takes into account the importance of eco-innovation activities from an evolutionary perspective (TRIGUERO; MORENO-MONDÉJAR; DAVIA, 2013).

The common base of the main four types of innovations (product innovation, process innovation, organisational innovation and marketing innovation) is that they may be implemented within the firm that first developed the innovation or in other firms that bought it to take advantage from its adoption (OECD; EUROSTAT, 2005; ARUNDEL; KEMP, 2009). This later point refers to the diffusion of innovation, which consists of the process by which firms acquire eco-innovation from other firms or institutions.

The innovation diffusion is “the way in which innovations spread, through the market or non-market channels, from their very first implementation to different consumers, countries, regions, sectors, markets and firms” (OECD; EUROSTAT, 2005, p. 17). This process of diffusion is so relevant that without it an innovation would not have impact at all (OECD; EUROSTAT, 2005).

Likewise many other processes, the diffusion process has drivers and barriers. Regulation, market demand, opening up new markets, cost reduction and savings to the firm, and firm’s image are some examples of eco-innovation’s drivers (RENNINGS; ZWICK, 2003; DANGELICO, 2015). Further, achieving public opinion accreditation, securing existing markets and increasing market share are other examples of drivers to eco-innovation diffusion (ARUNDEL; KEMP, 2009; DANGELICO, 2015).

In contrast, the barriers are mostly related to uncertainties, such as market prices, investment risks or changes from conventional technologies or non-technologies process

(ARUNDEL; KEMP, 2009), and lack of top management commitment to top management unawareness of long-term benefits of sustainability (ARUNDEL; KEMP, 2009; DANGELICO, 2015).

The type of innovation that mostly interests this study consists on the organisational innovations. Organisational innovations relate to the implementation of a new organisational method, such as one that may increase the firm's performance by reducing transaction costs, or gaining access to non-tradable resources (OECD; EUROSTAT, 2005).

When an organisational innovation is compared to other organisational changes, it can be distinguished by that it has not been used before by the firm and is the result of a strategic decision taken by the firm's manager, such as the implementation of new routines and procedures (OECD; EUROSTAT, 2005). To distinguish marketing innovations from other marketing changes, it is important to understand that the above objective is to increase the firm's sales through better addressing customer needs or even opening up new markets (OECD; EUROSTAT, 2005).

UNEP's operational definition states that "eco-innovation is the development and application of a business model, shaped by a new business strategy, which incorporates sustainability throughout all business operations based on life cycle thinking and in cooperation with partners across the value chain" (UNEP, 2014b, p. 7). This definition implies that firms may acquire green competitive advantage via a coordinated set of adjustments or original solutions to sustainable products, processes, organisational structure and market approach (UNEP, 2014b).

Life cycle thinking is a holistic approach that entails the understanding of all phases of the product lifecycle (UNEP, 2014a, 2014b). By all phases it is meant the extraction of raw material, transformation, distribution, product use and disposal phase (UNEP, 2014a, 2014b). This approach is fundamental to balance all impacts from the product life cycle on the economy, environment and society (UNEP, 2014a, 2014b).

Considering the actors involved in the product life cycle, such as suppliers, consumers, contractors, investors, or R&D institutions, the value chain concept links parties or activities which attract value from products or services (UNEP, 2014a, 2014b). In this sense, a collaboration between actors is key and may enable action towards solutions for sustainability issues (UNEP, 2014b).

Eco-innovation has many different definitions and each one is related to a different point of view, showing that it still is a concept in development (ANDERSEN, 2006; ARUNDEL; KEMP, 2009). Further, because of eco-innovation is a relative concept (ARUNDEL; KEMP,

2009), it may face apparent definitional incompatibilities. Nonetheless, we use here a dynamic definition which covers the previous ones implying that the firms' eco-innovation entice "green value" on the market (ANDERSEN, 2012b).

2.4 Green products

As eco-innovation, green product is a relative concept. Both definitions relate to different viewpoints and, by nature, these dynamic concepts are still in development, which justifies the existence of several definitions of green products (DANGELICO; PONTRANDOLFO, 2010, 2013; DURIF; BOIVIN; JULIEN, 2010). Its concept ranges from being overlapped by eco-innovation's aspects (DANGELICO, 2015) to being only an environmentally sound product (JABBOUR, 2015), or one that fosters changes in the food chain (DANGELICO; PONTRANDOLFO, 2010, 2013; DURIF; BOIVIN; JULIEN, 2010).

As a matter of fact, the concepts of eco-innovation and green products have been co-evolving. By green products, we mean having less impact on the environment or fair traded when compared to their conventional counterparts. Further, green products generally are understood broadly and include sustainable, environmentally friendly and responsible products.

The lack of a robust and accepted base to best fit a green product may create a situation where firms can claim that a product is green, ecological or sustainable in any way (DANGELICO; PONTRANDOLFO, 2010, 2013; DURIF; BOIVIN; JULIEN, 2010). The methodologies and criteria used to certify a product may vary substantially regarding the scope and rigour during the definition, testing, monitoring and certification process (FAO; UNEP, 2014; TROTH, 2015). These divergences may cause problems, such as the low accuracy problem (TROTH, 2015), greenwashing (DANGELICO; PONTRANDOLFO, 2010, 2013), or even causing confusion by over informing consumers (DAUGBJERG et al., 2014; FAO; UNEP, 2014).

Initially, in the 1970s, there was a vague idea of what a sustainable product was, such as an "ecology appeal" or "environmental product costs" (DURIF; BOIVIN; JULIEN, 2010). In the 2000s, this idea turned to specific definitions related to particular cases or points of view, such as "grown or manufactured locally" or "marketed by a socially responsible company" (DURIF; BOIVIN; JULIEN, 2010).

Green products may be defined as having “a less negative impact on the environment during production, use and disposal compared to other products (with the same functionality, addressing the same need, etc.)” (EUROPEAN COMMISSION, 2013, p. 6). Further, the features of a green product may be related to innovations with environmental purposes (DANGELICO; PONTRANDOLFO, 2010, 2013; DURIF; BOIVIN; JULIEN, 2010). For example, green product may be related to an eco-innovation (TRIGUERO; MORENO-MONDÉJAR; DAVIA, 2013; DANGELICO, 2015), being organic (YENIPAZARLI; VAKHARIA, 2014), using renewables or (bio)degradable materials or biotechnologies, eco-efficiency, life cycle thinking, lesser GHG emissions, be recyclable, eco-designed, avoiding the use of hazardous chemicals, produced by an environmentally friendly system (OECD, 2009b), natural, toxic-free and eco-labelled by a qualified third party certifier.

Furthermore, a green product may be associated with three types of environmental focus, which are focusing on materials, on energy, or on pollution (DANGELICO; PONTRANDOLFO, 2010, 2013). In terms of one of these three types of environmental focus, a product can be considered green “if it has an environmental impact lower than conventional products, or if it has a null impact, or if it positively contributes to environment, reducing environmental impact of other products” (DANGELICO; PONTRANDOLFO, 2010, p. 1611).

Although this latter definition still lacks a lifecycle perspective², it emphasises some critical features of a green product. The most relevant aspect is the possibility of positive impacts of green products, meaning that “these products contribute to solving environmental problems, which in turn implies a negative environmental footprint and then a reduction in the environmental footprint due to other products” (DANGELICO; PONTRANDOLFO, 2010, p. 1611). Moreover, a broader and integrative definition of a green product includes products “whose design and/or attributes (and/or production and/or strategy) use recycling (renewable/toxic-free/biodegradables) resources and which improves environmental impact or reduces environmental toxic damage throughout its entire life cycle” (DURIF; BOIVIN; JULIEN, 2010, p. 27).

This latter definition comes from the most frequently listed codes that were related to a variety of green products’ definitions (DURIF; BOIVIN; JULIEN, 2010). It covers the idea of absolute and relative concepts of a green product. Further, “absolute green products contribute to the improvement of society or the environment, whereas relative green products reduce the

² Notwithstanding, the “cradle-to-cradle” approach is rising mostly because its intrinsic characteristic of recycling, reverse logistic, and zero waste policies (ELLEN MACARTHUR FOUNDATION, 2015).

harm they cause to society or environment” (DANGELICO; PONTRANDOLFO, 2010, p. 1609).

In the same context, green products and eco-labelling have an old and strong connexion. Eco-labelling is part of a voluntary method to certify the environmental performance of a green product or service during its entire life cycle (BOZOWSKY; MIZUNO, 2004; FAO; UNEP, 2014). However, eco-labels have not been enough to increase the consumption of green products (DAUGBJERG et al., 2014; GRUNERT; HIEKE; WILLS, 2014; SMITS et al., 2014; NUTTAVUTHISIT; THØGERSEN, 2017). Even though, the main goal of an eco-label is informing consumers about products or services that are more sustainable than their counterparts within the same category (BOZOWSKY; MIZUNO, 2004; UNEP, 2012; DAUGBJERG et al., 2014; FAO; UNEP, 2014).

The inherent features of an eco-label can be listed as follows (BOZOWSKY; MIZUNO, 2004; FAO; UNEP, 2014):

- to consider the life cycle thinking of a product or service through a life cycle assessment (LCA) method, which intends to analyse in full the environmental impacts of the product or service;
- the assessment of the product or service is conducted transparently by an independent and recognised third party;
- to present an environmental advantage when compared to a conventional product or service.

To the International Organization for Standardization (ISO), there are three main types of voluntary environmental labelling schemes (BOZOWSKY; MIZUNO, 2004; TROTH, 2015):

- Type I (ISO 14024): voluntary and multi-criteria based on third party methods that grant certification under consideration of the product’s life cycle compared to other products in the same category.
- Type II (ISO 14021): environmental information by self-assessment, which consists on eco-labels by declarations.
- Type III (ISO 14025): voluntary programs with quantified information about a product based on LCA and using pre-established indices accredited by a qualified third party.

In general, eco-labels are included in Type I (BOZOWSKY; MIZUNO, 2004; TROTH, 2015). Usually, their voluntary adoption comes from the private sector, however it can be

instituted, regulated and administered or even forced by government agencies (FAO; UNEP, 2014). In many countries, such as Brazil and the European Union, the organic eco-label is compulsory for any organic product available in the marketplace.

The ISO 14020 states that the common objectives of eco-labels and declarations should communicate the verifiable and accurate information that is not misleading on environmental aspects of products and services; and to boost demand and supply of these products and services, which cause lesser stress on the environment (BOZOWSKY; MIZUNO, 2004). Hence, it can stimulate the potential market for products that are oriented to continuous environmental improvement (BOZOWSKY; MIZUNO, 2004).

It is worth pointing that we opted to focus on the ISO type I eco-labelled products. These green products certified by a third-party certification method are the most well-known and trusted by consumers, and more available in the market (ROKKA; UUSITALO, 2008; SCHLEENBECKER; HAMM, 2013; DAUGBJERG et al., 2014; SMITS et al., 2014; NUTTAVUTHISIT; THØGERSEN, 2017; TAUFIQUE; VOCINO; POLONSKY, 2017). Notwithstanding, we consider the competitive implications of other green products segments, such as organic, fair trade, locally-produced, and animal welfare eco-labels by declarations.

2.5 Eco-strategizing

The concept of strategy varies widely [e.g. (MINTZBERG; LAMPEL, 2013)]. From an evolutionary perspective, strategy may be understood as the firm's decision-making core managerial process. In general terms, strategizing is a core process of solving problems to give a direction for the firm to move forward (MINTZBERG, 1987; RUMELT, 2011; TEECE, 2014). Nonetheless, a strategy may carry provisions against a range of business environmental contingencies that may take place (CASADESUS–MASANELL; RICART, 2010; GRUNDY, 2014).

Traditionally strategy is conceived as having a deliberate intention, focusing on direction and control of the firm (MINTZBERG; WATERS, 1985; GRUNDY, 2014). Once the manager has set the intentions for the firm, attention is reinforced on realising the strategy, not on adapting it (MINTZBERG; WATERS, 1985; MINTZBERG, 1987).

The process of strategy formation occurs by two “middle” type of strategies, which are deliberate and emergent strategy (MINTZBERG; WATERS, 1985; MINTZBERG, 1987; GRUNDY, 2014). A deliberate strategy has a locked and rigid behaviour (GRUNDY, 2014).

However, a “deliberate strategy is hardly dysfunctional either. Managers need to manage too, sometimes to impose intentions on their organisations – to provide a sense of direction” (MINTZBERG; WATERS, 1985, p. 271).

An emergent strategy is, in essence, an unintended order, which has an open, flexible and responsive behaviour (MINTZBERG; WATERS, 1985; MINTZBERG, 1987). This unintended order happens because managers may come to change their intentions (MINTZBERG; WATERS, 1985; MINTZBERG, 1987), and need to create a strategy to deal with a new challenge (RUMELT, 2011), a new market arrangement, for instance (TEECE, 2014). Accordingly, the major difference between deliberate and emergent strategy is that the latter is opened to learn with the firm’s path, which is an intrinsic evolutionary characteristic.

According to Mintzberg and Waters (1985, p. 271),

This is another way of saying that not a few deliberate strategies are simply emergent ones that have been uncovered and subsequently formalized. Of course, unrealized strategies are also a source of learning, as managers find out which of their intentions do not work, rejected either by their organizations themselves or else by environments that are less than acquiescent.

An unrealized strategy is a type of strategy that was ruled out for some reason or has not been realised (MINTZBERG; WATERS, 1985; MINTZBERG, 1987). To an outside viewer of the firm, an unrealized strategy most likely will never be known (CASADESUS–MASANELL; RICART, 2010).

Strategy also is defined as “a coherent set of analyses, concepts, policies, arguments, and actions that respond to a high-stakes challenge” (RUMELT, 2011, p. 6). As strategies are liable to uncertainties about the future, all of them are some like a bet about the future (GRUNDY, 2014). The common response to market uncertainties is trying to absorb this uncertainty through some form of strategic plan that may be built from scenarios (CASADESUS–MASANELL; RICART, 2010; GRUNDY, 2014).

Regarding strategizing, it is an evolutionary process *par excellence* and an emergently deliberate strategy kind. We propose three types of strategizing phases on the green market, which are the following:

- “Making available”: green products are only available to customers.
- “Actively promoting”: green products are well-marketed to consumers.

- “Corporate competitive strategy”: green sales are explicitly considered as a source of competitive advantage to the firm.

Furthermore, we define eco-strategizing as the firm’s eco-innovative process of purposely adopting environmental sustainability into the corporate competitive strategy. Thus, a firm will be eco-strategizing only when the corporate competitive strategy become its core business strategy.

2.6 Green business models

The concept of business model may be understood as being intertwined and overlapped with the strategy concept (CASADESUS-MASANELL; RICART, 2010b; TEECE, 2017). In a relatively simplistic way, a business model describes how a firm does business, and from which business strategies it is established (RICHARDSON, 2008; SHORT et al., 2014). “Business Model refers to the logic of the firm [...]; and Strategy refers to the choice of business model through which the firm will compete in the marketplace” (CASADESUS-MASANELL; RICART, 2010, p. 196). In other words, a business model gives a body to coordinate the firm’s policies and actions originated from the strategizing by managers.

The business model depicts the rationale behind the decision-making process of how a firm chooses to create, deliver and capture value with the explicit intention to make money (OSTERWALDER; PIGNEUR; CLARK, 2010). In fact, a “business model is like a blueprint for a strategy to be implemented through organisational structures, processes, and systems” (OSTERWALDER; PIGNEUR; CLARK, 2010, p. 15). These structures, processes and systems constitute the firm’s operational and physical forms (UNEP, 2014a).

The key features of a business model are (TEECE, 2010):

- Crystallizing the customer needs and his/her ability to pay.
- Defining the way the firm responds and adds value to its customers, convincing them to pay for the value of the product.
- Converting those payments in profits through a proper design and operation of the various elements in the value chain.

A green business model is understood as the description of structures and mechanisms employed by the firm to enhance its green value proposition and to create, deliver and capture green value through customer, supplier and other stakeholders’ relationship management. In

addition, green business models may be understood by one of its aspects, such as a key business device that helps in the creation and deployment of markets for eco-innovations (BOONS; LÜDEKE-FREUND, 2013; LOORBACH; WIJSMAN, 2013), the sufficiency-driven approach (BOCKEN; SHORT, 2016), or, more broadly, generating purposeful architectures and organisational structures when the sustainability dimension is introduced (INIGO; ALBAREDA; RITALA, 2017).

2.7 Dynamic capabilities

A firm's capability is the competence to perform a particular business-related activity or task (HELFAT et al., 2007). Also, capabilities are understood as "complex bundles of skills and accumulated knowledge, exercised through firm processes that enable firms to coordinate activities and make use of their assets" (DAY, 1994, p. 38).

The capability component emphasises the competence of firms to appropriately adapt, integrate and reconfigure internal and external firm skills, resources, and functional capabilities (TEECE; PISANO; SHUEN, 1997; TEECE, 2009). The firm's resource base includes activities, capabilities themselves (BARNEY, 1991), partnerships, or alliances (TEECE; PISANO; SHUEN, 1997; HELFAT et al., 2007).

Two aspects distinguish firm's capabilities from its other resources. First, capabilities are firm-specific because they are embedded in the firm and its processes (MAKADOK, 2001). Hence, due to their embedded ownership, capabilities cannot be transferred easily without transferring the subunits or acquiring the firm itself (TEECE; PISANO; SHUEN, 1997). Second, the primary function of capabilities is to enhance the productivity of other resources which the firm possesses (MAKADOK, 2001).

Firm's capabilities are classified in ordinary and dynamic ones (TEECE, 2007). Feasible firms have ordinary or operational capabilities that enable them to transform resources into marketable products, to sell these products, to acquire more resources, and continue with this process over and over. Operational capabilities grant to the firm a way to survive in the present (WINTER, 2003). Other more capable firms have dynamic capabilities that enable them to renew ordinary capabilities to exploit opportunities or deal with change and build long-term competitive advantage. Dynamic capability is the ability of a firm to purposefully create,

extend, or modify its internal and external resources bases (HELFAT et al., 2007; HELFAT; PETERAF, 2009; TEECE, 2014).

The learning and practice skills over time have a determining role on ordinary and dynamic capabilities (WINTER, 2003; HELFAT et al., 2007). These capabilities differentiate themselves from the ad-hoc problem-solving competence by the use of those skills on a routine basis (WINTER, 2003; HELFAT et al., 2007; TEECE, 2014). Moreover, ad-hoc problem-solving competence or “ordinary capabilities may be sufficient for a fleeting competitive advantage but are insufficient to undergird sustainable competitive advantage” (TEECE, 2014, p. 343), which originates from dynamic capabilities.

Dynamic capabilities are abilities to transform static organisational capabilities or create new ones to meet changes in the environment (TEECE, 2009). To be able to transform static organisational capabilities to match the dynamic environment, firms have to develop dynamic capability first, before they can be used to address the changing business environment (HELFAT et al., 2007; TEECE, 2009).

The tripartite schema of dynamic capabilities is sensing, seizing, and transforming (TEECE, 2014). These higher-order dynamic capabilities are clusters of microfoundations that act to renew the firm’s current ordinary capabilities (TEECE, 2017). The three primary clusters are (TEECE, 2007):

- Sensing: firm’s analytical systems/processes and individual entrepreneurial capabilities to learn and to identify, filter, shape, and calibrate technological or market opportunities or threats.
- Seizing: firm’s structures, procedures, designs and incentives for addressing opportunities.
- Transforming: enhancement, combination, shielding, and continuous (re)alignment of firm-specific (in)tangible assets to sustain competitiveness.

As dynamic capabilities are unique and idiosyncratic, they cannot be easily bought in the market (TEECE; PISANO; SHUEN, 1997; HELFAT; PETERAF, 2009; TEECE, 2009). Instead, dynamic capabilities must be built (EISENHARDT; MARTIN, 2000; HELFAT et al., 2007; TEECE, 2012). Having dynamic capabilities, firms “adapt to and exploit changes in their business environment, while seeking opportunities to create change through technological, organizational, or strategic innovation” (HELFAT et al., 2007, p. 1).

The dynamic capabilities concept is, therefore, an approach which explains why and how firms using their resources/competencies change over time to reach and sustain higher performances and competitiveness in changing market environments which they operate

(TEECE, 2017). Nonetheless, possessing dynamic capabilities alone is not a guarantee for higher performance or sustained competitiveness, but rather its source lies in the processes through which firms develop and apply them (EISENHARDT; MARTIN, 2000; DI STEFANO; PETERAF; VERONAY, 2010; TEECE, 2014).

The major limitation of the dynamic capabilities framework is related to the negligence to the environmental sustainability (HART; DOWELL, 2011; CHEN; CHANG, 2013), which is today one of the most important drivers for change in the firm's environment (DANGELICO; ALBINO; PUJARI, 2015). As well-phrased by (PAPAGIANNAKIS; VOUDOURIS; LIOUKAS, 2014, p. 266), the firm's path to sustainability through strategically building green capabilities:

environmental outcomes that are associated with the emergence of organizational capabilities, such as environmental innovation, stakeholder integration and high-order learning, lead to the setting of higher environmental goals, thus facilitating the achievement of new outcomes. As new higher-level outcomes are realized, capabilities are further strengthened. [...] It also toward an emergent view of environmental strategy that evolves from rather detached (related to pollution prevention) to more bounded with the core business strategy capabilities (e.g., product innovation). So, as it advances to higher levels, environmental strategy becomes more and more integrated into firms' competitive advantage and business strategy.

Green dynamic capabilities have the environmental sustainability as the core of dynamic capabilities itself. It is a strong dynamic capability with a strategic fit of the environmental sustainability into the firm's routines and processes. Also, we define green dynamic capabilities as purposefully considering environmental sustainability as the preferable source of competitive advantage to the firm.

2.8 Final remarks

Through a proposed analytical framework of the determinants of firm-level performance and competitiveness on the green market, we highlight the interconnections between the concepts of eco-innovation, green products, eco-strategizing, green business models, and green

dynamic capabilities. Also, we offer new definitions to eco-strategizing, green business models and green dynamic capabilities.

Strategizing and dynamic capabilities are the determinants of firm-level performance and competitiveness. Strategizing, an emergently deliberate strategy type, is based on learning. Dynamic capabilities, which are also based on learning, are associated with deployment and coordination of the firm's resource base. Dynamic capabilities enable firms to address customer needs, targeting the right markets (new and old ones), and managing suppliers and partners accordingly.

Higher-order dynamic capabilities (sensing, seizing, and transforming) are the necessary condition to business model development. When firms are sensing, seizing and transforming business opportunities into business cases, they are also creating a set of business models to compete on the market. This set of business models are alternatives of the firm's emerging strategy.

Eco-strategizing is the firm's eco-innovative process of purposely adopting environmental sustainability into the corporate competitive strategy. Green business models seek to appropriate the eco-innovation's value embedded in the green products. Green dynamic capabilities purposefully consider environmental sustainability as the preferable source of competitive advantage to the firm.

Competitiveness, a comparative measure between firms within a sector, is associated with the existence of competitive advantage. Competitive advantage may lead the firm to superior performance. Eco-strategizing integrated with green dynamic capabilities may provide the basis to sustain long-term "green" competitive advantage in the green market.

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3 Eco-strategizing and green competitiveness in the Danish grocery retail sector

Abstract

In the context of the greening of the economy, this paper investigates the neglected demand side by analysing the rise of the greening of markets. We focus on the food market, where green products are relatively expensive compared to their conventional counterparts. We explore the Danish market as a case, as it has been among the pioneering green markets internationally. Grounded by an evolutionary approach to environmental sustainability, we use the dynamic capabilities framework as well as a novel set of indicators in three broad dimensions (macro, meso and micro), according to the level of detail reached by the data gathered from primary and secondary sources. We seek to analyse the co-evolution of the major grocery retail firms' strategizing on the one hand and the green food market on the other for the period 1980s-2020. Our findings corroborate the greening path in Denmark by the over time increasing of the major grocery retail firms' green food turnover and market share of organic food sales. A key finding is a breakthrough in the green food market during the recent years where large retail groups have been catalyzing several important eco-innovations and "green activities" to facilitate the green market development in Denmark. Sectorally, we find that grocery retailers' green food turnover exponentially grows as their green food sales strategies progress towards eco-strategizing. Other actors, notably market support stakeholders and specialized organic food producers have also played important roles in the Danish green food market development. Despite retail firms' heterogeneity within the Danish grocery sector, we identify convergence of retailers' strategizing on the green food market in Denmark. We also identify two generations of greener retail business models in the Danish grocery sector, besides some features of the third one, which is about to come. Even though green food sales are still marginal worldwide, grocery retail firms in Denmark are increasingly competing on green issues at the level of business models and this trend is being reinforced over time. Overall, the case demonstrates a considerable degree and a milestone in the greening of the Danish economy, emphasizing the important role of grocery retailers on it.

Keywords: Green economy; Organic foods; Fairtrade foods; Retail; Strategizing; Dynamic capabilities; Business models; Eco-innovation; Green market; Evolutionary economics

3.1 Introduction

In the context of managing efforts to bring in sustainable development into practice, the green economy, and other interrelated concepts (e.g. green growth, low carbon development, sustainable economy) have gained notable attention particularly since the financial crisis in 2008 (ALLEN; CLOUTH, 2012). The green economy paradigm, i.e. the rise of the green business cases, arose slowly up through the 1990s and 2000s (ANDERSEN, 2012). In 2011, the green economy was conceptualized politically by UNEP's Green Economy Initiative (UNEP, 2011). Since then, it has been catalyzing the greening of many economic sectors and

their value chains worldwide (GLACHANT, 2013). However, the scope of this greening trend has not thoroughly researched yet, particularly from an evolutionary perspective.

A core question from an evolutionary economic perspective is to inquire into the creation of variety and selection related to economic evolution (DOSI, 1982; NELSON; WINTER, 1982; DOSI; NELSON, 1994; DOSI; NELSON; WINTER, 2000). However, this core question has been little investigated in the context of the emerging green economy (ANDERSEN, 1999, 2009), particularly “green” selection aspects are little examined in the evolutionary economic research and business research, which have paid little attention to the evolution of green markets (ANDERSEN, 2012).

To understand eco-innovations dynamics and the rise of the green economy paradigm, we propose that is essential to investigate the greening of markets, which are still at early stages of development. The UNEP’s operational definition of eco-innovation states that “eco-innovation is the development and application of a business model, shaped by a new business strategy, which incorporates sustainability throughout all business operations based on life cycle thinking and in cooperation with partners across the value chain” (UNEP, 2014b, p. 7). This definition implies that firms may acquire green competitive advantage via a coordinated set of adjustments or original solutions to sustainable products, processes, organisational structure and market approach.

This paper applies the evolutionary perspective on environmental sustainability, and it uses, more specifically, the dynamic capabilities framework together with a novel set of indicators grouped in the macro (market-level), meso (sectoral-level) and micro (firm-level) dimensions of the green market analysis framework to explore the dynamics of the early greening of the food market from the standpoint of major retailers and of market support stakeholders. By applying this perspective, we emphasize the heterogeneity of firms and seek to understand how green markets are formed on the one hand and how green business cases and green business models emerge among retailers on the other.

The dynamic capabilities framework may provide firms with a better instrument on how to address changing customer needs, targeting the right markets, and pull in complementary assets from suppliers and partners timely and accordingly (TEECE; PISANO; SHUEN, 1997; PITELIS; TEECE, 2009; TEECE, 2012). Dynamic capabilities are understood as the ability of an organization to purposefully create, extend, or modify its internal and external resource bases to sustain competitive advantage in dynamic markets (TEECE; PISANO; SHUEN, 1997; HELFAT et al., 2007; TEECE, 2014).

Dynamic capabilities are a firm-specific ability to transform static organizational capabilities or to create new ones to meet changes in the environment (WINTER, 2003; TEECE, 2010). Here, we explore the higher-order dynamic capabilities sense, seize and transform to understand how retail firms build business opportunities into viable business cases, following (TEECE, 2007, 2014).

We conceptualize green products as those having less impact on the environment than their conventional counterparts, or fair traded, as the latter ordinarily embraces environmental aspects. However, we found that green food is understood broadly among retailers and includes sustainable, environmentally-friendly and responsible food products. Here, we enquire into the third-party certified green food products. Still, as several food eco-labels fall into this category, most lack of available data though. Accordingly, we chose to focus on organic and Fairtrade food products, which have more accessible data. In fact, Denmark is one of the few countries with official statistics of retail sales of organic food products since the 2000s.

Using organic and Fairtrade food products as a case, we compare the strategizing of major retailers in Denmark, an advanced economy and generally considered an early mover in green technology development and in green economic development. We defined “green food” as a case because it is where green products often are considerably more expensive than their conventional counterparts. In other words, it is a market that is extraordinarily difficult to “go green”. Hence it represents an interesting analysis of the difficulty of greening the economy. Even though the sales of green products today amount to small percentages of market shares in most sectors worldwide, it is still the case of early market developments. For instance, to Denmark, which has the highest market share of organic food products, took 18 years to grow from 2.5% in 1997 (WILLER; YUSSEFI, 2000) to 8.4% in 2015 (WILLER; LERNOUD, 2017), representing a 6.7% annual growth rate.

When it comes to the emerging green market, we inquire into how firms seek to create and appropriate the potential extra value associated with green products. It is important to emphasize that we look at the retailers as possible market creators and not only as market followers.

There is evidence that retailers internationally are increasingly developing green practices through, among others, eco-management schemes, sustainable supply chain management, and sustainable marketing management (EVANS; DENNEY, 2009; DAHLSTROM, 2011; STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012b; GALVEZ-MARTOS; STYLES; SCHOENBERGER, 2013). The unique position of retailers

between producers and consumers enables them potentially to play an active role in the rate and speed of the greening of markets by strategic focusing on the growing of sustainable products' market share (SCHMIDT et al., 2009; ARDEN-CLARKE; FARAH, 2010; STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012a; UNEP, 2012).

This paper aims to investigate on the one hand how grocery retailers' strategizing has changed over time, and on the other how the Danish green food market has evolved since its emergence in the 1980s and 1990s. By strategizing, we mean an evolutionary process par excellence and an emergently deliberate strategy kind. We propose three types of strategies exploited by retailers: 1) "making available" green products (only available to customers); 2) "actively promoting" green products (well-marketed to consumers); and 3) green sales are explicitly considered as "corporate competitive strategy" (source of competitive advantage).

We conclude up front that the greening of the Danish food market has an impressive growth rate in the period 2004-2015. In the recent years, retailers are by far the chosen channel for green food sales in Denmark. Therefore, the Danish green food business case is evolving, and grocery retail groups have been playing a decisive role in it. Also, retailers' strategizing that have been exploiting towards growing their green food sales are, among others, the enlargement of their assortment, increasing the visibility of green food, and the dropping of green food prices markedly.

3.2 Methodology

This paper builds on longitudinal qualitative and quantitative data collected from interviews and a survey undertaken with Danish grocery retailers and a market support stakeholder in 2016 (Table 4). Our analysis focuses on the retail groups in an aggregate way, not individually (Table 5). Also, additional sales data on organic and Fairtrade eco-labelled food products were gathered from other secondary sources (Table 2).

The period of the longitudinal data varies according to the variable displayed in Table 2 and Table 3. In general, we cover from the 1980s to 2020. Nonetheless, this period is divided into several subperiods: 1980s, 1990s, 2000s, 2010-2015, and 2016-2020. Further, when the field research was conducted in 2016, the period 2016-2020 was considered as the expectation for "the next five years".

Table 2 – Variables description gathered from secondary sources

Data collected	Source	Period
<i>Green food retail sales in Denmark</i>		
Turnover of organic food in retail shops [current thousand DKK]	(STATISTICS DENMARK, 2017)	2004-2015
Fairtrade food retail sales [current EUR]	(FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014)	2004-2015
<i>Green food retail sales in Europe</i>		
Organic retail sales [current EUR billion]	(WILLER; LERNOUD, 2017)	2004-2015
Fairtrade food retail sales [current EUR]	(FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014)	2004-2015
<i>Green food retail sales in the world</i>		
Organic food retail sales [current USD billion]	(WILLER; LERNOUD, 2017)	2005, 2010, 2015
Fairtrade food retail sales [current EUR]	(FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014)	2005, 2010, 2015
<i>Organic food sales in the retail channel</i>		
Organic food sales in retailers [%]	(WILLER; YUSSEFI, 2007)	2006
Organic food sales in retailers [%]	(OSCH et al., 2008)	2007
Organic food sales in retailers [%]	(KILCHER et al., 2011)	2009
Total organic turnover divided by sales channels [%]	(ORGANIC DENMARK, 2013, 2014a, 2015, 2016)	2012-2015
<i>Share of the organic food market</i>		
Retail chains' share of organic retail sales [%]	(ORGANIC DENMARK, 2013, 2014b, 2015, 2016)	2012-2015

From Table 2, we point out:

- The variable “organic food sales in the retail channel” includes hypermarkets, supermarkets, department stores, discount stores, and mini-markets.

- As the “organic food sales in other channels” are not the focus of our analysis, the data for this variable was calculated by the difference from the variable “organic food sales in the retail channel”.
- Variables with non-euro monetary values were converted to euro using year-over-year exchange rates from (X-RATES, 2017).

Table 3 – Variables description gathered from primary sources for the periods 1980s, 1990s, 2000s, 2010-2015, and 2016-2020

Variable	Data collected	Source
Strategic importance of green food sales	Q1.1 What is the strategic importance of your company’s green food sales over time? 0%–100%	Coop Denmark group’s CSR director, Dagrofa group’s CEO, Lidl Denmark’s CSR manager
Green food sales strategy	Q1.4 Which strategy do you estimate have been adopted by your company towards promoting green food sales? 1 – Making available 2 – Actively promote 3 – Corporate competitive strategy	Coop Denmark group’s CSR director, Dagrofa group’s CEO, Lidl Denmark’s CSR manager
Green food sales strategy	Q2.5 Which strategy do you estimate have been adopted by retailers towards promoting your organization’s green food products sales? 1 – Making available 2 – Actively promote 3 – Corporate competitive strategy	Fairtrade Denmark’s director
Green food turnover	Q1.7 How much have the green food products represented in your company’s annual turnover? Up to 5% 6%–10% 11%–30% 31%–50% 51%–75%	Coop Denmark group’s CSR director, Dagrofa group’s CEO

	More than 75%	
Green food turnover	Q3.5 How much do you estimate your organization's green food products have represented in the retailers' annual turnover?	Fairtrade Denmark's director
	Up to 5%	
	6%–10%	
	11%–30%	
	31%–50%	
	51%–75%	
	More than 75%	
Performance on the green food market relative to main competitors	Q3.5 How have your organisation's retailers been performing on the green food market relative to their competitors?	Fairtrade Denmark's director
	1 – Very poor	
	2 – Poor	
	3 – Fair	
	4 – Good	
	5 – Very good	

Note: for further details on interview guides and questionnaires, please refer to the appendices (3.B-3.E).

We highlight that although a couple of variables in Table 3 are Likert-type of data, the empirical literature supports the use of parametric statistics with Likert-type scale (CARIFIO; PERLA, 2008; NORMAN, 2010; COWELL; FLACHAIRE, 2017). It is also relevant to note that the variables in Table 3 are based on the perception of the respondents (Table 4), which had expressed their consent to the research in orally when being interviewed, or in writing when answering the online questionnaire.

The interviews and online questionnaires were applied to five major organisations' experts (CEO, Senior VP, CSR director, CSR manager, director) in Denmark, namely Coop Denmark group, Dagrofa group, Lidl Denmark, as well as the market support stakeholder Fairtrade Denmark (Table 4). Also, the interviews and questionnaires cover most but not all the major grocery retailers in Denmark.

Table 4 – Organizations interviewed in Denmark

Organization	Management employee position	Interview type	Questionnaire completion
<i>Retail groups</i>			
Coop Denmark	Senior VP	Face-to-face	No
Coop Denmark	CSR director	Telephone	Yes, fully
Dagrofa	CEO	Telephone	Yes, fully
Lidl Denmark	CSR manager	Telephone	Yes, partially
<i>Market support stakeholder</i>			
Fairtrade Denmark	Director	Face-to-face	Yes, fully

The main criteria for targeting the retailers surveyed was the market share and organisational structure of retailers in the Danish grocery sector (Table 5). Nevertheless, the selection of cases is arbitrary, and the units of analysis should adequately fit for the study purposes (YIN, 2011, 2014).

Moreover, Dansk Supermarked group was initially targeted and approached, but they did not wish to participate in the research. Also, REMA 1000 Denmark was approached, but they did not wish to participate in the research. Notwithstanding, we considered Dansk Supermarked group and REMA 1000 Denmark in the analysis because it was mentioned by the retail groups and market support stakeholder interviewed. Even though these retailers were included in our dataset, they were not in-depth analysed.

Table 5 – Profile of grocery retailers surveyed in Denmark

Retail group		Total		
Parent	Grocery chains	Physical stores*	Turnover including sales tax* [billion]	Grocery market share**
Coop Denmark	Kvickly, SuperBrugsen, Dagli'Brugsen, LokalBrugsen, Irma, Fakta, fakta Q, Coop.dk, and Irma.dk	1,200	€6.7	37.0%
Dagrofa [^]	Meny, SPAR, Min købmand, and Let-Køb	522	€2.5	14.0%
Lidl Denmark	Lidl	106	€0.3-0.5 ^a	2.5%
Dansk Supermarked	Netto, føtex, Bilka, Salling, Bilka.dk, Salling.dk, and føtex.dk	600	€5.5	32.2%
REMA 1000 Denmark	REMA 1000	284	€1.6	10.3%
Aldi Denmark	Aldi	222	€0.5	3.1%
Total		3,062	€16.9-17.1	99.1%

*2016 figures. **Mean of 2013-2016 values of the market share in the grocery sector. [^]It excludes the former discount retail chain KIWI, which was closed down in April 2017. ^aOur estimation.

Source: (ICANYHETER, 2016; ALDI, 2017; COOP, 2017a; DAGROFA, 2017; DANSK SUPERMARKED, 2017; LIDL, 2017; REMA 1000, 2017).

It is important to note that, as Lidl Denmark's turnover was not publicly disclosed (at least until June 2017), we estimated it from its average grocery market share in the period 2013-2016 and compared it to other discount retailers' turnover with similar market share, such as Aldi Denmark. This estimate is only for comparison purposes here in this paper.

Still in Table 5, considering the grocery market share of the surveyed retailers (99.1%), we highlight the high level of concentration in the Danish grocery sector (AASTRUP et al., 2010). This concentration does not hold any implication for the results (e.g. bias), which refer specifically to the green food market in Denmark. In fact, we found that the Danish organic and Fairtrade food markets are centralized in the grocery retail groups shown in Table 5.

Furthermore, we are heavily dependent on retailers' and market support stakeholder's perceptions, official databases with aggregated data (not firm-level), and on other literature's findings. It also includes the "grey literature", and other sources, such as retailers' and market support stakeholders' institutional website and reports. Still, we emphasize that the retail groups interviewed in Denmark (Table 4) did not provide access to their time series data of their green food products turnover.

3.2.1 Analytical approach

The set of "green" indicators proposed here were used to assess the green food market evolution pattern, grounded on an evolutionary perspective [e.g. (DOSI; NELSON, 1994; DOSI; NELSON; WINTER, 2000)]. We grouped the set of indicators in three broad dimensions (macro, meso and micro), according to the level of detail reached by the data gathered from primary and secondary sources (Table 2 and Table 3). Figure 2 depicts the dimensions and its proposed set of indicators to analyse the green market evolution pattern.

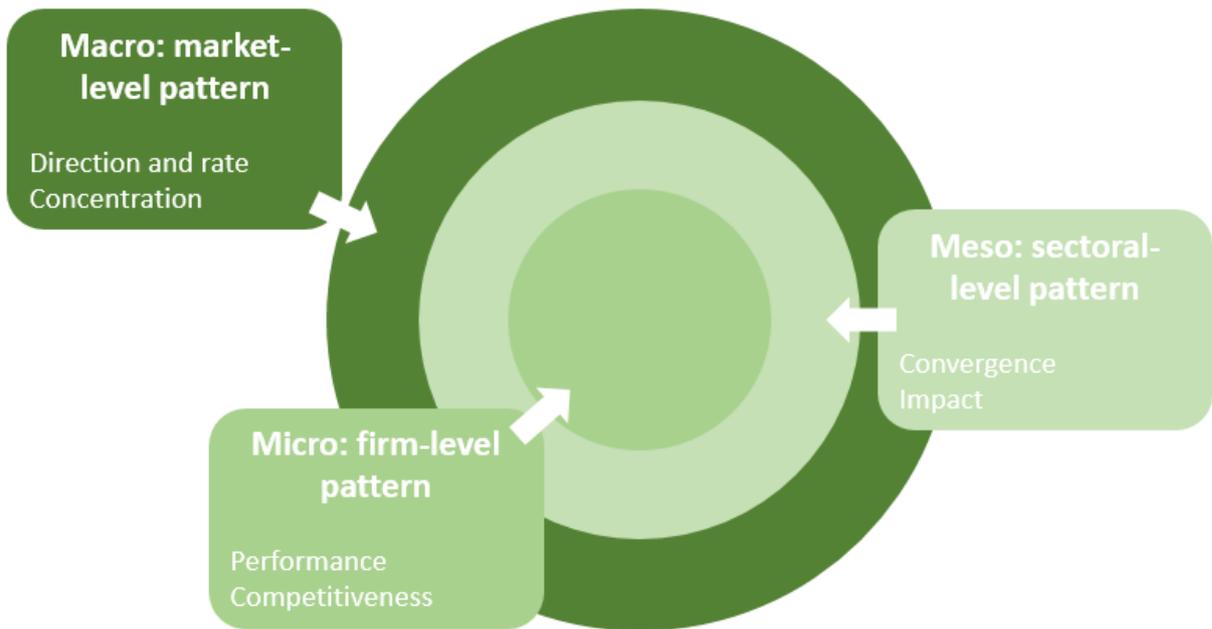


Figure 2 – Dimensions and proposed indicators to analyse the green market evolution pattern

3.2.1.1 Macro dimension's indicators

The macro dimension's indicators are a market-level perspective for a longitudinal analysis. In other words, these set of indicators enable a large-scale view of the dynamics of a market. Here, we explore the indicators to examine the market-level evolution pattern of the green food market in Denmark.

It follows the description of the two macro dimension's indicators:

- Direction and rate of the green food market development: the analysis of the statistical trend and average annual growth rate of the variables “green food retail sales in Denmark”, “green food retail sales in Europe” and “green food retail sales in the world”.
- Sales channels concentration on the green food market: market concentration analysis of “organic food sales in the retail channel” variable.

Rate of the green food market development

The continuous compounding growth rate is more suitable for our purposes because the green food market has annual growth rates that steadily changes. To calculate the average annual growth rate, we use the formula:

$$k = \frac{\ln(N_t/N_0)}{t}$$

where N_0 is the initial value, N_t is the final value, t is the number of years, and k is the annual growth rate.

Sales channels concentration on the green food market

We use the concentration ratio (CR) to evaluate the sales channels concentration on the green food market. The “adapted” concentration ratio formula follows:

$$CR_{R,t} = \sum_{i=1}^R MS_{i,t}$$

where R represents all retail sales channels, and MS is the market share of the retail sales channel i in the period t .

Here, the concentration ratio ranges from 0% to 100%, and measures the percentage market share of retail sales within the green food market. As a general reference, the concentration ratio ranging from 40% to 70% may indicate a medium concentration in the market, and from 70% to 100% may imply a high concentration in the market.

3.2.1.2 Meso dimension's indicators

The meso dimension's indicators are a sectoral-level approach for a longitudinal analysis of a market. It means that these set of indicators endow a medium-scale view of the dynamics of a sector within a market. Here, we explore the indicators to investigate the sectoral-level evolution pattern of the major grocery retail firms in the Danish green food market.

It follows the description of the two meso dimension's indicators:

- Convergence of retailers' strategic interest on green food sales: longitudinal convergence analysis of the mean and standard deviation of the “strategic importance of green food sales” variable.

- Convergence of retailers to eco-strategizing on the green food market: longitudinal convergence analysis of the mean and standard deviation of the “green food sales strategy” variable.
- Impact of retailers’ green food sales strategy on green food turnover: econometric analysis of the regression with the panel data of “green food sales strategy” and “green food turnover” variables.
 - It is important to note: i) the data are the perception of the survey respondents; ii) the panel is unbalanced.

Convergences of retailers’ strategic interest on green food sales, and retailers to eco-strategizing on the green food market

In general terms, for a variable normalized by the min-max scaling method ranging from 0 to 1, convergence occurs when the mean of a variable (Y-axis) tends to 1, and the standard deviation of the same variable (X-axis) tends to 0. It is longitudinally convergent when the firms’ mean increases its value over time tending to 1, and the firms’ standard deviation decreases its value over time tending to 0. This convergence definition is adapted from the statistical convergence $X_{it} \xrightarrow{\text{a.s.}} X$.

The derived definition from (GREENE, 2012) follows:

- Let $\{X_{it}\}_{i,t=1}^{\infty}$ be a longitudinal variable, where i represents the firm dimension and t represents time dimension. Further, let $\{\bar{X}_t\}_{t=1}^{\infty}$ be the arithmetic mean of the firms i on t . Then, $\{\bar{X}_t\}_{t=1}^{\infty}$ converges to 1, if $P\left(\lim_{t \rightarrow \infty} \bar{X}_t = 1\right) = 1$.

In practical terms, there is sectoral convergence when:

- Retailers’ “strategic importance of green food sales” are growing and differing less from the average for the grocery retail sector³. Also, “strategic importance of green food sales” ranges from not important (0% to 20%) to highly important (80% to 100%).
- Retailers’ “green food sales strategy” are enhancing and differing less from the average for the grocery retail sector⁴. Further, “green food sales strategy” ranges

³ Retail firms interviewed (Table 4).

⁴ Retail firms surveyed (Table 5).

from making available (1) or actively promote (2) to corporate competitive strategy (3).

Impact of retailers' green food sales strategy on green food turnover

Generally, panel data is analyzed by a panel regression model, e.g. fixed effects or random effects model. We used the Hausman test to decide between the fixed and random effects models (GREENE, 2012). As the null hypothesis of the Hausman test is that the preferred model is the random effect, we performed the panel regression through it. The random effects model follows:

$$\text{Turnover}_{it} = \alpha + \beta \text{Strategy}_{it} + u_{it} + \varepsilon_{it}$$

where *turnover* is “green food turnover” variable, *strategy* “green food sales strategy” variable, u_{it} is the error between retailers, and ε_{it} is the error within retailers in the grocery sector.

In the case of no evidence of significant differences across entities (null hypothesis of the Breusch-Pagan Lagrange multiplier test), a pooled ordinary least squares regression might be the appropriate model (GREENE, 2012). The linear regression model follows:

$$(\text{Turnover})_i = \alpha + \beta(\text{Strategy})_i + \varepsilon_i$$

where *turnover* is the average of “green food turnover” variable, *strategy* the average of “green food sales strategy” variable, ε_i is the error term.

We highlight that our longitudinal sample has only three cross-sectional units observed and five periods, and the “green food sales strategy” variable is based on Likert-type data. Nonetheless, we are still supported by the literature on the use of parametric statistics with small sample size and with Likert-type data (CARIFIO; PERLA, 2008; NORMAN, 2010; COWELL; FLACHAIRE, 2017). Furthermore, as the statistical bootstrap resampling method enables ascribing measures of accuracy to sample estimates (variance, confidence intervals, p-values) (DAVISON; HINKLEY, 1997), we used this technique in our linear regression model.

Still, we are mainly interested on the signal of the β coefficient and the magnitude of the Pearson correlation coefficient⁵ “ r ” between *strategy* and *turnover*. As reference, an r greater than 0.4, in general, indicates a strong positive relationship between the measures (TABLEAU SOFTWARE, 2017). Accordingly, we expect to find positive values for β and r , and an r greater than 0.4.

⁵ The Pearson correlation coefficient is estimated by taking the square root of R^2 from the regression's result.

Regarding practical terms, retailer's "green food sales strategy" is intended to affect its "green food turnover" positively, as usually any firm's strategy is planned to increase the firm's turnover. That is, grocery retailers strategize expecting to sell more green food products. Here, we understand retailers strategize by "making available" or "actively promoting" green food products, or explicitly considering green food sales as a "corporate competitive strategy". In this latter case, retailers are eco-strategizing on the green food market.

3.2.1.3 Micro dimension's indicators

The micro dimensions' indicators are a firm-level perspective for a longitudinal analysis of a market. In other words, these set of indicators enable a firm-specific view of the dynamics of a group of firms (and market support stakeholders). Here, we explore the indicators to assess the firm-level evolution pattern of the major grocery retail firms in the Danish green food market. We also explore the indicators as the inference whether the retail firm has dynamic capabilities or not by the longitudinal analysis (attainability through learning) of the high-order dynamic capabilities "sense", "seize" and "transform".

It follows the description of the two micro dimension's indicators:

- Retailer's performance on the green food market: it is the graphical analysis of the variables "strategic importance of green food sales", "green food sales strategy" and "green food turnover".
- Retailer's competitiveness on the green food market: it is the graphical analysis of the variables "performance on the green food market relative to main competitors" and "share of the organic food market".

We highlight that the higher the retailer's performance and competitiveness over time on the green food market, the better. In this case, there is an indication that the retail firm most likely has "green" dynamic capabilities. Also, an analysis of the strategic movements in the retailer's business model related to the green market development may also suggest that the retailer has green dynamic capabilities.

Furthermore, in Table 6 we propose the interrelation of the retailers' strategizing phases jointly with its business models changes and capabilities building in the evolution of the green food market. We emphasize that the dynamic structure presented in Table 6 is consistent with the literature reviewed (WINTER, 2003; HELFAT et al., 2007; CASADESUS-MASANELL;

RICART, 2010; TEECE, 2010, 2014; MINTZBERG; LAMPEL, 2013; BOCKEN; SHORT, 2016) and the designed interview guides and questionnaires (Appendices 3.B-3.E). This consistency is due to our case study protocol (Appendix 3.A), which was further developed on the recommendations of (DUL; HAK, 2008; YIN, 2014).

Table 6 – Proposed interrelation of retailers’ strategizing phases, business models changes and capabilities building in the green food market evolution

	Phase	Strategizing	Business model	Capabilities
1st	Reactive	Just “making available” green food products	Conventional business model	Ordinary capabilities
2nd	Proactive	“Actively promoting” green food products	Greener business model than conventional	From ordinary to dynamic capabilities
3rd	Preemptive	Green food sales as “corporate competitive strategy”	Green business model	“Green” dynamic capabilities

Lastly, it is worth mention that the strategizing phases presented in Table 6 are an evolutionary approach to environmental sustainability. Also, the third phase that we originally call “preemptive” is inspired by its dictionary definition, which is something “done before other people can act, especially to prevent them from doing something else” (CAMBRIDGE UNIVERSITY PRESS, 2017). As our understanding of environmental sustainability is built on the Lisbon principles of sustainable governance formulated by (COSTANZA et al., 1999), the preemptive phase of eco-strategizing is closely related to those principles.

3.3 Results

We present the “green” indicators in an different sequence shown in the methodology section. First, we present a macro picture of the green food market and then being grounded by the retailers’ “microdata” before showing it sectorally, which is the meso level dimension. The objective is investigating (describing and evaluating) retailers’ role in the evolution of the market for green food products in Denmark.

We start summarizing in Table 7 the statistics of the data of the variables explored here. We highlight that the variables with Likert-type scale are the perception of the respondents. Concerning to the variable “performance on the green food market relative to main competitors”, we stress that it is based on only one market support stakeholder’s perception, which is the Fairtrade Denmark’s director, employed since 2006.

Table 7 – Descriptive statistics of the variables

Variable		Mean	Std. Dev.	Min.	Max.
<i>Time series</i>					
Green food retail sales in Denmark [billion]		€0.67	€0.24	€0.28	€1.03
Green food retail sales in Europe [billion]		€22.13	€7.63	€11.49	€35.52
Green food retail sales in the world [billion]		€52.49	€26.65	€27.90	€80.81
Organic food sales in the retail channel		89.0%	5.7%	80.0%	97.0%
<i>Panel</i>					
Share of the organic food market	Overall	15.0%	15.7%	0.6%	43.6%
	Within		1.5%		
	Between		16.7%		
Strategic importance of green food sales	Overall	63.4%	34.2%	0.0%	98.0%
	Within		30.2%		
	Between		22.3%		
Green food sales strategy [Likert]	Overall	2.1	0.9	1.0	3.0
	Within		0.8		
	Between		0.5		
Green food turnover [maximum]	Overall	11.4%	9.0%	6.0%	31.0%
	Within		9.6%		
	Between		2.9%		
Performance on the green food market relative to main competitors [Likert]	Overall	3.4	0.6	2.0	4.0
	Within		0.4		
	Between		0.5		

Source: the time series variables are from (FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014; WILLER; YUSSEFI, 2007; OSCH et al., 2008; KILCHER et al., 2011; ORGANIC DENMARK, 2013, 2014a, 2015, 2016; STATISTICS DENMARK, 2017; WILLER; LERNOUD, 2017), and the panel variables are from the questionnaire answers of Coop Denmark group's CSR director, Dagrofa group's CEO, Lidl Denmark's CSR manager, and Fairtrade Denmark's director.

We also highlight that with the variable “green food turnover” we used the maximum values informed by the respondents. In one specific case, we merged the data from different primary sources, e.g. Lidl Denmark's values of “green food turnover” are the perception of a market support stakeholder, which is an acknowledged market expert at least since 2006.

We note that the lack of longitudinal organic food sales data and statistics are common factor worldwide (WILLER; LERNOUD, 2017), but not a particularity of Europe or Denmark. Although there are many green food products on the marketplace which fits the definition adopted in this paper, figures of retail sales at firm-level are not “transparent” in retailers' reports neither on their institutional websites, and longitudinal data is even quite hard to have access. The most accessible data and well-known cases in Europe, especially in Denmark, are those from retail sales (aggregated level) with their brand eco-labelled and certified by a third-party, such as organic and Fairtrade food products.

3.3.1 Macro dimension's indicators

Figure 3 depicts the green food market trend for Denmark, Europe, and the world. It is given by the retail sales of green food products for the period 2004-2015. As the number of Fairtrade products certified as organic has increased since 2004, according to several annual reports published by FLO, the representativeness of organic products in the green food aggregation is likely higher than 84.3%, which is the lowest value in the retail sales series.

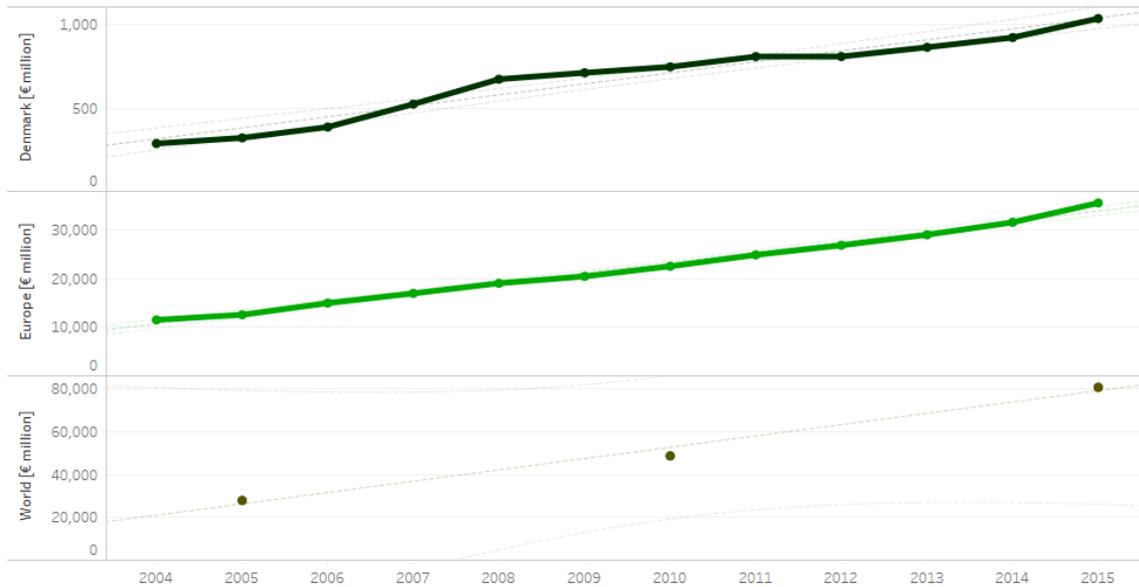


Figure 3 – Green food retail sales in Denmark, Europe, and the world, 2004-2015 (€ million)

Source: Denmark compiled from (FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014; STATISTICS DENMARK, 2017), and Europe and the world compiled from (FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014; WILLER; LERNOUD, 2017).

In Figure 3, we highlight the magnitude of the scales. Denmark’s retail sales account on average for only 3.0% of Europe’s sales and 1.3% of the world’s green food market. We also highlight the upward trend in all of them. Denmark has the trend line with the greatest slope and highest growth rate in the period 2004-2015. The average annual growth rate is 11.7% for Denmark, 10.3% for Europe, and 10.6% for the world. Also, the total variation of the Danish, the European and the world green food markets, measured by the green food retail sales, in that period, reached 261.3%, 209.1%, and 189.6%, respectively.

Figure 4 shows the two channels analysed for organic food sales in Denmark, which are “grocery retailers” and “others” channels. As organic food retail sales represented 92.2% of the green food market in the country, on the average of the period 2004-2015, we understand that these two channels represent the channels of commercialization for green food as a whole adequately.

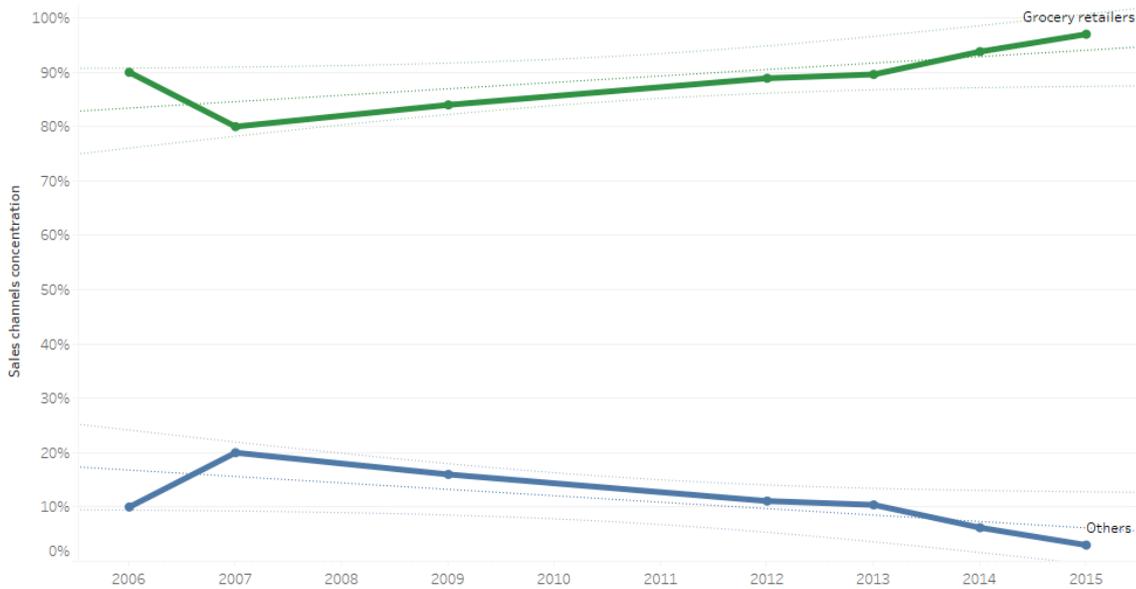


Figure 4 – Sales channels concentration on the Danish green food market, 2006-2015 (%)
 Source: compiled from (WILLER; YUSSEFI, 2007; OSCH et al., 2008; KILCHER et al., 2011; ORGANIC DENMARK, 2013, 2014a, 2015, 2016).

Supermarkets and discount stores are the two most important channels within the grocery retailers. Likewise, specialised shops and e-commerce are noteworthy within the others sales channel. Still, e-commerce has the fastest growing within other channels recently.

From 2006 to 2015, the retailers' organic sales channel increased its share by 7.8%, while the others' channel lost share of 70.0%. Also, the average annual growth rate is 0.8% for retailers and -13.4% for others. The average participation of each one in the total market of green products in Denmark was 89.0% and 11.0% for the sales channels retailers and others respectively.

3.3.2 Micro dimension's indicators

Figure 5 shows the interviewed retailers' performance on the green food market in Denmark. The indicator is composed by retailers' perception of the strategic importance of green food sales, their green food sales strategies in developing this market and their resulting green food turnover.

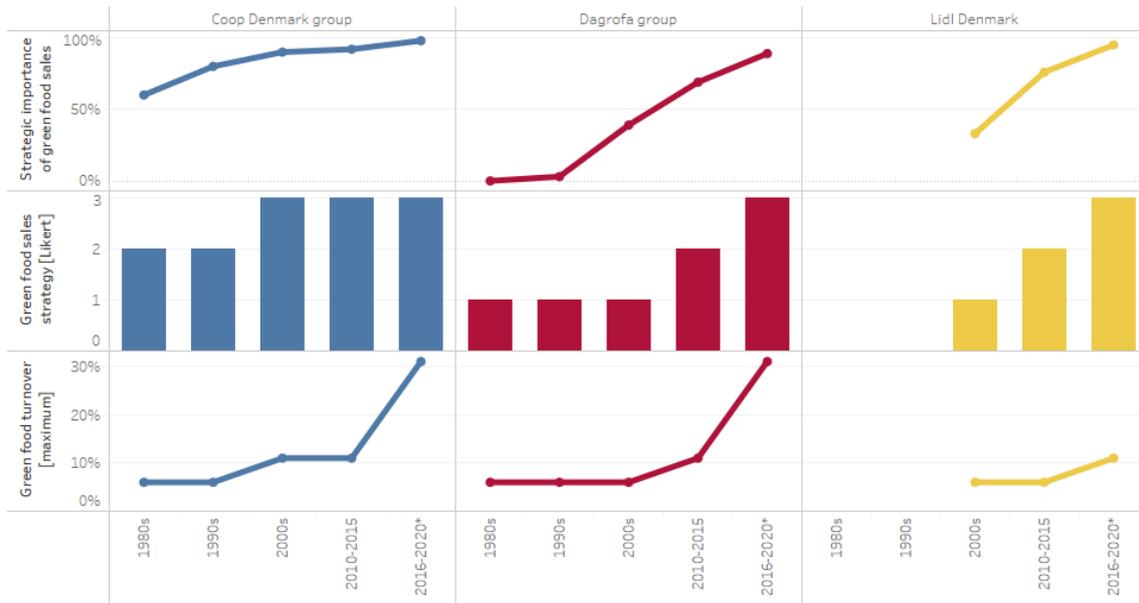


Figure 5 – Major retailers’ performance on the Danish green food market, 1980s-2020

*Respondents’ expectation, as the data were gathered in 2016.

Source: compiled from the questionnaire answers of Coop Denmark group’s CSR director, Dagrofa group’s CEO, Lidl Denmark’s CSR manager, and Fairtrade Denmark’s director.

Figure 6 A and B depict the surveyed retailers’ competitiveness on the green food market in Denmark. The indicator consists of the perception of one market support stakeholder about retailers’ performance on the green food market relative to their main competitors, and their market share of organic food sales.

The interpretation of **Error! Reference source not found.** and Figure 6 allows affirming that the higher the values presented in the plots, the better is the indicator for retailers in the green food market. Also, the two figures complement each other in the sense that performance and competitiveness are retailers’ outcomes operating in the green food market.

Coop Denmark, the largest grocery retail group in Denmark in the recent years, had the highest performance overall on the green food market, measured by the average of its variables in Figure 5. Besides the comparison with Dagrofa group and Lidl Denmark, Coop was the retail group in Denmark which started already in the 1980s “seizing” the green food market by deploying its higher and growing strategic interest in green food sales through “actively promoting” it. Since the 2000s, Coop Denmark has been eco-strategizing on the green food market by considering green food sales as a “corporate competitive strategy”. Accordingly, Coop’s green food turnover is the largest on the cumulative of the whole period.

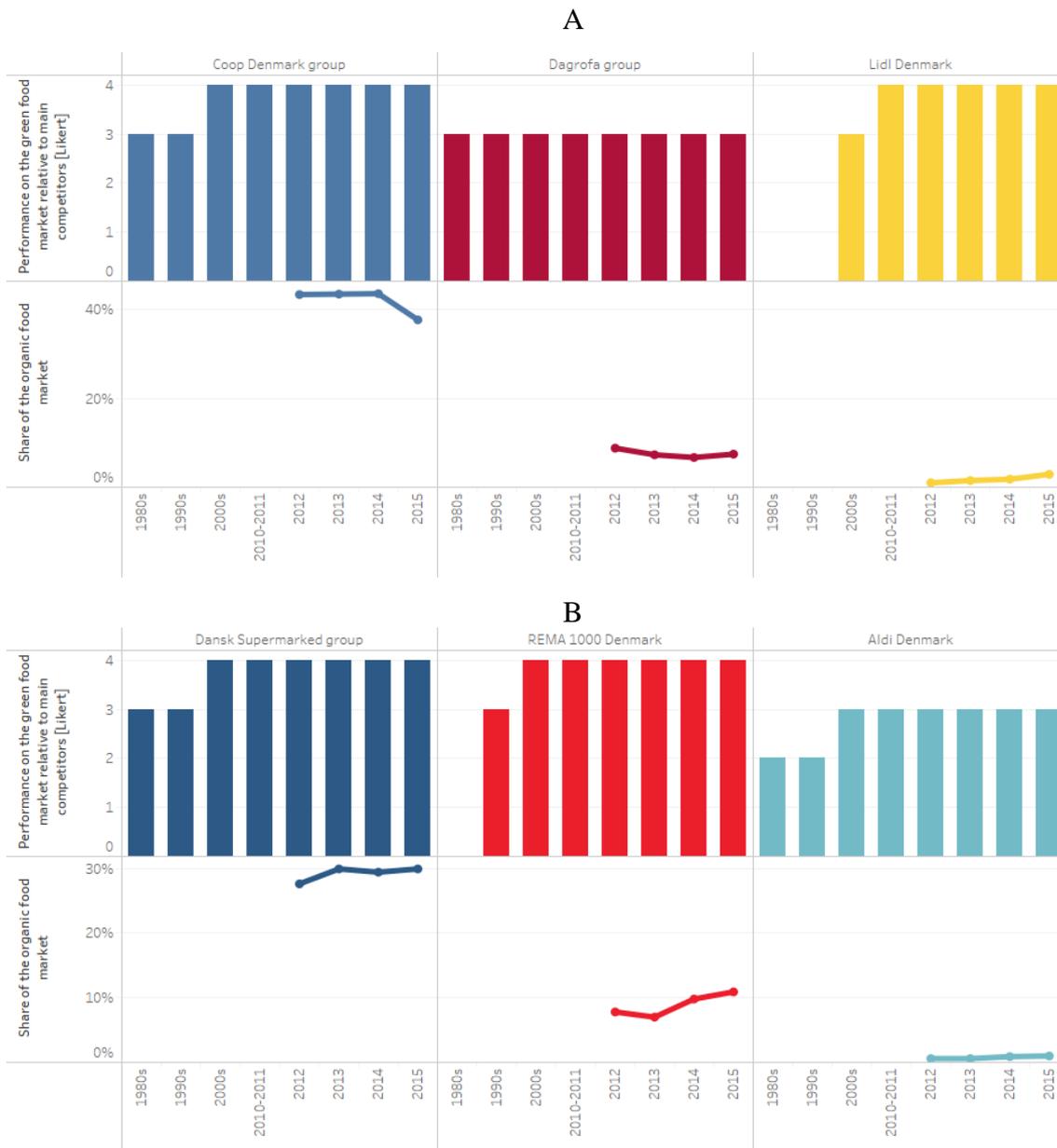


Figure 6 – Major retailers’ competitiveness on the Danish green food market, 1980s-2015

Source: compiled from the questionnaire answers of Fairtrade Denmark’s director, and the reports of (ORGANIC DENMARK, 2013, 2014b, 2015, 2016).

In Figure 6 A and B, the stabilization from the 2000s onwards of most grocery retail groups’ performance on the green food market relative to their main competitors means that these retailers had achieved the highest level of competition in the Danish market. Although the performance relative to competitors of Coop Denmark group, Dansk Supermarked group, REMA 1000 Denmark, and more recently Lidl Denmark, did not differ significantly throughout the period analysed, their shares of the organic food market were quite different. The leading

grocery retail groups Coop Denmark and Dansk Supermarked had the highest shares of the Danish organic food market at least until 2015.

Regardless of the similarity between Dagrofa group and Aldi in their performances on the Danish green food market relative to main competitors, they had a lower indicator from 2012 to 2015. Concerning to the share of the Danish organic food market, Dagrofa and REMA 1000 and Lidl and Aldi had a minor indicator than Coop Denmark group. Nonetheless, in 2015, Coop lost market share and REMA 1000 had increased its share in the Danish organic food market.

3.3.3 Meso dimension's indicators

Figure 7 exhibits the longitudinal convergence of retailers' strategic interest on green food sales in the Danish market in the period 1980s-2020. The axes represent the degrees of strategic importance of green food sales over time. These degrees range from 0% to 100%. As the variable was normalized, the average of retailers' strategic importance of green food sales tending to a mean of 100%, according to their point of view, implies that the firms within the grocery retail sector are growing their interest in the green food sales over time.

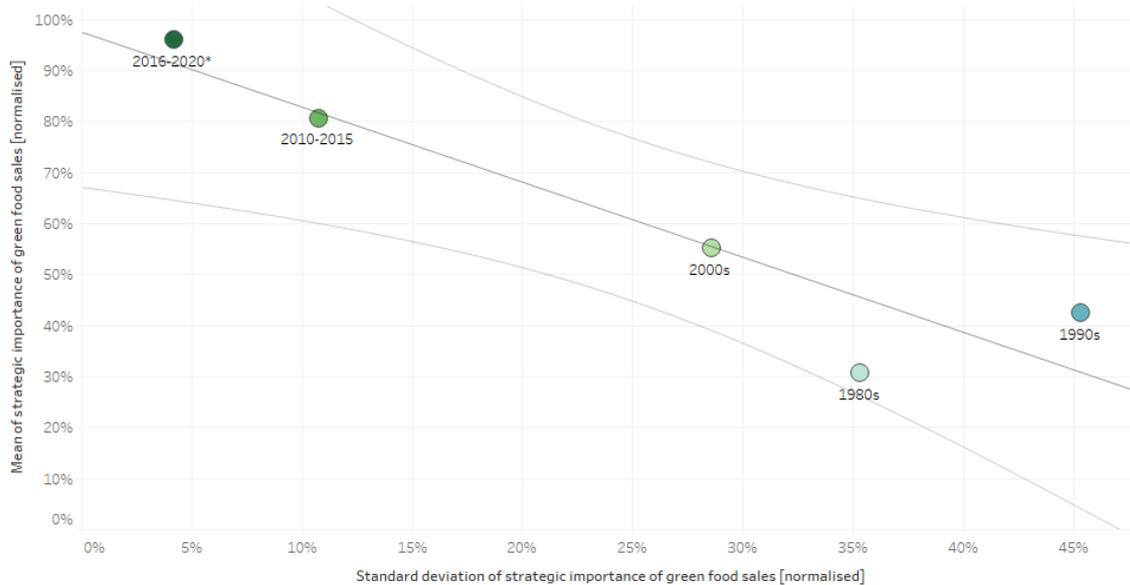


Figure 7 – Convergence of major retailers' strategic interest on green food sales in Denmark, 1980s-2020

*Respondents' expectation, as the data were gathered in 2016.

Source: compiled from the questionnaire answers of Coop Denmark group’s CSR director, Dagrofa group’s CEO, and Lidl Denmark’s CSR manager.

In Figure 7, the 1990s is an exception to the retailers’ upward trend towards a high interest (100%) in the green food sales, as both mean and standard deviation of strategic importance of green food sales increased. However, as all values are within the confidence interval at the level of 95%, the convergence of retailers’ strategic interest on green food sales is assured. In other words, it means that the retail firms interviewed (Table 4) within the grocery sector are tending to be more interested in the sales of green food products.

Figure 8 shows the convergence of the interviewed retailers to eco-strategizing on the Danish green food market in the period 1980s-2020. The axes represent the types of green food sales strategy defined here. These types progress from (1) just “making available” green food products, to (2) “actively promoting” these products, and to (3) consider green food sales as a “corporate competitive strategy”. Also, as the axes were normalized, the average of retailers’ green food sales strategies tending to a mean of 1.0 implies that the retail firms within the grocery sector are strategizing to consider green food sales as a corporate competitive strategy.

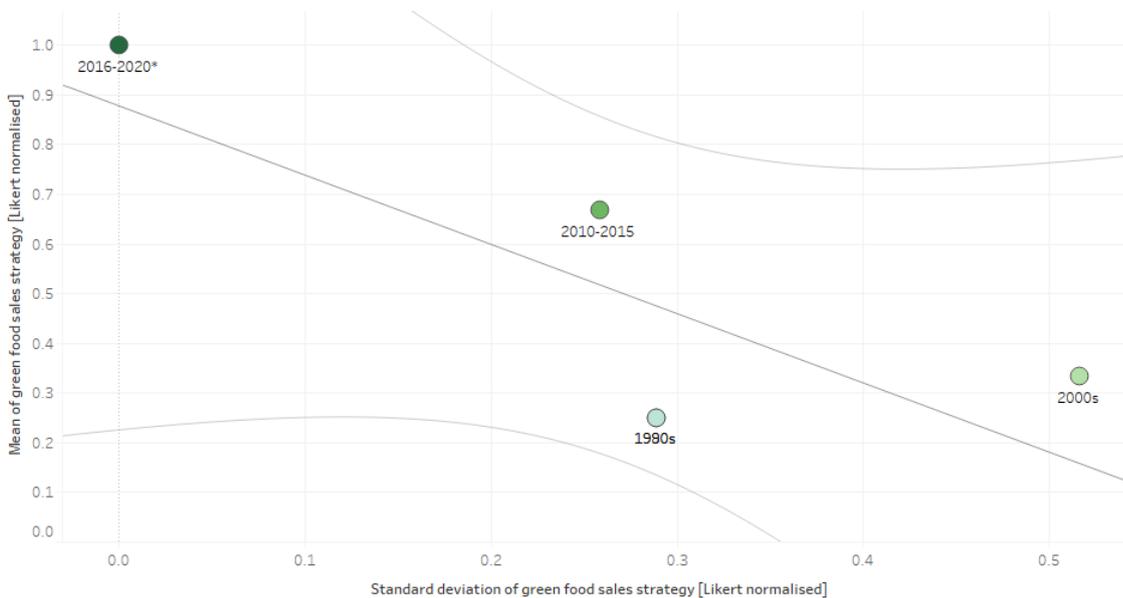


Figure 8 – Convergence of retailers to eco-strategizing on the Danish green food market, 1980s-2020

*Respondents’ expectation, as the data were gathered in 2016.

Source: compiled from the questionnaire answers of Coop Denmark group’s CSR director, Dagrofa group’s CEO, and Lidl Denmark’s CSR manager.

In Figure 8, the 2000s is an exception to the retailers' upward trend towards eco-strategizing (1.0), as both mean and standard deviation of green food sales strategy increased. Also, the values of the 1980s and 1990s are equal and, consequently, overlapping. However, as all values are within the confidence interval at the level of 95%, the convergence of retailers to eco-strategizing on the green food market is guaranteed. In other words, it means that the retail firms interviewed (Table 4) within the grocery sector are tending to acknowledge green food sales as a corporate competitive strategy.

The main results of the model regression analysis of the indicator "impact of retailers' green food sales strategy on green food turnover" is described in Table 8. Also, the variables strategy ("green food sales strategy") and turnover ("green food turnover") explored through the models in Table 8 were presented above in Table 7 and Figure 5.

The model 1 used the random effects (RE) technique and was estimated by generalised least squares (GLS). The model 2 used the pooled technique and was estimated by ordinary least squares (OLS). Both models are significant at least 5%, according to the Wald χ^2 test, and have similar regression results. These two characteristics fit in our purpose, which is that variable's estimated coefficient has not a quantitative meaning, only a qualitative meaning whether strategy impacts turnover or not.

Table 8 – Main results of the regression analysis of impact of major retailers’ green food sales strategy on their green food turnover in Denmark, 1980s-2020

Variable		Model 1 ^a		Model 2	
Dependent	Independent	(RE, GLS)		(Pooled, OLS)	
Turnover	Intercept	-0.058	(0.048)		
	Strategy	0.081	(0.021)***		
ln(Turnover)	Intercept			-3.462	(0.138)***
	Strategy			0.523	(0.070)**
Wald χ^2		14.9***		55.9*	
Breusch-Pagan χ^2		0.006			
Hausman χ^2		1.150			
R^2				0.560	
Adjusted R^2				0.520	
Durbin-Watson				0.850	
White LM				5.098	

Both models were estimated in gretl software version 2017d-git: i) using 13 observations; ii) 3 cross-sectional units; iii) time-series length: minimum 3, maximum 5; and iv) robust (HAC) standard errors. Standard errors are in parentheses. ^aUsing Nerlove’s transformation.

*p-value<0.05

**p-value<0.01

***p-value<0.001

Concerning the model 1, the Breusch-Pagan χ^2 test, which has a p-value equal to 0.938, indicates that the pooled OLS model is more adequate to the data than the RE model. Also, the Hausman χ^2 test, which has a p-value equal to 0.283, confirms that the RE model is a better option than the fixed effects model.

Regarding to the model 2, even though the Durbin-Watson test, which has a $d_{L,0.05}$ equal to 1.010, suggests positive first-order autocorrelation, we are not using statistical inference from coefficients’ standard errors *per se* neither statistical hypothesis testing. Moreover, when based on 1000 replications using the “wild” bootstrap technique for the strategy coefficient (point estimate 0.523) of model 2, it is reassured that the p-value is significant at 0.1% (p-value = 0.000) and the 95% confidence intervals range from 0.262 to 0.765. The White’s test, which has a p-value equal to 0.078, indicates that heteroskedasticity is not present.

As expected, the coefficient of strategy in both models is positive and significant at least 1%. This high significance and the Pearson correlation ($r = 0.748$) suggest a strong positive relationship between turnover and strategy. Graphically, this association is shown by the exponential regression line, which is significant at 5%, in Figure 9.

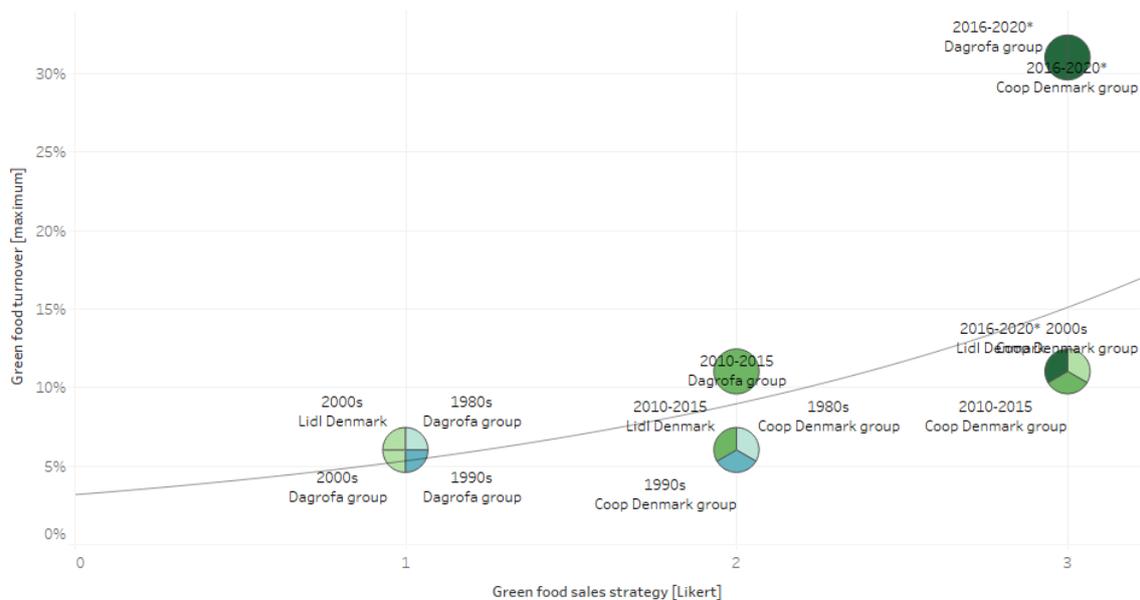


Figure 9 – Impact of major retailers’ green food sales strategy on green food turnover in Denmark, 1980s-2020

*Respondents’ expectation, as the data were gathered in 2016.

Source: compiled from the questionnaire answers of Coop Denmark group’s CSR director, Dagrofa group’s CEO, Lidl Denmark’s CSR manager, and Fairtrade Denmark’s director.

From the model 2 portrayed in Figure 9, we infer the positive impact of retailers’ green food sales strategy on green food turnover. In other words, grocery retailers’ green food turnover exponentially grows as their green food sales strategies progress towards eco-strategizing.

3.4 Discussion

In general, there is an upward trend for the green food market in Denmark, in Europe, and in the world. Notwithstanding, these markets are co-evolving over time when considering

their magnitude of green food sales. Also, the Danish is evolving faster than the European and world markets, according to the average annual growth rate from 2004.

According to the perspective of the grocery retailers and market support stakeholder interviewed, the Danish upward trend is expected to continue growing until 2020. Nevertheless, “until the introduction of the [Denmark’s] national organic label in 1990, we only saw slow growth” (Coop Denmark group’s CSR director).

Even though the Danish green food market is a tiny share of the European and world markets, Denmark is one of the leading countries worldwide regarding green food consumption. Concerning the organic food consumption, Denmark is leading since 1997 (WILLER; YUSSEFI, 2000).

We found that in Denmark the grocery retail sector is the driver of the sales of the green food products. The Danish green food market reached a high level of concentration focusing the green food sales on retailers. “Their role is absolutely essential, it is only through major food retailers that we obtain interesting volumes” (Fairtrade Denmark’s director). Further, the Danish organic market is one of the most concentrated in Europe when the participation in sales channel is examined (KILCHER et al., 2011).

The dominant sales trend by retailers emerged at least since 2005 when store-based retail groups in Denmark were already the main way to commercialize organic food (DENMARK, 2006). Retailers “are the main sales outlet for products and hence a key player when it comes to allocating shelf space to an increasing number of Fairtrade products” (Fairtrade Denmark’s director), and, more comprehensively, green food products. Also, according to the Fairtrade Denmark’s director, retailers market, promote, and overall communicate the green food products whether in the store, online or offline.

We found in the period 2004-2015 that supermarkets were the primary driver of organic sales within the Danish retail channel. Nevertheless, discount stores increased its market share significantly over the recent years and started to lead alongside supermarkets the organic food sales in Denmark.

Taking into consideration the vast internet diffusion and the emergence of food e-commerce in Denmark (AASTRUP et al., 2010), it is understandable that major retail groups, especially Coop, are growing their organic food sales over the internet. Thereby, it seems to be a very prominent sales driver for the near future in Denmark. Still, embodied predominantly by major retail groups, as the early sales were made by specialized organic internet dealers.

“Actively promoting” green food products in Denmark during the 1980s and the 1990s, Coop Denmark group was “proactive” strategizing by using a greener retail business model.

According to the Coop Denmark group's CSR director, it took several years after Coop's introduction of organic products in 1981, before it became a success in the 1990s.

The structures and mechanisms of Coop's new business model were primarily connecting the supplier interface (diversity in the organic food supply) with the customer interface (visibility of the organic food assortments), in order, mainly, to create, deliver and capture value from the commercialization of organic food products. This new greener business model was replicated throughout the Danish grocery retail sector.

Interpreting these changes from a dynamic capabilities perspective, (TEECE, 2007, 2014), in the 1980s, the Danish green food market was "sensed" and "seized" by the Coop Denmark group. The first "transformation" of the green food market happened at the beginning of the 1990s by Coop Denmark group's strategizing in collaboration with Danish organic food producers.

Our finds suggest that Coop Denmark group's competitive advantage measured by its performance and competitiveness in the green food market materialized between the 1990s and the 2000s, as expected by its earlier "green efforts" to create a greener food market in Denmark. Also, Coop's organic products assortment enlargement and price reduction policies (HINDHORG, 2008) came from its proactive strategizing towards more green food sales.

In the period 1980s-2000s, Dagrofa group's strategizing did not focus on the greening of the Danish food market but rather on just "making available" green food products. According to Dagrofa group's CEO, in this period, its green demands on suppliers were low and its green product range was very small and from recognized brands. Thereby, Dagrofa was strategizing reactively by using its ordinary capabilities with a conventional retail business model. Concerning Lidl Denmark, its first stores did open only in 2005.

The second transformation of the Danish green food market came about in 2005 by the strategic movement of the market support stakeholder Organic Denmark in a "co-venture" with the Dansk Supermarked group and Danish specialized organic food producers (NORDEN, 2005; HINDHORG, 2008). According to the Fairtrade Denmark's director, "a breakthrough [took place] in 2005-2006 when substantial shelf-space was allocated, triggering an increased demand. From that point on both assortment and visibility [of green food products, especially Fairtrade products,] has grown tremendously". Dansk Supermarked group's proactive strategizing galvanized the second generation of the Danish greener retail business model, which emerged from that co-venturing. Also, Dansk Supermarked's dynamic capabilities

“sensed”, “seized” and “transformed” timely its business model to leverage the Danish green food market.

We found that, from the mid-2000s to 2015, Coop Denmark group in collaboration with the market support stakeholder Organic Denmark and Fairtrade Denmark took a core role in the evolution of the Danish green food market. Also, Dansk Supermarked group and REMA 1000 Denmark had a noteworthy acting on the greening of the Danish food market in this period. However, Dagrofa, Lidl Denmark and Aldi Denmark still were marginal to the market development in Denmark.

During the period 2005-2015, we did not identify a significant change in the second generation of retailers’ greener business models in Denmark, except the fact that retailers’ strategizing became more transparent towards sustainability science-based. From 2010-2015, the overall green food market development in Denmark, according to the Fairtrade Denmark’s director, has occurred through the upstream actors, namely food producers and food and packaging industries, which are mostly following demand from retailers, and through the downstream actors, namely retailers and consumers, which are core to ongoing building the market.

Our results indicate that the third transformation of the Danish green food market is expected to take place in the following years (2016-2020) by one of the main retail groups in Denmark, namely Coop Denmark, Dansk Supermarked, or REMA 1000 Denmark. Most likely it is going to come from the integration of a “preemptive” eco-strategizing and the use of “green” dynamic capabilities to design and deploy a green business model, where green food sales are considered as a “corporate competitive strategy”. Accordingly, this third generation of retail business models is already in development [e.g. (COOP, 2017b), and Dagrofa group’s CEO questionnaire answers].

From 2016, Coop Denmark group has been (re)sensing and (re)seizing the Danish green food market to (re)transform it again until 2020. Coop Denmark group’s eco-strategizing is carrying on an “extra” enlargement of the organic products assortment (including range expansion across stores and geographically) and price reduction (a total of €134,3 mn in five years) policies, and co-venturing with market support stakeholders (Organic Denmark, Fairtrade) and organic and fair-trade food suppliers to further develop green food products (COOP, 2017a). In 2016, Coop Denmark group tried for two weeks this third generation of business model through the campaign “2020 Denmark twice as organic” (COOP, 2017b). In this experiment with market price reductions and awareness campaigns, Coop Denmark group managed to double the organic food sales.

Also from 2016, Dagrofa group, according to its CEO, expects to fine-tune its “green activities” with the green food market development in Denmark. That is, launching more brands and expanding product ranges; setting large focus on green products’ campaigns, on marketing and promotion, and on store innovation; marketing more brands and having 300 SKU’s; enlarging green demands on suppliers; and growing partnerships with suppliers and other stakeholders for green market making. As a result, Dagrofa’s business model will be designed to provide “green” competitive advantage on the Danish green food market.

Ultimately, from a sectoral viewpoint, the convergence of retailers’ strategic interest on green food sales implies that environmental sustainability has moved from being peripheric to becoming a core business case among grocery retail firms in Denmark. The convergence of retailers to eco-strategizing on the green food market indicates homogeneity within the Danish retail sector towards eco-strategizing on the green food market. The models of the impact of retailers’ green food sales strategy on green food turnover show that grocery retail firm’s eco-strategizing is essential to sustain “green” competitive advantage on the greening of the food market in Denmark.

3.5 Conclusions

We confirmed that the path of the greening of the food market in Denmark shows an upward trend throughout the period 2004-2015, which was measured by the green food retail sales. We further corroborated this greening path by the increasing of the major grocery retail firms’ green food turnover in Denmark. Also, it indicates that green food products are a necessary retail business case to Coop Denmark group and Dansk Supermarked group. Dagrofa group, REMA 1000 Denmark, Lidl Denmark, and Aldi Denmark are way behind in the Danish green food market, but this may be about to change though.

We confirmed that retailers in Denmark are by far the chosen channel for green food sales in the recent years. We identified that large retail groups, especially Coop Denmark and Dansk Supermarked, have been key players on the greening of the Danish food market. Also, the major retail groups in Denmark have been acting in collaboration with market support stakeholders (Organic Denmark and Fairtrade Denmark) and organic food producers to the green food market development. Accordingly, in Denmark, the green food market and grocery retailers’ strategizing co-evolved.

Fundamentally, the major retail groups have been sensing, seizing and transforming the green food market in Denmark. Also, these groups have been managing to pull in the complementary assets among market support stakeholders and food producers to develop the Danish green food market. Furthermore, we understand that it is relevant to further study along the value chain of the Danish green food market from an evolutionary perspective, highlighting the respective roles of the different players and phases of this market.

We found that the green food sales strategies exploited by grocery retailers in Denmark have been evolving from just making available or actively promoting green food products to considering green food sales as a corporate competitive strategy, which is, in our definition, “preemptive” eco-strategizing. Also, it indicates that strategizing increases retailers’ green food turnover.

Following retail firms’ homogeneity within the Danish grocery sector, we identified convergence of those retailers’ green food sales strategies that they have been exploiting over time. We infer that this convergence one way or the other is leading to changes in retailers’ capabilities building and business models developments in the Danish green food market. Consequently, we identified two generations of greener retail business models that have been changing the Danish grocery sector environment. Also, we provided some features of the third generation of green business models that are about to leverage the Danish green food market to a whole new level, and again change the environment of the grocery sector in Denmark.

From these findings, we conclude that green food is a business case in Denmark. Except for some players, the competition on the Danish green food market has been impacting retailers’ green performance and green competitiveness over time. Further, few grocery retail firms in Denmark have a “truly” green competitive advantage and are competing on green food products at the level of green business models.

Therefore, we deduce that major retail groups in Denmark are greening their food markets by strategizing towards environmental sustainability, which in turn is entailing changes to their business models. When it comes to eco-innovation of firms, the large retail players in Denmark are clearly “green” pioneering the developments of the green food market among other international powerful players.

Acknowledgements

Marcelo Fernando Mazzero acknowledges the funding from the CAPES Foundation, Ministry of Education of Brazil, by the scholarships throughout his PhD studies, especially the scholarship BEX 3754/15-4 related to the internship period from 01/08/2015 to 31/07/2016 at

the department of Management Engineering, Technical University of Denmark. He also thanks the DTU Management Engineering's Technology and Innovation Management division for had hosted me during this period of study abroad. The authors are grateful to the case retailers and market support stakeholders for their time, shared knowledge and rich insights.

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Appendix 3.A

Preliminary case study protocol (2015)

1 Introduction

The following case study protocol for the proposed study is essentially an explanatory research and uses the multiple-case study method for the in-depth explanation of the contemporary phenomena. Moreover, the study is a qualitative research in nature, but with quantitative data analysis.

2 Procedures and script of topics

The procedures for implementation of the field research part is divided into three stages. Some procedures are described below.

The first stage corresponds to the use of secondary sources for the preparation of a dossier of the following targeted retail firms:

- Brazil: Walmart Brazil, Carrefour Brazil, and Pão de Açúcar (GPA)
- Denmark: Coop Danmark, Dansk Supermarked, and DAGROFA

Furthermore, the first stage will use the targeted retail firms' sustainability reports, the information available on their institutional website, and all other available documents.

The second stage is subdivided into two phases. The first phase refers to the preparation of the questionnaire from the dossiers and its implementation in an online platform. In fact, a previous step includes the identification of the level of the green food market in the targeted retail firms. For example, let say that in one retail we might have a whole division to deal with the green food market and in another, only one person. It is because the targeted retailers' internal structure it is not disclosed.

Still, in the first phase, an invitation to answer the questionnaire will be made by telephone to retailers' employee that would be responsible for defining strategies or managing their green food market. The application of the online questionnaire will be conducted in English. Here, the surveyed employee's consent is implicitly by answering the questionnaire. Moreover, the questionnaire will be implemented on an online research platform, and it will be available for at least one week.

The second phase concerns the preparation of a semi-structured interview guide based on all data previously obtained, and the implementation of the interview in each company headquarters. Indeed, in this second phase a personal interview will be conducted in English in Denmark, and in Portuguese in Brazil.

Also, a new invitation for the same employee who has completed the online questionnaire to participate in the interview that will be scheduled. The interview may last up to two hours, and it will be recorded (audio) with the interviewee's oral consent. Also, we will follow the universities ethics committee recommendations, but not being restricted by it; and will maintain the confidentiality of the data obtained.

We plan to interview per month, given the need for transcription of the audio's most important parts and for writing the report of it. Once the individual reports are done, they will be submitted to the ratification of the interviewee.

The reporting format adopted here for a transcription of the embedded units of analysis is question-and-answer. Furthermore, the cross-cases reports composition structure will be in a linear-analytic fashion.

The third stage relates to the preparation of all data collected and the analysis of it. In fact, this third stage of the field research concerns of the examination, categorization and tabulation of the evidence obtained through the application of questionnaires and interviews to retailers' employees; and the analysis of these data through a computational tool.

Finally, the Figure 4.A.1 shows the multiple-case study parts (define and design; prepare, collect and analyze; analyze and conclude), and some processes/procedures (develop thesis; select cases; design data collection protocol; conduct cases studies; write reports; draw cross-case conclusions; modify thesis; develop policy implications; just to name a few) of the entire research.

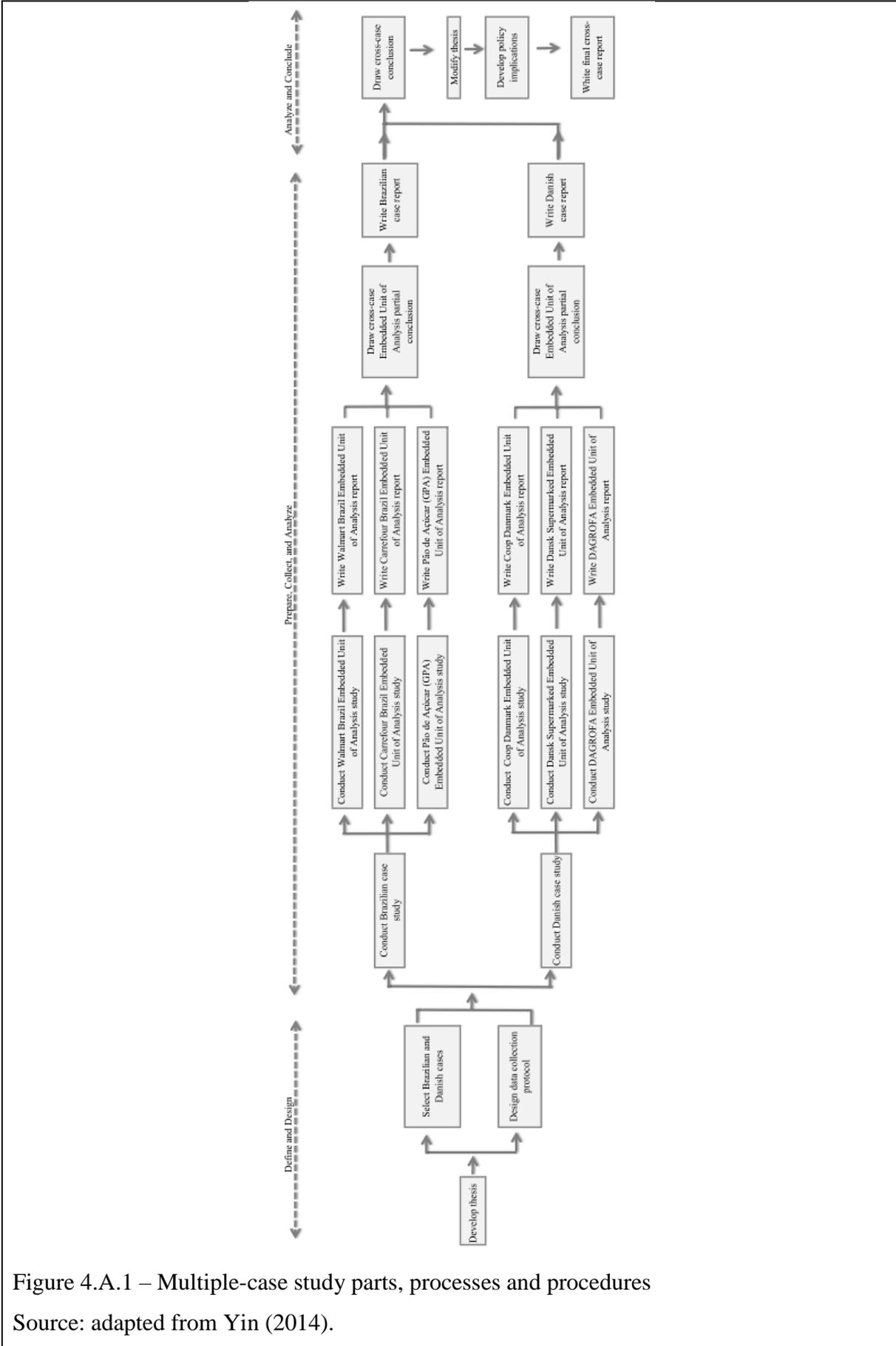


Figure 4.A.1 – Multiple-case study parts, processes and procedures

Source: adapted from Yin (2014).

The preliminary script of topics to be addressed in the questionnaires and interview guides follow:

- Categories: organic foods; other green foods; and conventional foods
 - Food product lines certified or non-certified
 - Monthly or annual turnover (revenue, number of units) of the categories; average profit margin of the categories; listing of the predominant types of eco-innovation related to the categories
- Retailer's strategy in the appropriation of eco-innovations value
 - General features (definition, key actors, incentives, barriers, competitors, trends) of strategies adopted for the categories; planning dates and implementation of these strategies; expected and achieved results for these strategies
- Retailer history in green food products marketing maker
 - General features (definition, key actors, incentives, barriers, competitors, trends) of the entry time on the market, if possible with dates related to it
- Retailer market share
 - The company market-share and the categories market-share
- Retailer's business models related to eco-innovations
 - General features (definition, motivation, competitive implications); organizational and strategic change, if possible with dates related to the change and implementation of it; expected and achieved results for these change and implementations

References

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Appendix 3.B

Interview guide for retailers in Denmark

1 Brief introduction¹

Market Evolution, Eco-Strategizing and Green Competitiveness
in the Grocery Retail Sector

Marcelo F. Mazzero

Guest PhD student, marmaz@dtu.dk, 71 38 69 40

Maj Munch Andersen

Senior Researcher, mmua@dtu.dk, 45 25 45 32

Sílvia H. Galvão de Miranda

Associate Professor, shgdmira@usp.br

Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food² products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions for your company's eco-strategizing³ and green competitiveness, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the strategic interests and competitive implications for the Brazilian and Danish grocery sector.

2 Questions

2.1 Strategic interest

Q2.1.1 When and to what degree has the promotion of green food products become interesting for your company in Denmark (and internationally) over time⁴?

Q2.1.2 What is the strategic importance of your company's green branding⁵ activities over time?

Q2.1.3 Where did the inspiration and knowledge for your company engaging in these green activities⁶ come from?

2.2 Market maturity

Q2.2.1 How well-functioning do you estimate your company's local (and international) green food market is over time?

Q2.2.2 How well do you estimate your company's green food products local (and international) market-share has developed over time?

2.3 Competitiveness

Q2.3.1 How profitable do you estimate the green food market has been to your company over time?

Q2.3.2 How do you estimate your company's return of investment on the green food market has developed over time?

Q2.3.3 How has your company been performing on the green food market relative to your competitors over time?

Q2.3.4 Please identify the main incentives and barriers for your company's eco-strategizing on the green food market over time.

2.4 Overall dynamics and trends

Q2.4.1 What role have the different key actors⁷ in the food value chain been playing in the creation and development of your company's green food market over time?

Q2.4.2 How do you see the trends and dynamics of your company's local (and international) green food market development as opposed to markets abroad (Brazil, EU, USA)?

¹For further info, please see the one-page PhD research description.

²Green food is understood broadly and includes sustainable, environmentally-friendly and responsible food products.

³Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.

⁴By over time we mean the time periods: 1980's, 1990's, 2000's, 2010-2015, and when applicable "Next 5 years".

⁵Green branding is understood by the development process of a strong environmental corporate image towards all stakeholders.

⁶By green activities we refer to eco-strategizing, green food sales and specific eco-innovation activities. Eco-innovation is a type of innovation which aim at and/or result in environmental gain, and it covers technical, organizational and marketing innovations.

⁷Please consider the upstream (food producers, food and packaging industries etc.) and downstream key actors (consumers, catering, public sector, NGOs etc.).

Appendix 3.C

Interview guide for market support stakeholders in Denmark

1 Brief introduction¹

Market Evolution and Green Competitiveness of Green Food Products

Marcelo F. Mazzero

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Maj Munch Andersen

Senior Researcher, mmua@dtu.dk, 45 25 45 32

Sílvia H. Galvão de Miranda

Associate Professor, shgdmira@usp.br

Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food² products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions on retailers' eco-strategizing³ and green competitiveness in selling your organization's green food products, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the business case and competitive implications for the Brazilian and Danish grocery sector.

2 Questions

2.1 Business case

Q2.1.1 When and to what degree has the promotion of green food products become interesting for your organization in Denmark (and internationally) over time⁴?

Q2.1.2 What is your organization's perspective on the role played by local retailers in selling green food products over time?

Q2.1.3 When has your organization's green food products experienced a breakthrough acceptance among local retailers? Were Danish retailers laggards or pioneers?

2.2 Market maturity

Q2.2.1 How well-functioning do you estimate your organization's local and international green food market is over time?

Q2.2.2 How well do you estimate your organization's green food products local market-share has developed over time?

2.3 Competitiveness

Q2.3.1 What segments of your organization's green food products do you estimate retailers have been demanding most over time? How much?

Q2.3.2 Please identify the main incentives and barriers for your organization's green food products over time.

2.4 Overall dynamics and trends

Q2.4.1 What role have the different key actors⁵ in the food value chain been playing in the creation and development of your organization's green food market over time?

Q2.4.2 How do you see the trends and dynamics of your organization's local green food market development as opposed to markets abroad (Brazil, EU, USA)?

¹For further info, please see the one-page PhD research description.

²Green food is understood broadly and includes sustainable, environmentally-friendly and responsible food products.

³Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.

⁴By over time we mean the time periods: 1980's, 1990's, 2000's, 2010-2015, and when applicable "Next 5 years".

⁵Please consider the upstream (food producers, food and packaging industries, retailers etc.) and downstream key actors (consumers, catering, public sector, NGOs etc.).

Appendix 3.D

Online questionnaire for retailers in Denmark

Introduction

Market Evolution, Eco-Strategizing and Green Competitiveness in the Grocery Retail Sector

Marcelo F. Mazzero

Guest PhD student, marmaz@dtu.dk, 71 38 69 40

Maj Munch Andersen

Senior Researcher, mmua@dtu.dk, 45 25 45 32

Sílvia H. Galvão de Miranda

Associate Professor, shgdmira@usp.br

Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions for your company's eco-strategizing* and green competitiveness, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the strategic interests and competitive implications for the Brazilian and Danish grocery sector.

**Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.*

For further info, please see the 1-page PhD research description.

Table of Contents

1 Strategizing, Market Maturity and Sales (7 questions)

2 Competitiveness and Business Model Impact (2 questions)

Notice: please specify your answers at the best of your knowledge. If you have any doubts, do not hesitate to contact us by telephone (71 38 69 40) or email (marmaz@dtu.dk). You are welcome to complete the questionnaire in 1 week. Your answers will hold secure during this period.

Starting off

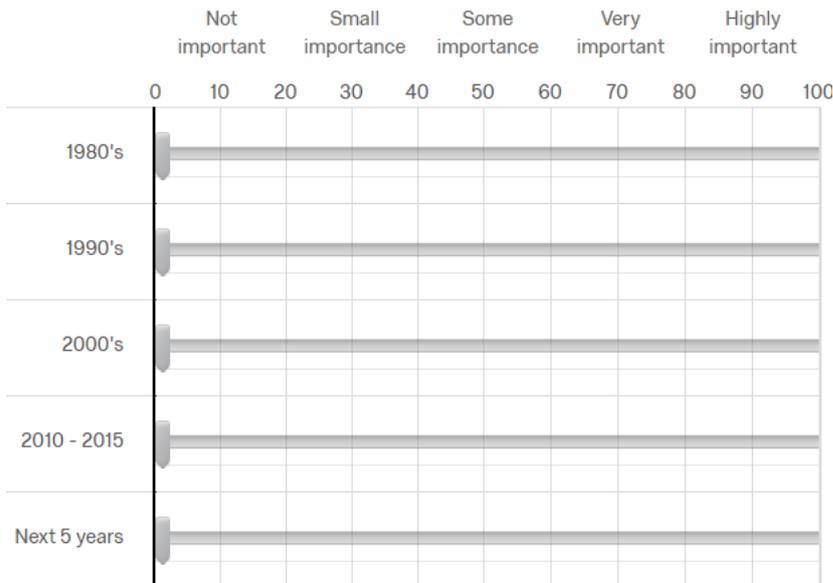
Please fill in the following required information:

Company's name:
 Your full name:
 Your position:
 Employee since (year):
 Email:
 Telephone:

1 Strategizing, Market Maturity and Sales

Q1.1 What is the strategic importance of your company's green food sales over time?

Green food is understood broadly and includes sustainable, environmentally-friendly and responsible food products.



Further data comments/explanations:

Q1.2 Which issues do you estimate have been determining your company's green food sales?

	Environment	Health	Animal Welfare	Local	Taste and quality	Social	Other
1980's	<input type="checkbox"/>						
1990's	<input type="checkbox"/>						
2000's	<input type="checkbox"/>						
2010 - 2015	<input type="checkbox"/>						
Next 5 years	<input type="checkbox"/>						

Further data comments/explanations:

Q1.3 What segments of your company's green food market do you estimate have been functioning best (5), and what segments worst (1)?

	Bread and cereals					Fish and seafood					Fruits and vegetables					Meat					Milk, cheese and eggs				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>																								
1990's	<input type="radio"/>																								
2000's	<input type="radio"/>																								
2010 - 2015	<input type="radio"/>																								
Next 5 years	<input type="radio"/>																								

	Sugar, jam, honey, chocolate and confectionery					Fats and oils					Tea and coffee					Spices					Ready meals				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q1.4 Which strategy do you estimate have been adopted by your company towards promoting green food sales?

Corporate competitive strategy implies that green food sales is explicitly considered as a source of competitive advantage on top-level management.

	Just making available	Actively promote	Corporate competitive strategy
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q1.5 Please state when and how your company's key green activities have taken place, and estimate which of these have been most demanding and/or costly.

By green activities we refer to eco-strategizing, promoting green food products/sales and specific eco-innovation activities. Eco-innovation is a type of innovation which aim at and/or result in environmental gain, and it covers technical, organizational and marketing innovations.

	Green activities		
	Green product range (how many, decisions, effects)	Green products' campaigns (bonus, price and other types)	Marketing and promotion (efforts, new ways/channels)
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Green activities		
	Store innovation (new concepts, design)	Use of private (own) and other labels (organic, fairtrade etc.)	Choice editing of products
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Green activities	
	Green demands on suppliers	Partnerships with suppliers and other stakeholders for green market making
1980's	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>

Further data comments/explanations:

Q1.6 Please estimate how many percent of the different types of green food products your company has sold?

	Core eco-labelled products (organic and fairtrade)						Private (own) green label products						Other eco-labelled products (Swan, MSC, carbon footprint etc.)					
	Up to 5%	6%-10%	11%-30%	31%-50%	51%-75%	More than 75%	Up to 5%	6%-10%	11%-30%	31%-50%	51%-75%	More than 75%	Up to 5%	6%-10%	11%-30%	31%-50%	51%-75%	More than 75%
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q1.7 How much have the green food products represented in your company's annual turnover?

	Up to 5%	6% - 10%	11% - 30%	31% - 50%	51% - 75%	More than 75%
1980's	<input type="radio"/>					
1990's	<input type="radio"/>					
2000's	<input type="radio"/>					
2010 - 2015	<input type="radio"/>					
Next 5 years	<input type="radio"/>					

Further data comments/explanations:

2 Competitiveness and Business Model Impact

Q2.1 What segments of the green food market do you estimate your company has been profiting best (5), and what segments worst (1)?

	Bread and cereals					Fish and seafood					Fruits and vegetables					Meat					Milk, cheese and eggs				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>																								
1990's	<input type="radio"/>																								
2000's	<input type="radio"/>																								
2010 - 2015	<input type="radio"/>																								

	Sugar, jam, honey, chocolate and confectionery					Fats and oils					Tea and coffee					Spices					Ready meals				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q2.2 How has your company's business model been changing concerning the local (and international) green food market?

Business model is understood as the description of structures and mechanisms employed by the company to enhance its value proposition and to create, delivery and capture value through customer, supplier and other stakeholder relationship management.

	Business model		
	Internally	Customer interface	Supplier interface
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>

Further data comments/explanations:

Appendix 3.E

Online questionnaire for market support stakeholders in Denmark (Pilot)

Introduction

Market Evolution and Green Competitiveness of Green Food Products

Marcelo F. Mazzero

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Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions on retailers' eco-strategizing* and green competitiveness in selling your organization's green food products, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the business case and competitive implications for the Brazilian and Danish grocery sector.

**Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.*

For further info, please see the 1-page PhD research description.

Table of Contents

1 Business Case (6 questions)

2 Market Maturity and Sales (4 questions)

3 Competitiveness and Business Model Impact (6 questions)

4 Overall Dynamics and Trends (3 questions)

Notice: please specify your answers at the best of your knowledge. If you have any doubts, do not hesitate to contact us by telephone (71 38 69 40) or email (marmaz@dtu.dk). You are welcome to complete the questionnaire in 1 week. Your answers will hold secure.

	Rema 1000			Aldi			Lidl		
	Poorly	Adequately	Well	Poorly	Adequately	Well	Poorly	Adequately	Well
1980's	<input type="radio"/>								
1990's	<input type="radio"/>								
2000's	<input type="radio"/>								
2010 - 2015	<input type="radio"/>								
Next 5 years	<input type="radio"/>								

Further data comments/explanations:

Q1.5 To what degree do you estimate your organization has been attempting to influence retailers' eco-strategizing on the green food market?

Retailers' eco-strategizing means the process of (retailers) purposely adopting environmental sustainability into (their) corporate strategy.

	Coop Danmark			Dansk Supermarked			Dagrofa		
	A little	Some	A lot	A little	Some	A lot	A little	Some	A lot
1980's	<input type="radio"/>								
1990's	<input type="radio"/>								
2000's	<input type="radio"/>								
2010 - 2015	<input type="radio"/>								
Next 5 years	<input type="radio"/>								

	Rema 1000			Aldi			Lidl		
	A little	Some	A lot	A little	Some	A lot	A little	Some	A lot
1980's	<input type="radio"/>								
1990's	<input type="radio"/>								
2000's	<input type="radio"/>								
2010 - 2015	<input type="radio"/>								
Next 5 years	<input type="radio"/>								

Further data comments/explanations:

Q1.6 Which strategy do you estimate have been adopted by retailers towards promoting your organization's green food products sales?

Corporate competitive strategy implies that green food sales are explicitly considered as a source of competitive advantage on top-level management.

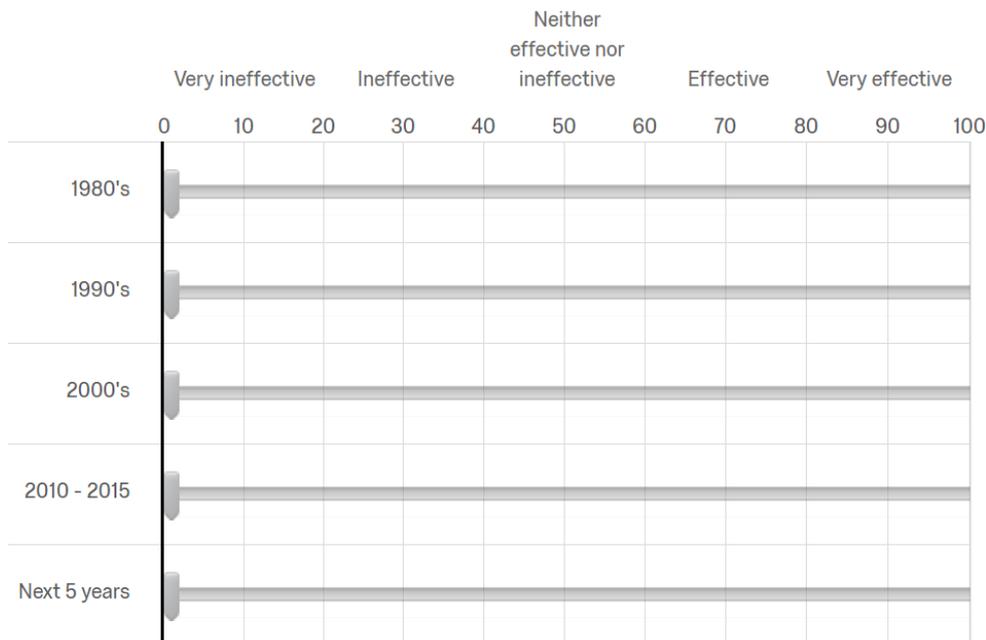
	Coop Danmark			Dansk Supermarked			Dagrofa		
	Making available	Actively promote	Corporate competitive strategy	Making available	Actively promote	Corporate competitive strategy	Making available	Actively promote	Corporate competitive strategy
1980's	●	●	●	●	●	●	●	●	●
1990's	●	●	●	●	●	●	●	●	●
2000's	●	●	●	●	●	●	●	●	●
2010 - 2015	●	●	●	●	●	●	●	●	●
Next 5 years	●	●	●	●	●	●	●	●	●

	Rema 1000			Aldi			Lidl		
	Making available	Actively promote	Corporate competitive strategy	Making available	Actively promote	Corporate competitive strategy	Making available	Actively promote	Corporate competitive strategy
1980's	●	●	●	●	●	●	●	●	●
1990's	●	●	●	●	●	●	●	●	●
2000's	●	●	●	●	●	●	●	●	●
2010 - 2015	●	●	●	●	●	●	●	●	●
Next 5 years	●	●	●	●	●	●	●	●	●

Further data comments/explanations:

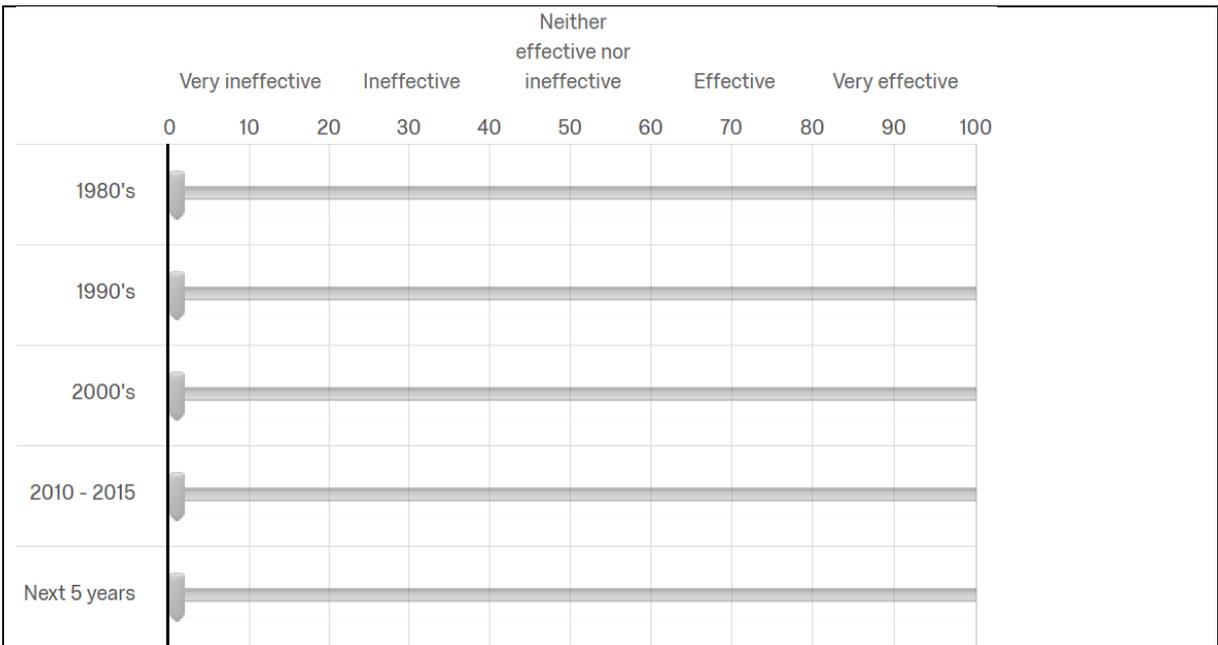
2Market Maturity and Sales

Q2.1 How well-functioning do you estimate your organization's local green food market is?



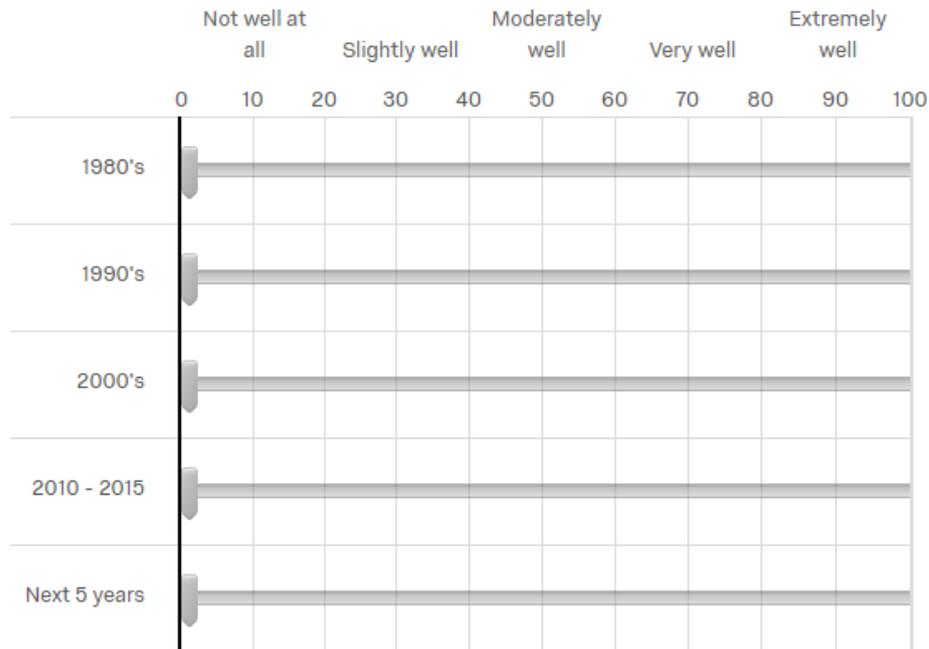
Further data comments/explanations:

Q2.2 How well-functioning do you estimate your organization's international green food market is?



Further data comments/explanations:

Q2.3 How well do you estimate your organization's green food products local market-share has developed?



Further data comments/explanations:

Q2.4 How much do you estimate your organization's green food products have represented in the retailers' annual turnover?

	Coop Danmark						Dansk Supermarked						Dagrofa					
	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%
	1980's	<input type="radio"/>																
1990's	<input type="radio"/>																	
2000's	<input type="radio"/>																	
2010 - 2015	<input type="radio"/>																	
Next 5 years	<input type="radio"/>																	

	Rema 1000						Aldi						Lidl					
	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%
	1980's	<input type="radio"/>																
1990's	<input type="radio"/>																	
2000's	<input type="radio"/>																	
2010 - 2015	<input type="radio"/>																	
Next 5 years	<input type="radio"/>																	

Further data comments/explanations:

3 Competitiveness and Business Model Impact

Q3.1 What segments of your organization's green food products do you estimate have been profiting best (5), and what segments worst (1)?

	Bread and cereals					Fish and seafood					Fruits and vegetables					Meat					Milk, cheese and eggs				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>																								
1990's	<input type="radio"/>																								
2000's	<input type="radio"/>																								
2010 - 2015	<input type="radio"/>																								
Next 5 years	<input type="radio"/>																								

	Sugar, jam, honey, chocolate and confectionery					Fats and oils					Spices					Tea and coffee				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q3.2 What segments of your organization's green food products do you estimate retailers have been demanding most?

	Coop Danmark	How much? (C)	Dansk Supermarked	How much? (DS)
		%		%
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Dagrofa	How much? (D)	Rema 1000	How much? (R1)
		%		%
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

	Aldi	How much? (A)	Lidl	How much? (L)
		%		%
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Further data comments/explanations:

Q3.3 How profitable do you estimate your organization's green food products have been to the referred retailers?

	Coop Danmark					Dansk Supermarked					Dagrofa				
	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good
1980's	<input type="radio"/>														
1990's	<input type="radio"/>														
2000's	<input type="radio"/>														
2010 - 2015	<input type="radio"/>														
Next 5 years	<input type="radio"/>														

	Rema 1000					Aldi					Lidl				
	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good
1980's	<input type="radio"/>														
1990's	<input type="radio"/>														
2000's	<input type="radio"/>														
2010 - 2015	<input type="radio"/>														
Next 5 years	<input type="radio"/>														

Further data comments/explanations:

Q3.4 How has your organization’s business model changed concerning the local green food market?

Business model is understood as the description of structures and mechanisms employed by the company to enhance its value proposition and to create, delivery and capture value through customer, supplier and other stakeholder relationship management.

	Business Model		
	Internally	Customer interface	Supplier interface
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>

Further data comments/explanations:

Q3.5 How have your organization’s retailers been performing on the green food market relative to their competitors?

	Coop Danmark					Dansk Supermarked					Dagrofa				
	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good
1980's	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1990's	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2000's	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2010 - 2015	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

	Rema 1000					Aldi					Lidl				
	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good
1980's	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
1990's	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2000's	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2010 - 2015	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Further data comments/explanations:

Q3.6 Please identify the main incentives and barriers for your organization’s green food products.

	Green food products	
	Incentives	Barriers
1980's		
1990's		
2000's		
2010 - 2015		
Next 5 years		

Further data comments/explanations:

4 Overall Dynamics and Trends

Q4.1 Which agenda do you estimate have been pursued by retailers towards promoting your organization's green food products sales?

	Agenda's issues						
	Social	Environment	Health	Animal Welfare	Local	Taste and quality	Other
1980's	<input type="checkbox"/>						
1990's	<input type="checkbox"/>						
2000's	<input type="checkbox"/>						
2010 - 2015	<input type="checkbox"/>						
Next 5 years	<input type="checkbox"/>						

Further data comments/explanations:

Q4.2 What role have the different key actors in the food value chain been playing in the creation and development of your organization's green food market?

	Market development	
	Upstream key actors (food producers, food and packaging industries etc.)	Downstream key actors (retailers, consumers, catering, public sector, NGOs etc.)
Before 1980		
1980's		
2000's		
2010 - 2015		
Next 5 years		

Further data comments/explanations:

Q4.3 How do you see the trends and dynamics of your organization's local green food market development as opposed to markets abroad (Brazil, EU, USA)?

4 The evolution of retailers' eco-strategizing and green competitiveness in the Brazilian grocery sector

Abstract

In the context of the greening of the economy, this paper investigates the neglected demand side by analysing the rise of the greening of markets. We focus on the food market, where green products are relatively expensive compared to their conventional counterparts. We explore the Brazilian market as a case. Grounded by an evolutionary approach to environmental sustainability, we use the dynamic capabilities framework as well as a novel set of indicators in three broad dimensions (macro, meso and micro), according to the level of detail reached by the data gathered from primary and secondary sources. We seek to analyse the co-evolution of the major grocery retail firms' strategizing on the one hand and the green food market on the other for the period 1980s-2020. Our findings corroborate the greening path in Brazil by the over time increasing of the major grocery retail firms' green food turnover and market share of organic food sales. A key finding in the recent years is that large retail groups have been catalyzing few important eco-innovations and "green activities" to facilitate the green market emergence in Brazil. Sectorally, we find that grocery retailers' green food turnover grows as their green food sales strategies progress towards eco-strategizing. Other actors, notably specialized organic food producers and market support stakeholders have also played important roles in the Brazilian green food market development. Despite retail firms' heterogeneity within the Brazilian grocery sector, we identify convergence of retailers' strategizing on the green food market in Brazil. We also identify two generations of greener retail business models in the Brazilian grocery sector. Even though green food sales are still marginal worldwide, grocery retailers in Brazil are starting to compete on green issues at the level of business models. Overall, the case demonstrates a degree in the greening of the Brazilian economy, emphasizing the important role of grocery retailers on it.

Keywords: Green economy; Green food; Brazil; Green market; Retailers; Eco-innovation; Evolutionary economics; Dynamic capabilities

4.1 Introduction

As the green economy is still in development (UNEP, 2015) and green markets are not yet mature, green business cases are often limited (POTTS et al., 2014; GEORGESON; MASLIN; POESSINOEW, 2017), especially in the retailing sector (UNEP, 2013). Inquiring into the creation of variety and selection related to economic evolution (DOSI, 1982; NELSON; WINTER, 1982; DOSI; NELSON, 1994; DOSI; NELSON; WINTER, 2000) has been neglected in the context of the green economy (ANDERSEN, 1999, 2009, 2012). Comprehending the way this process occurs in the food market adds an understanding on another fundamental part of the dynamics of the greening of economies.

The promotion of sustainable consumption and production agreed at the 2002 World Summit on Sustainable Development was a breakthrough shifting from only focusing on

cleaner production policies to also pursue a more sustainable global consumption and production patterns (ARDEN-CLARKE; FARAH, 2010; UNEP, 2012). The challenge has been to improve the overall environmental performance of products throughout their life-cycle, to boost the demand for greener products and production technologies and to enable consumers in making more sustainable choices (EUROPEAN COMMISSION, 2008; ARDEN-CLARKE; FARAH, 2010).

The greening of the grocery sector is an attractive case because green food⁶ products are generally costlier than conventional ones (OOSTERVEER; GUIVANT; SPAARGAREN, 2007; POTTS et al., 2014). The “extra cost” related to green products (SMITS et al., 2014) reflect, among others, on its market prices, and on its production and consumption levels (UNEP, 2013). Also, the production and consumption of conventional products have been based on markets that exclude environmental externalities on the price formation (KOTLER, 2011; BERGH, 2012; STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012) as production does not account all social and environmental costs related to it (BERGH, 2010).

Many years of marketing green products have not yet reflected in changing the mainstream consumption pattern. Still, sales of organic, Fairtrade and other eco-labelled products are growing faster than their conventional counterparts (SCHMIDT et al., 2009; SMITS et al., 2014; WILLER; LERNOUD, 2017).

We conceptualize green products as those having less impact on the environment than their conventional counterparts, or fair traded, as the latter ordinarily embraces environmental aspects. Here, we enquire into the third-party certified green food products. As several food eco-labels fall into this category but most lacks available data, we chose to focus on organic and Fairtrade food products, which have more accessible data.

When it comes to consumer’s viewpoint, credence products such as green food may be identified by eco-labels, certified by a third-party or not (NUTTAVUTHISIT; THØGERSEN, 2017). Eco-labels such as organic and fair trade are the most well-known among consumers (SCHMIDT et al., 2009; GRUNERT; HIEKE; WILLS, 2014; OOSTERVEER et al., 2014; POTTS et al., 2014).

As “bridge builders” between producers and consumers, retailers have the potential to influence multiple levels of production and consumption behaviours (STYLES; SCHOENBERGER; GALVEZ-MARTOS, 2012) in a manner that no other economic sector has (EVANS; DENNEY, 2009). Retailers can catalyse changes towards sustainable

⁶ If not otherwise stated, “food” means foods and beverages products.

consumption and production patterns through greening its internal operations, influencing their customers' choice to a more sustainable one and pushing their supply chain to comply with greener standards than those currently followed (UNEP, 2006).

The UNEP's operational definition of eco-innovation states that "eco-innovation is the development and application of a business model, shaped by a new business strategy, which incorporates sustainability throughout all business operations based on life cycle thinking and in cooperation with partners across the value chain" (UNEP, 2014b, p. 7). This definition implies that firms may acquire green competitive advantage via a coordinated set of adjustments or original solutions to sustainable products, processes, organisational structure and market approach.

The dynamic capabilities framework may provide firms with a better instrument on how to address changing customer needs, targeting the right markets, and pull in complementary assets from suppliers and partners timely and accordingly (TEECE; PISANO; SHUEN, 1997; PITELIS; TEECE, 2009; TEECE, 2012). Dynamic capabilities are understood as the ability of a organization to purposefully create, extend, or modify its internal and external resource bases to sustain competitive advantage in dynamic markets (TEECE; PISANO; SHUEN, 1997; HELFAT et al., 2007; TEECE, 2014).

Dynamic capabilities are a firm-specific ability to transform static organizational capabilities or to create new ones to meet changes in the environment (WINTER, 2003; TEECE, 2010). Here, we explore the higher-order dynamic capabilities sense, seize and transform to understand how retail firms build business opportunities into viable business cases, following (TEECE, 2007, 2014). Also, we apply the dynamic capabilities framework to explore how retail firms strategize in markets in development where information is lacking, and uncertainty is high, as it is the current situation of the green food market in Brazil.

The Brazilian green food market took shape in the second half of the 1990s when large grocery retailers made organic food products as a business case (ORMOND et al., 2002; BUAINAIN; BATALHA, 2007). Since then, the demand for organic food products has been evolving all over Brazil (OOSTERVEER; GUIVANT; SPAARGAREN, 2007; DALCIN et al., 2014).

During the 2000s, the Brazilian domestic market has become a significant organic consumer at a global level (WILLER; YUSSEFI, 2004; WILLER; LERNOUD, 2017). In 2016, the Brazilian green food sales reached €633.3 million in the domestic market (from our

findings). Even though, the Brazilian domestic market of organic food is still in the initial stage of a mass market formation (WILLER; LERNOUD; KILCHER, 2013).

Furthermore, the green food market in Brazil is idiosyncratic when compared with other markets worldwide, especially the market for organic food products (DALCIN et al., 2014). Firstly, Brazil has a recent organic regulation, which was enacted only in 2011 (DALCIN et al., 2014; DAROLT et al., 2016). Secondly, there is still not well-established brands of organic food, fair trade or other responsible products in the Brazilian green food market (DAROLT, 2017). Lastly, at least since 2003 the Brazilian government has been supporting the production of organic food products to the domestic market and giving preference to direct sales channels of these products, such as organic farmers' market, and public procurement (DAROLT et al., 2016).

While the other sales channels (farmers' markets, online and specialized shops, government procurement) still play an essential role in the development of the organic market in Brazil (DAROLT et al., 2016), we chose to focus the analysis on grocery retailers' role in the development of the market for green food products in Brazil. We understand that retailers have far more scale and scope for green food products than other sales channels, especially when compared to specialised shops and organic farmers' market.

Although grocery retailers (hypermarkets, supermarkets) were not the pioneers in the Brazilian organic food market (ORMOND et al., 2002; WILLER; KILCHER, 2012), grocery retail groups have been playing a key role in the development of the domestic market since the 2000s (GUIVANT, 2003; OOSTERVEER; GUIVANT; SPAARGAREN, 2007; DALCIN et al., 2014). Retailers in Brazil leveraged the turnover of the organic food products by firstly making them available in their shops (ORMOND et al., 2002; GUIVANT, 2003; BUAINAIN; BATALHA, 2007). Since the 2000s, large grocery retail groups have been scaling up the green market (from our findings). Currently, these retail groups still are the major organic food sales channel (ORGANIS, 2017).

In this paper, we focus on the standpoint of major retailers in Brazil on the evolution of the Brazilian green food market, complementing it with the viewpoint of some market support stakeholders. This addition is valuable to compare the view of these two actors (retailers and market support stakeholders) and to identify a better picture of the Brazilian green food market. Further, we investigate how grocery retailers' strategizing towards environmental sustainability have impacted their performance and competitiveness in the Brazilian green food market. We also explore how the Brazilian grocery retail sector has co-evolved with the green food market in Brazil.

4.2 Methodology

This paper builds on longitudinal qualitative and quantitative data collected from interviews and a survey undertaken with the leading Brazilian retail groups and market support stakeholders in 2016-2017. Our analysis focuses on the grocery retail groups in an aggregate way, not individually. Also, additional sales data on organic and Fairtrade eco-labelled food products were gathered from other secondary sources (Table 9).

The period of the longitudinal data varies according to the variable displayed in Table 9 and Table 10. In general, we cover from the 1980s to 2020. Nonetheless, this period is divided into several subperiods: 1980s, 1990s, 2000s, 2010-2015, and 2016-2020. In addition, when the field research was conducted in 2016-2017, the period 2016-2020 was considered as the expectation for “the next five years”.

Table 9 – Variables description gathered from secondary sources

Data collected	Source	Period
<i>Green food retail sales in Brazil</i>		
Organic packaged food retail sales [current EUR million]	(EUROMONITOR, 2017a)	2004-2015
Organic food retail sales [current EUR million]	(OOSTERVEER; GUIVANT; SPAARGAREN, 2007)	2004
Organic food retail sales [current USD million]	(IPD, 2011)	2010-2011
Organic food retail sales [current USD million]	(ORGANICS BRASIL, 2013, 2014, 2015, 2016)	2012-2015
Organic food sales [current USD million]	(BUAINAIN; BATALHA, 2007)	2004
Organic food sales [current BRL million]	(IBGE, 2006)	2006
Organic food sales [current EUR million]	(WILLER; LERNOUD, 2014, 2015)	2013-2014
Fairtrade food retail sales [current EUR]	(FLO, 2015, 2016)	2014-2015
<i>Green food retail sales in the BRICS</i>		

Organic packaged food retail sales [current EUR million]	(EUROMONITOR, 2017a)	2002-2015
Fairtrade food retail sales [current EUR]	(FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014)	2004-2015
<i>Green food retail sales in the world</i>		
Organic food retail sales [current USD million]	(WILLER; LERNOUD, 2017)	2005, 2010, 2015
Fairtrade food retail sales [current EUR]	(FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014)	2005, 2010, 2015
<i>Organic food sales in the retail channel</i>		
Organic food sales in retailers [%]	(WILLER; YUSSEFI, 2004; OOSTERVEER; GUIVANT; SPAARGAREN, 2007)	2003
Organic food sales in grocery retailers [%]	(BUAINAIN; BATALHA, 2007)	2004
Organic food sales in supermarkets [%]	(IPD, 2011)	2011
Organic food sales in conventional retailers [%]	(ORGANICS BRASIL, 2013, 2014, 2015, 2016)	2012-2015
<i>Share of the organic food market</i>		
Company's brand shares of organic packaged food [%]	(EUROMONITOR, 2017b)	2012-2015

From Table 9, we point out:

- The organic food retail sales in Brazil in 2005, and 2007-2009 are our estimation. The estimation is based on the (EUROMONITOR, 2017a) time series data and a multiplier (coefficient) of 4.1 derived from the average of time series data gathered from (ORGANICS BRASIL, 2013, 2014, 2015, 2016).
- Although the Latin America countries would be the most suitable to compare with the Brazilian green food market, the lack of market data from these countries is still an issue. Hence, the BRICS countries, Brazil, Russia, India, China and South Africa,

were chosen because of the closest match in an economic perspective, as globally recognized.

- The variable “organic food sales in the retail channel” includes hypermarkets, supermarkets, department stores and mini-markets.
- The data for the organic food sales in other channels was calculated by the difference from the variable “organic food sales in the retail channel”.
- Because there is no available data on the share of each retailer in the green food market, we consider the variable “share of the organic food market” as a proxy of retailer’s market share for organic sales in Brazil⁷.
- Variables with non-euro monetary values were converted to euro using year-over-year exchange rates from (X-RATES, 2017).

Table 10 – Variables description gathered from primary sources for the periods 1980s, 1990s, 2000s, 2010-2015, and 2016-2020

Alias	Data collected	Source
Strategic importance of green food sales	Q1.1 What is the strategic importance of your company’s green food sales over time? 0%–100%	GPA group’s CSR diretor
Green food sales strategy	Q1.4 Which strategy do you estimate have been adopted by your company towards promoting green food sales? 1 – Making available 2 – Actively promote 3 – Corporate competitive strategy	GPA group’s CSR diretor

⁷ For more details on the major retail groups’ brand of organic products in Brazil, please, see Appendix 4.A.

Green food sales strategy	<p>Q2.5 Which strategy do you estimate have been adopted by retailers towards promoting your organization's green food products sales?</p> <p>1 – Making available</p> <p>2 – Actively promote</p> <p>3 – Corporate competitive strategy</p>	Organics Brazil's executive director, and Brazilian Supermarket Association's economics and research manager
Green food turnover	<p>Q1.7 How much have the green food products represented in your company's annual turnover?</p> <p>Up to 5%</p> <p>6%–10%</p> <p>11%–30%</p> <p>31%–50%</p> <p>51%–75%</p> <p>More than 75%</p>	GPA group's CSR director
Green food turnover	<p>Q3.5 How much do you estimate your organization's green food products have represented in the retailers' annual turnover?</p> <p>Up to 5%</p> <p>6%–10%</p> <p>11%–30%</p> <p>31%–50%</p> <p>51%–75%</p> <p>More than 75%</p>	Organics Brazil's executive director, and Brazilian Supermarket Association's economics and research manager
Performance on the green food market relative to main competitors	<p>Q3.5 How have your organisation's retailers been performing on the green food market relative to their competitors?</p> <p>1 – Very poor</p> <p>2 – Poor</p> <p>3 – Fair</p> <p>4 – Good</p> <p>5 – Very good</p>	Organics Brazil's executive director, and Brazilian Supermarket Association's economics and research manager

Note: for further details on interview guides and questionnaires, please refer to the Appendices (4.C-4.F).

We highlight that although a couple of variables in Table 10 are Likert-type of data, the empirical literature supports the use of parametric statistics with Likert-type scale (CARIFIO; PERLA, 2008; NORMAN, 2010; COWELL; FLACHAIRE, 2017). It is also relevant to note that the variables in Table 10 are based on the perception of the respondents (Table 11), which had expressed their consent to the research in orally when being interviewed, or in writing when answering the online questionnaire.

The interviews and online questionnaires were applied to seven major organisations' experts (CSR directors, executive director, manager, coordinators, and president) in Brazil, namely GPA group, Carrefour Brazil group, as well as the market support stakeholders, Organics Brazil, Brazilian Supermarket Association, Intelligence Centre in Organics, Fairtrade Brazil, and the Brazilian Ministry of Agriculture, Livestock and Food Supply (Table 11). Also, the interviews and questionnaires cover most but not all the major grocery retailers in Brazil.

Table 11 – Organizations interviewed in Brazil

Organization	Management employee position	Interview type	Questionnaire completion
<i>Retail groups</i>			
GPA	CSR Director	Face-to-face	Yes, fully
Carrefour Brazil	CSR Director	Telephone	No
<i>Market support stakeholders</i>			
Organics Brazil	Executive Director	Telephone	Yes, fully
Brazilian Supermarket Association	Economics and Research Manager	Telephone	Yes, fully
Intelligence Centre in Organics	Coordinator	Telephone	Yes, partially
Fairtrade Brazil	President	Telephone	Yes, partially
Brazilian Ministry of Agriculture, Livestock and Food Supply	Agroecology Coordinator	Telephone	No

The main criteria for targeting the retailers surveyed was the market share and organisational structure of retailers in the Brazilian grocery sector (Table 12). Walmart Brazil group was initially targeted and approached, but they did not wish to participate in the research.

Nonetheless, we considered Walmart Brazil group in the analysis because it was mentioned by market support stakeholders on the green food market. Although this retail group was included in the dataset, it is not in-depth analysed.

Table 12 – Profile of grocery retailers surveyed in Brazil

Parent	Retail group	Physical stores*	Total	
			Turnover excluding sales tax* [billion]	Market share**
GPA [^]	Pão de Açúcar, Extra, Minuto Pão de Açúcar, Minimercado Extra, Assaí Atacadista, PãodeAçúcar.com, and DeliveryExtra.com.br	1,117	€6.2	10.1%
Carrefour Brazil	Carrefour Hipermercado, Carrefour Bairro, Carrefour Express, Atacadão, and Supeco	498	€4.4	6.4%
Walmart Brazil	Walmart, Hipermercados BIG, Hiper Bompreço, Bompreço, Mercadorama, Nacional, TodoDia, Maxxi Atacado, Sam’s Club, and Walmart.com.br	471	€4.3	6.4%
Total		2,086	€14.9	23.0%

[^]It does not consider “Aliados CompreBem” within GPA group’s grocery chains. *2016 figures. **Mean of 2013-2016 values of the market share in the grocery sector.

Source: (GPA, 2015, 2017, CARREFOUR, 2016, 2017, WALMART, 2016, 2017; EUROMONITOR, 2017a).

Still in Table 12, considering the market share of the surveyed retailers (23.0%), we highlight the low level of concentration in the Brazilian grocery sector (DE BARCELLOS; BASSO; ESPARTEL, 2014). Even though the “sample” represents almost a fourth of the market, we consider that these retail groups are a reasonable indication of the Brazilian grocery sector.

As GPA, Carrefour Brazil, and Walmart Brazil are the three largest retail groups in Brazil (EUROMONITOR, 2017a), this does not hold any implication for the results (e.g. bias),

which refers specifically to the green food market, not to the whole food market in Brazil. In fact, the selection of cases is arbitrary, and the units of analysis should adequately fit for the study purposes (YIN, 2011, 2014).

Although there are many green food products on the marketplace which fits the definition adopted in this paper, figures of retail sales are not “transparent” in their reports neither on their institutional websites, and longitudinal data is quite hard to have access. The most accessible data and well-known cases in Brazil are those from retail firms with their brand eco-labelled and certified by a third-party, such as organic and Fairtrade food products.

Several previous studies (ORMOND et al., 2002; BUAINAIN; BATALHA, 2007; IPD, 2011; DAROLT et al., 2016; ORGANICS BRASIL, 2016), just like here, found Brazilian statistics for sales of organic food scarce. Therefore, we are heavily dependent on retailers’ and market support stakeholders’ perceptions, third-party private database, and on other literature's findings. It also includes the “grey literature”, and other sources, such as retailers’ institutional website and sustainability reports. Still, we emphasize that the retail groups surveyed in Brazil (Table 11) did not have time series data available of their green food products turnover.

Furthermore, the only historical data available for the retail sales of organic food is from a third-party private database, which contains the value of sales of organic packaged food in retail. This database is from (EUROMONITOR, 2017a), and it seems very underestimated when compare with the data gathered from (ORGANICS BRASIL, 2013, 2014, 2015, 2016), which in turn seems very overestimated.

Data on Fairtrade sales were taken from annual reports available on (FLO, 2017) website. Moreover, the certification requirements of this eco-label include more than “responsible issues” related to the social sphere, but also environmental issues, and besides organic certification is suggested to producers (FLO, 2017).

4.2.1 Analytical approach

The set of “green” indicators proposed here were used to assess the green food market evolution pattern, grounded on an evolutionary perspective [e.g. (DOSI; NELSON, 1994; DOSI; NELSON; WINTER, 2000)]. We grouped the set of indicators in three broad dimensions (macro, meso and micro), according to the level of detail reached by the data gathered from primary and secondary sources (Table 9 and Table 10). **Error! Reference source not found.**

depicts the dimensions and its proposed set of indicators to analyse the green market evolution pattern.

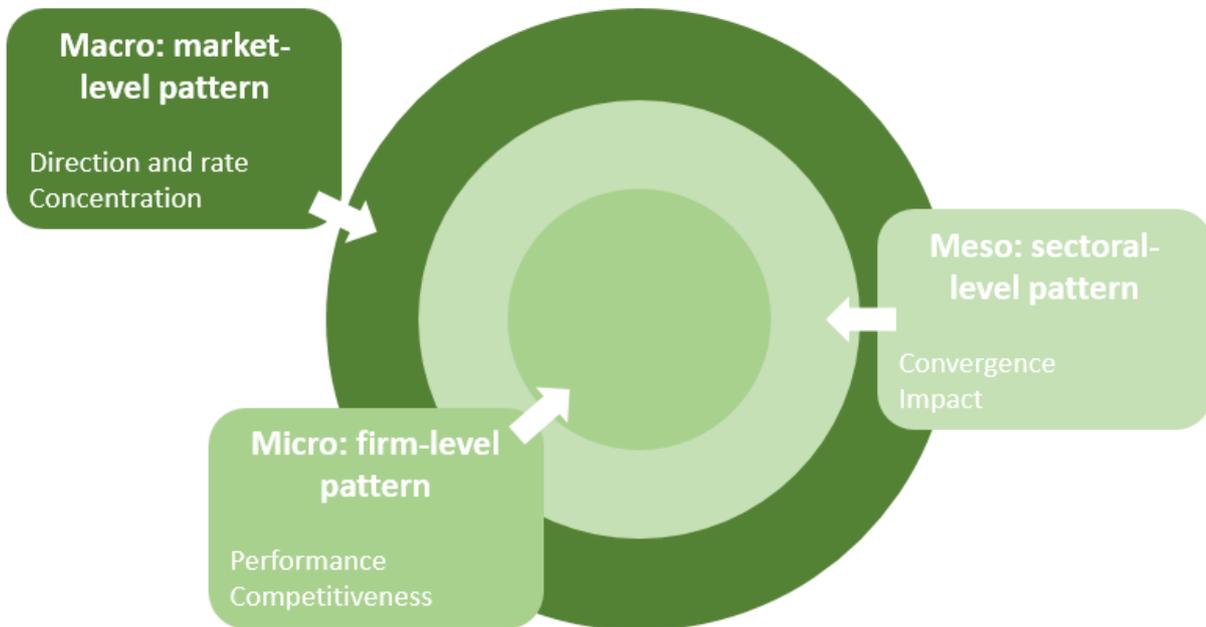


Figure 10 – Dimensions and proposed indicators to analyse the green market evolution pattern

4.2.1.1 Macro dimension's indicators

The macro dimension's indicators are a market-level perspective for a longitudinal analysis. In other words, these set of indicators enable a large-scale view of the dynamics of a market. Here, we explore the indicators to examine the market-level evolution pattern of the green food market in Brazil.

It follows the description of the two macro dimension's indicators:

- Direction and rate of the green food market development: the analysis of the statistical trend and average annual growth rate of the variables “green food retail sales in Brazil”, “green food retail sales in BRICS” and “green food retail sales in the world”.
- Sales channels concentration on the green food market: market concentration analysis of “organic food sales in the retail channel” variable.

Rate of the green food market development

The continuous compounding growth rate is more suitable for our purposes because the green food market has annual growth rates that steadily changes. To calculate the average annual growth rate, we use the formula:

$$k = \frac{\ln(N_t/N_0)}{t}$$

where N_0 is the initial value, N_t is the final value, t is the number of years, and k is the annual growth rate.

Sales channels concentration on the green food market

We use the concentration ratio (CR) to evaluate the sales channels concentration on the green food market. The “adapted” concentration ratio formula follows:

$$CR_{R,t} = \sum_{i=1}^R MS_{i,t}$$

where R represents all retail sales channels, and MS is the market share of the retail sales channel i in the period t .

Here, the concentration ratio ranges from 0% to 100%, and measures the percentage market share of retail sales within the green food market. As a general reference, the concentration ratio ranging from 40% to 70% may indicate a medium concentration in the market, and from 70% to 100% may imply a high concentration in the market.

4.2.1.2 Meso dimension’s indicators

The meso dimension’s indicators are a sectoral-level approach for a longitudinal analysis of a market. It means that these set of indicators endow a medium-scale view of the dynamics of a sector within a market. Here, we explore the indicators to investigate the sectoral-level evolution pattern of the major grocery retail firms in the Brazilian green food market.

It follows the description of the two meso dimension’s indicators:

- Retailers convergence to eco-strategizing on the green food market: convergence analysis of the mean and standard deviation of the “green food sales strategy” variable.

- Impact of retailers' green food sales strategy on green food turnover: econometric analysis of the regression with the panel data of “green food sales strategy” and “green food turnover” variables.
 - It is important to note: i) the data of the “green food sales strategy” and “green food turnover” variables were merged from two different sources (here, one retailer and two market support stakeholders); ii) these data are the perception of the survey respondents; iii) the panel is unbalanced.

Retailers convergence to eco-strategizing on the green food market

In general terms, convergence occurs when the mean of a normalized variable (Y-axis) tends to 1, and the standard deviation of the same normalized variable (X-axis) tends to 0. This convergence definition is adapted from the statistical convergence $X_{it} \xrightarrow{a.s.} X$. The derived definition from (GREENE, 2012) follows:

- Let $\{X_{it}\}_{i,t=1}^{\infty}$ be a longitudinal variable, where i represents the firm dimension and t represents time dimension. Further, let $\{\bar{X}_t\}_{t=1}^{\infty}$ be the arithmetic mean of the firms i on t . Then, $\{\bar{X}_t\}_{t=1}^{\infty}$ converges to 1, if $P\left(\lim_{t \rightarrow \infty} \bar{X}_t = 1\right) = 1$.

In practical terms, there is sectoral convergence when retailers' “green food sales strategy” (1 – making available; 2 – actively promote; 3 – corporate competitive strategy) are differing less from the average green food sales strategy of the grocery retail sector. Further, as the values of the green food sales strategy were normalized by the min-max scaling method, which values ranging from 0 to 1 (here, 0 represented by “making available” strategy), the convergence happens when retailers' green food sales strategy tend to a “corporate competitive strategy” (equals to 1, meaning “eco-strategizing”).

Impact of retailers' green food sales strategy on green food turnover

Generally, panel data is analyzed by a panel regression model, e.g. fixed effects or random effects model. We used the Hausman test to decide between the fixed and random effects models (GREENE, 2012). As the null hypothesis of the Hausman test is that the preferred model is the random effect, we performed the panel regression through it. The random effects model follows:

$$Turnover_{it} = \alpha + \beta Strategy_{it} + u_{it} + \varepsilon_{it}$$

where *turnover* is “green food turnover” variable, *strategy* “green food sales strategy” variable, u_{it} is the error between retailers, and ε_{it} is the error within retailers in the grocery sector.

In the case of no evidence of significant differences across entities (null hypothesis of the Breusch-Pagan Lagrange multiplier test), a pooled ordinary least squares regression might be the appropriate model (GREENE, 2012). The linear regression model follows:

$$(\textit{Turnover})_i = \alpha + \beta(\textit{Strategy})_i + \varepsilon_i$$

where *turnover* is the average of “green food turnover” variable, *strategy* the average of “green food sales strategy” variable, ε_i is the error term.

We highlight that our longitudinal sample has only three cross-sectional units observed and five periods, and the “green food sales strategy” variable is based on Likert-type data. Nonetheless, we are still supported by the literature on the use of parametric statistics with small sample size and with Likert-type data (CARIFIO; PERLA, 2008; NORMAN, 2010; COWELL; FLACHAIRE, 2017). Furthermore, as the statistical bootstrap resampling method enables ascribing measures of accuracy to sample estimates (variance, confidence intervals, p-values) (DAVISON; HINKLEY, 1997), we used this technique in our linear regression model.

Still, we are mainly interested on the signal of the β coefficient and the magnitude of the Pearson correlation coefficient⁸ “*r*” between *strategy* and *turnover*. As reference, an *r* greater than 0.4, in general, indicates a strong positive relationship between the measures (TABLEAU SOFTWARE, 2017). Accordingly, we expect to find positive values for β and *r*, and an *r* greater than 0.4.

Regarding practical terms, retailer’s “green food sales strategy” is intended to affect its “green food turnover” positively, as usually any firm’s strategy is planned to increase the firm’s turnover. That is, grocery retailers strategize expecting to sell more green food products. Here, we understand retailers strategize by “making available” or “actively promoting” green food products, or explicitly considering green food sales as a “corporate competitive strategy”. In this latter case, retailers are eco-strategizing on the green food market.

4.2.1.3 Micro dimension’s indicators

⁸ The Pearson correlation coefficient is estimated by taking the square root of R^2 from the regression’s result.

The micro dimensions' indicators are a firm-level perspective for a longitudinal analysis of a market. In other words, these set of indicators enable a firm-specific view of the dynamics of a group of firms (and market support stakeholders). Here, we explore the indicators to assess the firm-level evolution pattern of the major grocery retail firms in the Brazilian green food market. We also explore the indicators as the inference whether the retail firm has dynamic capabilities or not by the longitudinal analysis (attainability through learning) of the high-order dynamic capabilities "sense", "seize" and "transform".

It follows the description of the two micro dimension's indicators:

- Retailer's performance on the green food market: it is the graphical analysis of the variables "strategic importance of green food sales", "green food sales strategy" and "green food turnover".
- Retailer's competitiveness on the green food market: it is the graphical analysis of the variables "performance on the green food market relative to main competitors" and "share of the organic food market".

We highlight that the higher the retailer's performance and competitiveness over time on the green food market, the better. In this case, there is an indication that the retail firm most likely has "green" dynamic capabilities. Also, an analysis of the strategic movements in the retailer's business model related to the green market development may also suggest that the retailer has green dynamic capabilities.

Furthermore, in Table 13 we propose the interrelation of the retailers' strategizing phases jointly with its business models changes and capabilities building in the evolution of the green food market. We emphasize that the dynamic structure presented in Table 6 is consistent with the literature reviewed (WINTER, 2003; HELFAT et al., 2007; CASADESUS-MASANELL; RICART, 2010; TEECE, 2010, 2014; MINTZBERG; LAMPEL, 2013; BOCKEN; SHORT, 2016) and the designed interview guides and questionnaires (Appendices 4.C-4.F). This consistency is due to our case study protocol⁹ (Appendix 4.B), which was further developed on the recommendations of (DUL; HAK, 2008; YIN, 2014).

⁹ It is based on the preliminary case study protocol, which is found in the first version of the PhD research project.

Table 13 – Proposed interrelation of retailers’ strategizing phases, business models changes and capabilities building in the green food market evolution

	Phase	Strategizing	Business model	Capabilities
1st	Reactive	Just “making available” green food products	Conventional business model	Ordinary capabilities
2nd	Proactive	“Actively promoting” green food products	Greener business model than conventional	From ordinary to dynamic capabilities
3rd	Preemptive	Green food sales as “corporate competitive strategy”	Green business model	“Green” dynamic capabilities

Lastly, it is worth mention that the strategizing phases presented in Table 13 are an evolutionary approach to environmental sustainability. Also, the third phase that we originally call “preemptive” is inspired by its dictionary definition, which is something “done before other people can act, especially to prevent them from doing something else” (CAMBRIDGE UNIVERSITY PRESS, 2017). As our understanding of environmental sustainability is built on the Lisbon principles of sustainable governance formulated by (COSTANZA et al., 1999), the preemptive phase of eco-strategizing is closely related to those principles.

4.3 Results

We present the “green” indicators in an different sequence shown in the methodology section. First, we present a macro picture of the green food market and then being grounded by the retailers’ “microdata” before showing it sectorally, which is the meso level dimension. The objective is investigating (describing and evaluating) retailers’ role in the evolution of the market for green food products in Brazil.

We start summarizing in Table 14 the statistics of the data of the variables explored here. We highlight that the variables with Likert-type scale are the perception of the respondents.

Table 14 – Descriptive statistics of the variables

Variable		Mean	Std. Dev.	Min.	Max.
<i>Time series</i>					
Green food retail sales in Brazil [billion]		€0.2	€0.1	€0.03	€0.4
Green food retail sales in the BRICS [billion]		€0.7	€0.7	€0.1	€2.2
Green food retail sales in the world [billion]		€52.5	€26.7	€27.9	€80.8
Organic food sales in the retail channel		60.4%	15.5%	33.0%	77.0%
Share of the organic food market*		€0.2	€0.1	€0.03	€0.4
<i>Panel</i>					
Strategic importance of green food sales**	Overall	46.8%	24.6%	9.0%	74.0%
Green food sales strategy [Likert]	Overall	1.9	0.7	1.0	3.0
	Within		0.8		
	Between		0.2		
Green food turnover [maximum]	Overall	6.7%	1.3%	5.0%	7.5%
	Within		1.1%		
	Between		1.0%		
Performance on the green food market relative to main competitors [Likert]	Overall	3.1	1.0	1.0	4.0
	Within		1.1		
	Between		0.3		

*Brand shares of organic packaged food. **Only GPA group data.

Source: the time series variables are from (WILLER; YUSSEFI, 2004; FLO, 2012, 2013, 2014, 2015, 2016, 2005, 2006, 2007, 2008, 2009, 2010, 2011; IBGE, 2006; BUAINAIN; BATALHA, 2007; OOSTERVEER; GUIVANT; SPAARGAREN, 2007; IPD, 2011; ORGANICS BRASIL, 2013, 2014, 2015, 2016, WILLER; LERNOUD, 2014, 2015, 2017, EUROMONITOR, 2017a, 2017b), and the panel variables are from the questionnaire answers of GPA group's CSR director, Organics Brazil's executive director, and Brazilian Supermarket Association's economics and research manager.

We also highlight that with the variable “green food turnover” we used the maximum values informed by the respondents. In specific cases, we merged the data from different primary sources, e.g. GPA group’s values of “green food sales strategy” for the 1980s and 1990s are an average of the perception of two market support stakeholders, which are acknowledged market experts at least since 2005.

We note that the lack of longitudinal organic food sales data and statistics are common factor worldwide (WILLER; LERNOUD, 2017). Also, we identified that all available information on the organic food turnover in Brazil are rough estimates and varies considerably depending on the source.

Furthermore, the estimates from the literature and market support stakeholders for the organic food turnover in Brazil are in many cases very underestimated by too specific selection of the type of products or overestimated by a high market growth expectation considered. Based on all these facts and the lack of official statistics in Brazil, the variable “green food retail sales in Brazil” is our estimate¹⁰.

4.3.1 Macro dimension’s indicators

Figure 11 **Error! Reference source not found.** shows the green food market trend for Brazil, the BRICS, and the world. Still in this figure, we emphasize that the data for the variable “green food retail sales in Brazil” is from our estimation. Also, concerning the data for the variable “green food retail sales in the BRICS”, the organic food sales are only about organic packaged food.

¹⁰ For more details on our estimation, please, see the methodological section.



Figure 11 – Green food retail sales in Brazil, the BRICS, and the world, 2004-2015 (€ million)

Source: Brazil own estimate based on (IBGE, 2006; BUAINAIN; BATALHA, 2007; OOSTERVEER; GUIVANT; SPAARGAREN, 2007; IPD, 2011; ORGANICS BRASIL, 2016, 2013, 2014, 2015, WILLER; LERNOUD, 2014, 2015, FLO, 2015, 2016; EUROMONITOR, 2017a), the BRICS compiled from (FLO, 2005, 2014, 2015, 2016, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013; EUROMONITOR, 2017a), and the world compiled from (FLO, 2005, 2006, 2015, 2016, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014; WILLER; LERNOUD, 2017).

The first point to highlight is the considerable representativeness of organic food products within the Brazilian green food market. From 2004 to 2015 organic food sales accounted for almost the entire green market in our Brazilian time series (99.97%). The second point is the magnitude of the scales, once the Brazilian green food market is, on average only 0.2% of the world market. Nonetheless, the Brazilian green food market accounts for 27.1% of the BRICS' market. The third point is that all trend lines are upward. From 2004 to 2015, the green food market increased 1059.9% in Brazil, 2361.8% in the BRICS, and 189.6%, globally. Also, the average annual growth rate is 22.3% for Brazil, 29.1% for the BRICS, and 10.6% for the world.

Figure 12 shows the two channels analysed for organic food sales in Brazil, which are “retailers” and “others” channels. As organic food sales represent almost the totality of the green food market in the country, on the average of the period 2003-2015, we understand that these two channels represent the channels of commercialization for green food as a whole

adequately. Supermarkets and hypermarkets are the two most important channels within “retailers”. Likewise, farmers’ market, public procurement, specialised shops, and e-commerce are noteworthy within “others” sales channel.

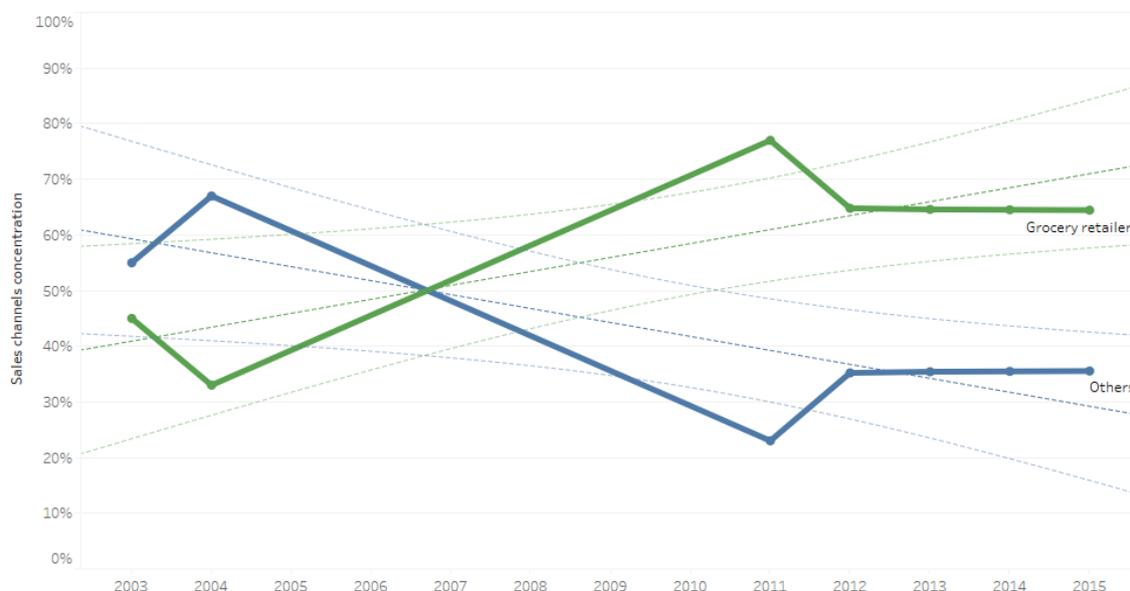


Figure 12 – Sales channels concentration on the Brazilian green food market, 2003-2015 (%)

Source: compiled from (WILLER; YUSSEFI, 2004; BUAINAIN; BATALHA, 2007; OOSTERVEER; GUIVANT; SPAARGAREN, 2007; IPD, 2011; ORGANICS BRASIL, 2013, 2014, 2015, 2016).

From 2003 to 2015, the retailers’ organic sales channel increased its share by 46%, while the others’ channel lost share of 36.4%. Also, the average annual growth rate is 3.3% for retailers and -4.3% for others. The average participation of each one in the total market of green products in Brazil was 58.5% and 41.4% for the sales channels retailers and others respectively.

4.3.2 Micro dimension’s indicators

Interpretation of Figure 13 and Figure 14 allows affirming that the higher the values presented in the sketches, the better is the indicator for retailers in the green food market. Also, the two figures complement each other in the sense that performance and competitiveness are the retailer’s results operating in the green food market.

Furthermore, Figure 13 shows the perception of retailers about the strategic importance of green food sales, their food sales strategy on developing this market, and their green food turnover, as derived from those actions. Figure 14 shows the perception of market support stakeholders about retailers’ performance on the green food market relative to their main competitors in this market, as well as their relative organic food market shares.

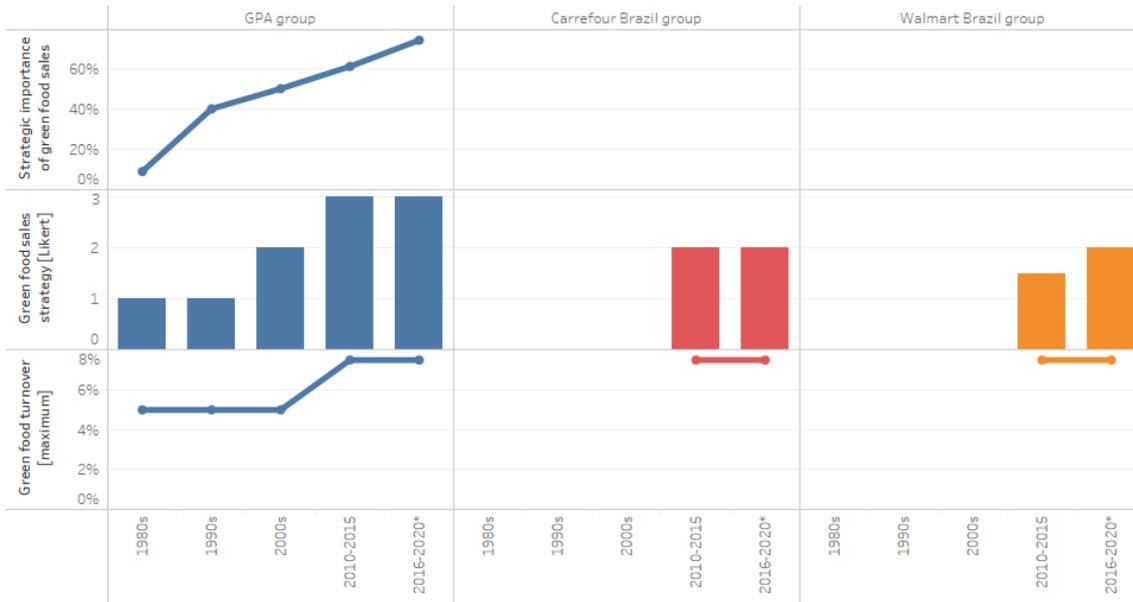


Figure 13 – Major retailers’ performance on the Brazilian green food market, 1980s-2020

*Respondents’ expectation, as the data were gathered in the period 2016-2017.

Source: compiled from the questionnaire answers of GPA group’s CSR director, Organics Brazil’s executive director, and Brazilian Supermarket Association’s economics and research manager.

Figure 13 shows that GPA is the only large grocery retail group that has been selling green food products in Brazil since the 1980s. Further, GPA group’s strategic importance of the green food sales and green food sales strategy started at least one decade earlier when compared with Carrefour Brazil group and Walmart Brazil group. Also, GPA group’s green food turnover is the largest on the cumulative of the whole period, as they started very early “seizing” the market.

In Figure 14, the stabilization from 2010-2011 onwards of GPA and Carrefour Brazil groups' performance on the green food market relative to their main competitors means that these retailers have achieved the highest level of competition in the market. Also, this implies that GPA and Carrefour Brazil are performing well in the green food market. Notwithstanding,

the share of the organic food market of Carrefour Brazil and Walmart Brazil group are not significant.

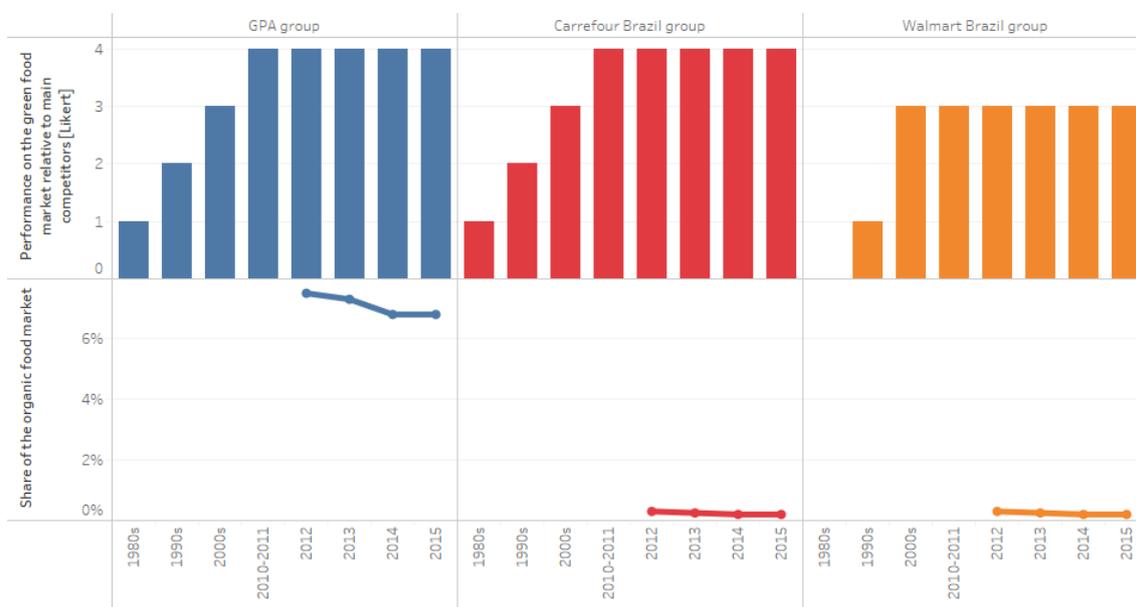


Figure 14 – Major retailers’ competitiveness on the Brazilian green food market, 1980s-2015

Source: compiled from the questionnaire answers of Organics Brazil’s executive director, Brazilian Supermarket Association’s economics and research manager, and the database of (EUROMONITOR, 2017b).

(EUROMONITOR, 2017b), the source of the variable “share of the organic food market”, ranks all firms selling organic packaged food products on the market, whether it is a retailer under its brand or a producer’s brand. Thus, retailers with their brand compete with the brand of producers, including the commercialization inside retailers’ stores. Although GPA group’s “Taeq Orgânicos” brand led individually with a market share of 6.5%, followed by Jasmine brand with 4.8%, still the aggregate “others” had a market share of 75.4% in 2015.

4.3.3 Meso dimension’s indicators

In Figure 15 A and B, the axes represent the types of green food sales strategy defined here. These types progress from (1) just “making available” green food products, to (2) “actively promoting” these products, and to (3) consider green food sales as a “corporate

competitive strategy”. Also, as the axes were normalized, the average of retailers’ green food sales strategies tending to a mean of 1.0 implies that the firms within the grocery retail sector are strategizing to acknowledge green food sales as a corporate competitive strategy.

While in Figure 15 A all periods (the 1980s, 1990s, 2000s, 2010-2015, and 2016-2020) were considered, in Figure 15 B only the recent periods (2010-2015 and 2016-2020) were included. Also, in Figure 15 A, the periods 1980s, 1990s and 2000s only contain GPA group’s green food sales strategy data.

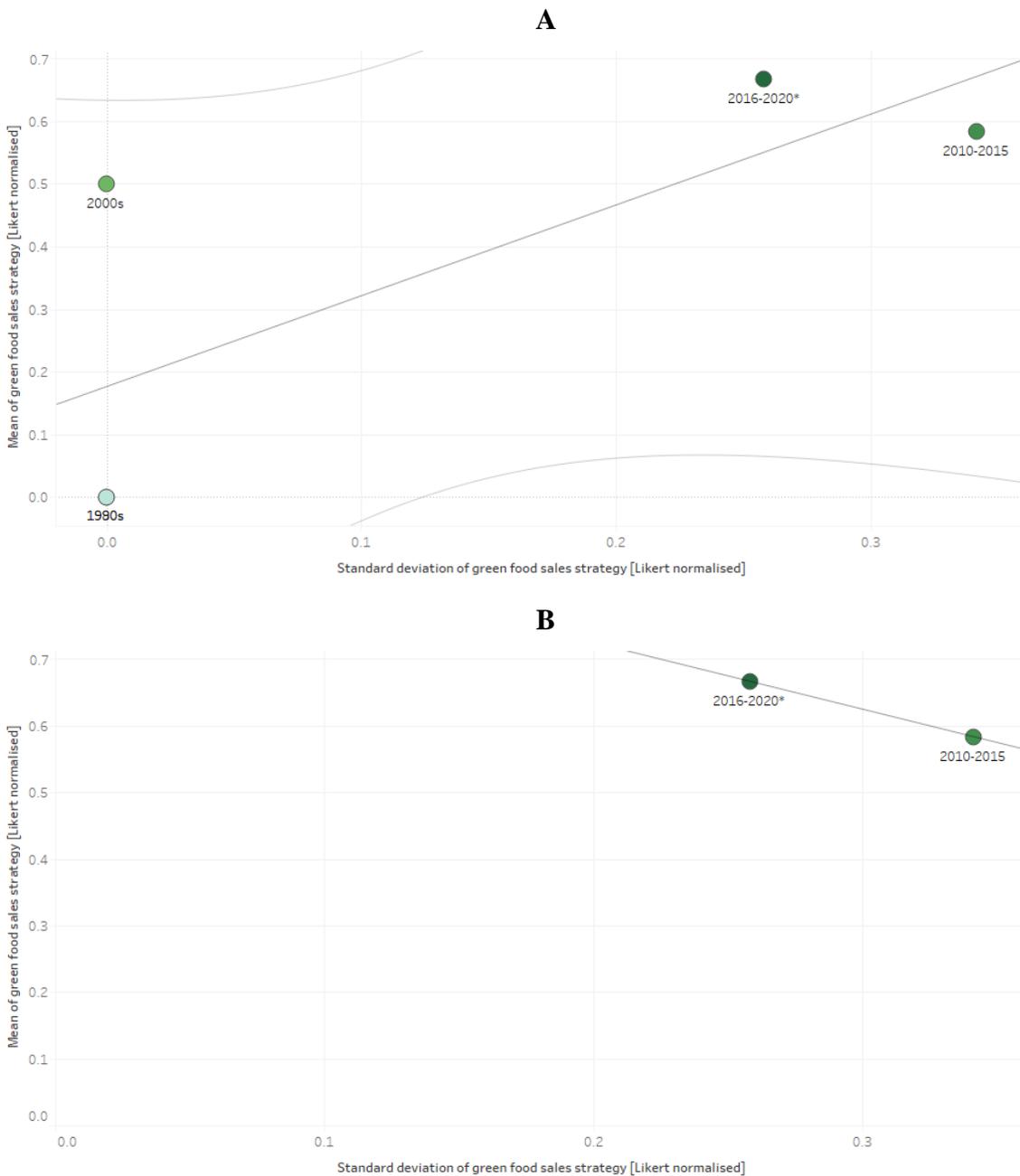


Figure 15 – Convergence of major retailers to eco-strategizing on the Brazilian green food market, 1980s-2020

*Respondents' expectation, as the data were gathered in the period 2016-2017.

Source: compiled from the questionnaire answers of GPA group's CSR director, Organics Brazil's executive director, and Brazilian Supermarket Association's economics and research manager.

The limitation in Figure 15 A is twofold: i) GPA group's values of the 1980s and 1990s are from the market perception of two market support stakeholders; and ii) the absence of data on the other retail groups (Carrefour Brazil group, and Walmart Brazil group) for those initial periods. However, Figure 15 B includes all retail groups' green food sales strategy data.

The comparison of the figures means that the divergence of the variable green food sales strategy in Figure 15 A is spurious as a result of lack of data in the initial periods. Notwithstanding, Figure 15 B indeed shows the convergence of retailers' green food sales strategies within the Brazilian grocery retail sector.

The main results of the model regression analysis of the indicator "impact of retailers' green food sales strategy on green food turnover" is described in **Error! Reference source not found.** Also, the variables strategy ("green food sales strategy") and turnover ("green food turnover") explored through the models in **Error! Reference source not found.** were presented above in Table 14 and Figure 13.

The model 1 used the random effects (RE) technique and was estimated by generalised least squares (GLS). The model 2 used the pooled technique and was estimated by ordinary least squares (OLS). Both models are significant at least 5%, according to the Wald χ^2 test, and have similar regression results. These two characteristics fit in our purpose, which is that variable's estimated coefficient has not a quantitative meaning, only a qualitative meaning whether strategy impacts turnover or not.

Table 15 – Main results of the regression analysis of impact of major retailers’ green food sales strategy on their green food turnover in Brazil, 1980s-2020

Variable		Model 1 ^a		Model 2	
Dependent	Independent	(RE, GLS)		(Pooled, OLS)	
Turnover	Intercept	0.047	(0.006)***	0.046	(0.048)*
	Strategy	0.012	(0.000)***	0.011	(0.039)*
Wald χ^2		520.6***		24.1*	
Breusch-Pagan χ^2		4.613*			
Hausman χ^2		0.042			
R^2				0.398	
Adjusted R^2				0.312	
Durbin-Watson				0.795	
White LM				3.033	

Both models were estimated in gretl software version 2017d-git: i) using 9 observations; ii) 3 cross-sectional units; iii) time-series length: minimum 2, maximum 5; and iv) robust (HAC) standard errors. Standard errors are in parentheses. ^aUsing Nerlove’s transformation.

*p-value<0.05

**p-value<0.01

***p-value<0.001

Concerning the model 1, the Breusch-Pagan χ^2 test, which has a p-value equal to 0.032, indicates that the RE model is more adequate to the data than the pooled OLS model. Also, the Hausman χ^2 test, which has a p-value equal to 0.837, confirms that the RE model is a better option than the fixed effects model. Regarding to the model 2, the Durbin-Watson test, which has a $d_{L,0.05}$ equal to 0.824, suggests positive first-order autocorrelation, and the White’s test, which has a p-value equal to 0.219, indicates that heteroskedasticity is not present.

As expected, the coefficient of strategy in both models is positive and significant at least 0.5%. This high significance suggests a very strong positive relationship between turnover and strategy. Also, the model 2 is depicted in Figure 16.



Figure 16 – Impact of major retailers’ green food sales strategy on green food turnover in Brazil, 1980s-2020

*Respondents’ expectation, as the data were gathered in the period 2016-2017.

Source: compiled from the questionnaire answers of GPA group’s CSR director, Organics Brazil’s executive director, and Brazilian Supermarket Association’s economics and research manager.

In Figure 16, the linear regression (Pooled OLS) suggests that when grocery retailers’ green food sales strategy progresses (heading toward the Likert value of 3) from just making available or actively promoting green food products to consider green food sales as a corporate competitive strategy, their green food turnover also increases. In other words, as retailers strength their strategies on marketing green food products, their green food sales grow.

Furthermore, taking into account the generalization that we can achieve with the micro dimensions’ indicators, still, we considered that the retail groups surveyed at least partly represent the green food market in Brazil. Currently, GPA group, Carrefour Brazil group, and Walmart Brazil group together hold almost 25% of the share of the food market in Brazil.

4.4 Discussion

In general, there is an upward trend for the green food market in Brazil, in the BRICS and in the world. Notwithstanding these markets are co-evolving over time, when considering

the magnitude of green food sales. Also, the Brazilian is evolving faster than the world market, according to the average annual growth rate from 2004.

Brazil has a significant domestic market for organic food products (WILLER; KILCHER, 2012) in spite that the Brazilian green food market is a tiny share of the world market. In fact, regarding production and consumption of green food products, Brazil has the largest organic food domestic market in Latin America, since at least 2012, as noted in the statistics published by (WILLER; LERNOUD, 2014, 2015, 2016, 2017). Furthermore, our findings show that the Brazilian green food market impressively doubled its turnover in 2012, even though roughly 95% of consumers in Brazil still did not know what an organic product was (GPA, 2012). More recently, 15% of the urban population in Brazil¹¹ already consumes organic food products (ORGANIS, 2017).

We found that the dominant path of the retail in Brazil comes from at least since 2008 when store-based retailers were the driving channel in terms of organic food products. Regarding organic turnover, supermarkets and hypermarkets have been green food market dominant within the retail channel in Brazil (GUIVANT, 2003; OOSTERVEER; GUIVANT; SPAARGAREN, 2007; DALCIN et al., 2014; EUROMONITOR, 2017b; ORGANIS, 2017), at least since 2003.

Besides, our research reinforced findings of previous literature, concluding that the farmers' market, since the 1980s (ORMOND et al., 2002; WILLER; LERNOUD; KILCHER, 2013) and the public procurement, since the 2000s, both classified as others channels, also have been playing an important role in the development of the Brazilian domestic market for organic food products (BUAINAIN; BATALHA, 2007; IPD, 2011; WILLER; KILCHER, 2012; DALCIN et al., 2014; WILLER; LERNOUD, 2015, 2017).

Still, within other channels for organic sales channels, specialised shops and e-commerce are fewer representatives than farmers' market and public procurement. Nonetheless, specialised stores and e-commerce continue increasing its sales of organic food products at least since 2012, as shown by statistics from (ORGANICS BRASIL, 2013, 2014, 2015, 2016). We note that the green food market still has much to evolve within the Brazilian food market.

Moreover, with the boom of e-commerce in Brazil after 2010 (SEBRAE, 2016), the organic food sales over the internet have been growing fast since 2012, according to statistics of (ORGANICS BRASIL, 2013, 2014, 2015, 2016). We found that the organic food producers

¹¹ In 2015, 84.7% of the population in Brazil lived in urban areas (IBGE, 2016b).

and processors have been using this direct sales channel for some time and, indeed, as the Internet diffusion in Brazil reached 63.9% in urban area in 2015 (IBGE, 2016a), it seems that the e-commerce of organic food is a very prominent channel for the near future. However, if this green food e-commerce will be led by large retailers in Brazil, it remains an open question.

The survey showed that, in the 1980s, grocery retailers, such as GPA group and Carrefour Brazil group, had a poor performance on the Brazilian green food market. Green food sales were not strategically important to large retailers in Brazil, including the GPA group at that time. Also, according to our data, green food products accounted for an insignificant share of GPA group's turnover in the 1980s.

Both, literature consulted and our findings, pointed that, nonetheless, "making available" green food products during the 1980s and the 1990s, the GPA group was (emergently) strategizing using a greener retail business model. In the dynamic capabilities framework (TEECE, 2007, 2014), during the 1980s and 1990s, GPA group "sensed" and "seized" the incipient Brazilian green food market.

GPA group's greener business model structures and mechanisms were built mainly to deliver and capture value from the commercialization of a small variety of organic food products. Notwithstanding, the eco-innovation of this business model was related to manage the supplier interface (organic food offering by few distributors and scattered family farmers) with the customer interface (addition of organic food in other conventional assortments).

We found that the greener GPA group's strategizing, and business model approach was "followed" by very few retailers in Brazil, such as Carrefour Brazil group. In the late 1990s, Carrefour Brazil group started producing in Brazil its organic table grapes¹² (GUIVANT, 2003), exploring a chronic deficiency within the greener business model's supplier interface. Another retailer that followed GPA group's greener approach was Walmart Brazil in the 2000s, which had a poor performance when compared to GPA and Carrefour Brazil groups as noticed by our findings.

Although Carrefour Brazil group has started displaying third-party certified organic food products on special shelves in the late 1990s (ORMOND et al., 2002; GUIVANT, 2003), the first "transformation" of the Brazilian green food market happened by beginning of 2000s. We confirmed previous literature in verifying that large retailers, such as GPA group and

¹² As the organic grapes production was an international experience of the French retail group base, 70% of it was exported to Europe (GUIVANT, 2003).

Carrefour Brazil group, have started strategically expanding its assortments of organic food products.

In a first strategic movement between large retail groups in Brazil, GPA group through Pão de Açúcar retail chain made available organic food products in its marketplace. In 2002, Pão de Açúcar's green turnover was about €2.5 million¹³; one year later, its green turnover increased 40.0% reaching roughly €3.5 million¹⁴ (IPD, 2011). These green turnovers were due to sales of *in natura* organic food products (fruits and vegetable). As the estimated¹⁵ Brazilian domestic market was roughly €31.2 million in the 2002-2003 period, GPA group had a market share of 11.2% of the green food market.

During the 2000s, large retail groups in Brazil invested in introducing their organic brand, such as GPA group's "Taeq Orgânicos" and Carrefour Brazil group's "Viver Orgânico", which was also registered by (WILLER; LERNOUD, 2014)]. These retailers' brand eco-labelled (third-party certified) have been increasingly recognised on the Brazilian green food market (IPD, 2011; WILLER; LERNOUD, 2016), although we could not identify any major national recognised organic brand in Brazil, as had been also underlined by (ORGANIS, 2017).

In the first part of the 2000s, grocery retailers in collaboration with organic food producers, distributors and processors and market support stakeholders got more involved in developing the market for organic products in Brazil (WILLER; YUSSEFI, 2005; IPD, 2011). Analysing statistics of organic products as well as field information obtained in this research, since mid-2000s, we concluded that the organic food producers and processors in Brazil has been changing their strategic focus from exporting organic products to supplying the Brazilian domestic market.

"Actively promoting" the green food market in Brazil during the 2000s, GPA group still was (emergently) strategizing using an enhanced greener business model. At the beginning of the 2000s, GPA group's strategizing was exploring a new type of relationship with specialised food suppliers, and a new kind of reassurance label of the quality from the origin. Through the Pão de Açúcar retail chain, GPA group was seeking to expand the organic sales by scaling the organic food production and lowering the price of organic products, as well as certifying its organic food supply by third-party bodies (GUIVANT, 2003).

In 2000, Pão de Açúcar's turnover of organic food products reached 5% of fruits and vegetable sales (GUIVANT, 2003; BUAINAIN; BATALHA, 2007). In 2002, even with a

¹³ Currency conversion made by us considering the 2002 average exchange rate of R\$ 0.42 per € 1.

¹⁴ Currency conversion made by us considering the 2003 average exchange rate of R\$ 0.29 per € 1.

¹⁵ Details on the estimate calculation can be provided on request.

significant lack of information by consumers, producers, suppliers and retailers in understanding the benefits of organic products, GPA group managed to double its sales of these food products (GUIVANT, 2003). As we found that about 95% of all food products sold in the Brazilian food market is sourced domestically, in 2003, GPA group's Pão de Açúcar retail chain persuaded food producers that the conversion to organic was a better deal for both sides (GUIVANT, 2003).

Since the 2000s, GPA group has been observing a double-digit growth of sales of organic food. The statistics published by (WILLER; LERNOUD, 2015), allowed identifying the GPA group's Pão de Açúcar retail chain as a leading retailer of organic food turnover, at least since 2002 [from our findings, (IPD, 2011)]. Also, we confirmed that most of the organic food sales have been occurring through large grocery retailers in Brazil, such as the GPA and Carrefour Brazil groups.

The second transformation of the Brazilian green food market came about in the 2006-2009 by the strategic movement of large grocery retailers in Brazil, such as GPA group, Carrefour Brazil group and Walmart Brazil group, investing in their organic private brand to enlarge the organic products assortment. This finding is supported by literature as in 2009, GPA group invested heavily in the further expansion of its private brand of organic packaged food products (IPD, 2011; DALCIN et al., 2014).

From those major grocery retailers' strategizing, we identify a second generation of the greener retail business model. This business model emerged from the strategic shift of *in natura* organic food commercialization to more processed organic products with greater added value. Other unfoldings of retailers' eco-strategizing were the increasing of value chain complexity (lengthen of the supply chain) of organic food products (BUAINAIN; BATALHA, 2007) and greater management of the supply of these packaged food products (from our findings).

With regards to performance and competitiveness, GPA group materialised it between the 2000s and 2010-2015 period. Further, GPA group has been leading the Brazilian green food market by managing its higher market share since at least 2012, even though GPA group and Carrefour Brazil group were at the same level of performance on the green food market relative to their main competitors in the period 2010-2015. According to information released by (GPA, 2012), since 2012, marketing more its assortment of organic food products, the Pão de Açúcar retail chain has been acting with more aggressive exhibitions, through national campaigns and the distribution of printed materials, such as leaflets with healthy information.

Despite de the fact that GPA group absorbed nearly 45% of the Brazilian organic food production in 2012 (GPA, 2012), we found that Carrefour Brazil group and Walmart Brazil group had a noteworthy acting on the greening of the Brazilian food market during the period 2006-2015. This is corroborated by the literature reviewed, which states that these grocery retail groups have increased their organic products assortment and also contributed to developing the demand for organic products (DALCIN et al., 2014). Furthermore, Carrefour Brazil group has been observing a notable growth of its organic food demand since the 2000s (GUIVANT, 2003; DALCIN et al., 2014).

During the 2010-2015 period, we did not identify a significant change in the second generation of retailers' greener business models. The three large retailers that we analyze here have been reducing their organic product sales margin due to the restructuring of their commercial policies to one more aligned with the "Brazilian reality"¹⁶. Nonetheless, following eco-strategies adopted by the GPA group in 2010-2015 and 2016-2020, green food products have come to be considered as a source of corporate competitive advantage. These findings are corroborated by other information available, such as according to (GPA, 2017), through "Aliados CompreBem", the neighbourhood small-medium grocery shops privately owned by third parties, which "virtually" expand its retail chain may reach even more consumers with more affordable green food products.

From the strategic movements and (greener) business model developments of GPA group and Carrefour Brazil group, we draw the inference that these retailers built their higher-order dynamic capabilities (sense, seize, and transform) in the 1990s. Also, we infer that Walmart Brazil group seems to have built its green dynamic capabilities later, in the 2000s.

As retailers in Brazil have been green food market dominant since the second half of the 2000s, GPA group is using its "green" dynamic capabilities to leverage the Brazilian green food market to another (turnover) level. Also, Carrefour Brazil group and Walmart Brazil group are using their green dynamic capabilities to some extent to develop the Brazilian green food market further.

Finally, the convergence of grocery retailers' green food sales strategies indicates homogeneity within the Brazilian retail sector towards eco-strategizing on the green food market. Also, the models of the impact of retailers' green food sales strategy on green food turnover shows that retailers' strategizing has a positive impact on their level of the green food

¹⁶ Since the 1980s, Brazil is on average classified by (WORLD BANK, 2017) as an upper-middle-income economy. Also, from 2013 to 2016, the Brazilian gross national income per capita decreased by 30.6%.

turnover. Expressing in another manner, grocery retail firms' eco-strategizing is essential to sustain competitive advantage on the greening of the food market in Brazil.

4.5 Conclusions

We confirmed that the path of the greening of the food market in Brazil shows an upward trend throughout the period 2004-2015, which was measured by the green food retail sales. We further corroborated this greening path by the increasing of the major grocery retail firms' green food turnover in Brazil. Also, it indicates that green food products have become an important retail business case to at least the GPA group and Carrefour Brazil group.

We identified that large retail groups, especially GPA and Carrefour Brazil, have been key players on the greening of the Brazilian food market. Also, the major retail groups in Brazil have been acting in collaboration with organic food producers to the green food market development. Accordingly, in Brazil, the green food market and grocery retailers' strategizing co-evolved.

Fundamentally, the large retail groups have been sensing, seizing and transforming the green food market in Brazil. Also, these groups have been managing to pull in the complementary assets among food producers and distributors to develop the Brazilian green food market. Furthermore, we understand that it is relevant to further study along the value chain of the Brazilian green food market from an evolutionary perspective, highlighting the respective roles of the different players and phases of this market.

We found that the green food sales strategies exploited by grocery retailers in Brazil have been evolving from just making available or actively promoting green food products to considering green food sales as a corporate competitive strategy, which is, in our definition, eco-strategizing. Also, it indicates that strategizing increases retailers' green food turnover.

Following retail firms' heterogeneity within the Brazilian grocery sector, we identified divergence of those retailers' green food sales strategies that they have been exploiting over time. We infer that this divergence one way or the other is leading to changes in retailers' capabilities building and business models developments in the Brazilian green food market. Consequently, we identified two generations of greener retail business models that have been changing the Brazilian grocery sector environment.

From these findings, we conclude that the green food business case is still limited in Brazil. With the exception of the few big players, the competition on the Brazilian green food

market has only to a limited degree impacted retailers' green performance and green competitiveness over time so far. Further, very few grocery retail firms in Brazil have a green competitive advantage and are competing on green food products at the level of greener business models.

Therefore, we deduce that major retail groups in Brazil are greening their food markets by strategizing towards environmental sustainability, which in turn is entailing changes to their business models. When it comes to green catching up of firms, the big retail players in Brazil are clearly in line with international developments among other international powerful players.

Acknowledgements

Marcelo Fernando Mazzero acknowledges the funding from the CAPES Foundation, Ministry of Education of Brazil, by the scholarships throughout his PhD studies, especially the scholarship BEX 3754/15-4 related to the internship period from 01/08/2015 to 31/07/2016 at the department of Management Engineering, Technical University of Denmark. He also thanks the DTU Management Engineering's Technology and Innovation Management division for had hosted me during this period of study abroad. The authors are grateful to the case retailers and market support stakeholders for their time, shared knowledge and rich insights.

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Appendix 4.A

Major retail groups' brand of organic products in Brazil

Retail group	Brand
GPA	Taeq Orgânicos
Carrefour Brazil	Viver Orgânico
Walmart Brazil	Sentir Bem Orgânico

Source: (GPA, 2015, 2017, CARREFOUR, 2016, 2017, WALMART, 2016, 2017).

Appendix 4.B

Preliminary case study protocol (2015)

1 Introduction

The following case study protocol for the proposed study is essentially an explanatory research and uses the multiple-case study method for the in-depth explanation of the contemporary phenomena. Moreover, the study is a qualitative research in nature, but with quantitative data analysis.

2 Procedures and script of topics

The procedures for implementation of the field research part is divided into three stages. Some procedures are described below.

The first stage corresponds to the use of secondary sources for the preparation of a dossier of the following targeted retail firms:

- Brazil: Walmart Brazil, Carrefour Brazil, and Pão de Açúcar (GPA)
- Denmark: Coop Danmark, Dansk Supermarked, and DAGROFA

Furthermore, the first stage will use the targeted retail firms' sustainability reports, the information available on their institutional website, and all other available documents.

The second stage is subdivided into two phases. The first phase refers to the preparation of the questionnaire from the dossiers and its implementation in an online platform. In fact, a previous step includes the identification of the level of the green food

market in the targeted retail firms. For example, let say that in one retail we might have a whole division to deal with the green food market and in another, only one person. It is because the targeted retailers' internal structure it is not disclosed.

Still, in the first phase, an invitation to answer the questionnaire will be made by telephone to retailers' employee that would be responsible for defining strategies or managing their green food market. The application of the online questionnaire will be conducted in English. Here, the surveyed employee's consent is implicitly by answering the questionnaire. Moreover, the questionnaire will be implemented on an online research platform, and it will be available for at least 30 days.

The second phase concerns the preparation of a semi-structured interview guide based on all data previously obtained, and the implementation of the interview in each company headquarters. Indeed, in this second phase a personal interview will be conducted in English in Denmark, and in Portuguese in Brazil.

Also, a new invitation for the same employee who has completed the online questionnaire to participate in the interview that will be scheduled. The interview may last up to two hours, and it will be recorded (audio) with the interviewee's oral consent. Also, we will follow the universities ethics committee recommendations, but not being restricted by it; and will maintain the confidentiality of the data obtained.

We plan to interview per month, given the need for transcription of the audio's most important parts and for writing the report of it. Once the individual reports are done, they will be submitted to the ratification of the interviewee.

The reporting format adopted here for a transcription of the embedded units of analysis is question-and-answer. Furthermore, the cross-cases reports composition structure will be in a linear-analytic fashion.

The third stage relates to the preparation of all data collected and the analysis of it. In fact, this third stage of the field research concerns of the examination, categorization and tabulation of the evidence obtained through the application of questionnaires and interviews to retailers' employees; and the analysis of these data through a computational tool.

Finally, the Figure 4.A.1 shows the multiple-case study parts (define and design; prepare, collect and analyze; analyze and conclude), and some processes/procedures (develop thesis; select cases; design data collection protocol; conduct cases studies; write reports; draw cross-case conclusions; modify thesis; develop policy implications; just to name a few) of the entire research.

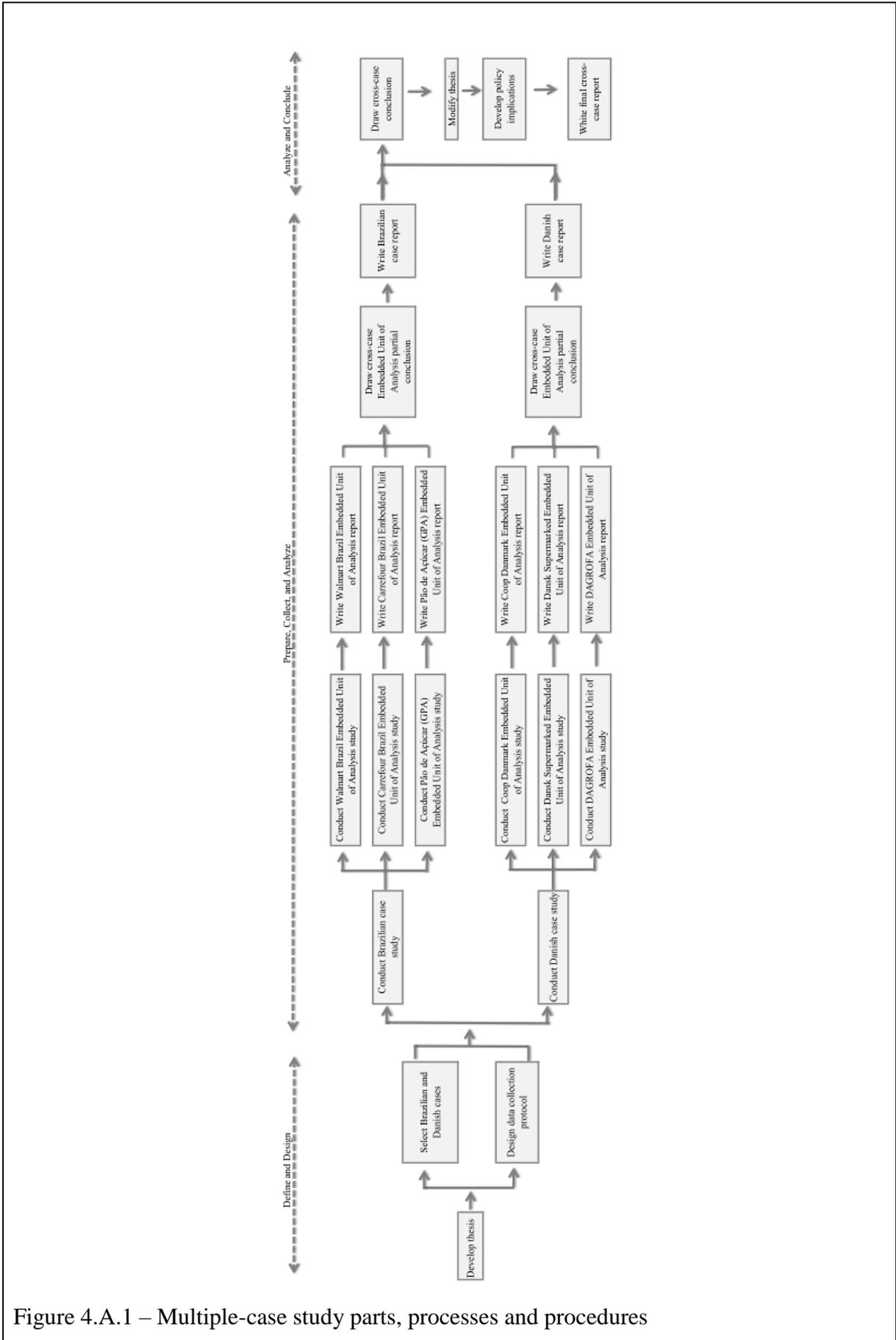


Figure 4.A.1 – Multiple-case study parts, processes and procedures

Source: adapted from Yin (2014).

The preliminary script of topics to be addressed in the questionnaires and interview guides follow:

- Categories: organic foods; other green foods; and conventional foods
 - Food product lines certified or non-certified
 - Monthly or annual turnover (revenue, number of units) of the categories; average profit margin of the categories; listing of the predominant types of eco-innovation related to the categories
- Retailer's strategy in the appropriation of eco-innovations value
 - General features (definition, key actors, incentives, barriers, competitors, trends) of strategies adopted for the categories; planning dates and implementation of these strategies; expected and achieved results for these strategies
- Retailer history in green food products marketing maker
 - General features (definition, key actors, incentives, barriers, competitors, trends) of the entry time on the market, if possible with dates related to it
- Retailer market share
 - The company market-share and the categories market-share
- Retailer's business models related to eco-innovations
 - General features (definition, motivation, competitive implications); organizational and strategic change, if possible with dates related to the change and implementation of it; expected and achieved results for these change and implementations

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Appendix 4.C

Interview guide for retailers in Brazil1 Brief introduction¹

Market Evolution, Eco-Strategizing and Green Competitiveness
in the Grocery Retail Sector

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Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food² products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions for your company's eco-strategizing³ and green competitiveness, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the strategic interests and competitive implications for the Brazilian and Danish grocery sector.

2 Questions

2.1 Strategic interest

Q2.1.1 When and to what degree has the promotion of green food products become interesting for your company in Brazil (and internationally) over time⁴?

Q2.1.2 What is the strategic importance of your company's green branding⁵ activities over time?

Q2.1.3 Where did the inspiration and knowledge for your company engaging in these green activities⁶ come from?

2.2 Market maturity

Q2.2.1 How well-functioning do you estimate your company's local (and international) green food market is over time?

Q2.2.2 How well do you estimate your company's green food products local (and international) market-share has developed over time?

2.3 Competitiveness

Q2.3.1 How profitable do you estimate the green food market has been to your company over time?

Q2.3.2 How do you estimate your company's return of investment on the green food market has developed over time?

Q2.3.3 How has your company been performing on the green food market relative to your competitors over time?

Q2.3.4 Please identify the main incentives and barriers for your company's eco-strategizing on the green food market over time.

2.4 Overall dynamics and trends

Q2.4.1 What role have the different key actors⁷ in the food value chain been playing in the creation and development of your company's green food market over time?

Q2.4.2 How do you see the trends and dynamics of your company's local (and international) green food market development as opposed to markets abroad (Denmark, EU, USA)?

¹For further info, please see the one-page PhD research description.

²Green food is understood broadly and includes sustainable, environmentally-friendly and responsible food products.

³Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.

⁴By over time we mean the time periods: 1980's, 1990's, 2000's, 2010-2015, and when applicable "Next 5 years".

⁵Green branding is understood by the development process of a strong environmental corporate image towards all stakeholders.

⁶By green activities we refer to eco-strategizing, green food sales and specific eco-innovation activities. Eco-innovation is a type of innovation which aim at and/or result in environmental gain, and it covers technical, organizational and marketing innovations.

⁷Please consider the upstream (food producers, food and packaging industries etc.) and downstream key actors (consumers, catering, public sector, NGOs etc.).

Appendix 4.D

Interview guide for market support stakeholders in Brazil1 Brief introduction¹

Market Evolution, Eco-Strategizing and Green Competitiveness
in the Grocery Retail Sector

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Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food² products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions on retailers' eco-strategizing³ and green competitiveness in selling your organization's green food products, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the business case and competitive implications for the Brazilian and Danish grocery sector.

2 Questions

2.1 Business case

Q2.1.1 When and to what degree has the promotion of green food products become interesting for your organization in Brazil (and internationally) over time⁴?

Q2.1.2 What is your organization's perspective on the role played by local retailers in selling green food products over time?

Q2.1.3 When has your organization's green food products experienced a breakthrough acceptance among local retailers? Were Brazilian retailers laggards or pioneers?

2.2 Market maturity

Q2.2.1 How well-functioning do you estimate your organization's local and international green food market is over time?

Q2.2.2 How well do you estimate your organization's green food products local market-share has developed over time?

2.3 Competitiveness

Q2.3.1 What segments of your organization's green food products do you estimate retailers have been demanding most over time? How much?

Q2.3.2 Please identify the main incentives and barriers for your organization's green food products over time.

2.4 Overall dynamics and trends

Q2.4.1 What role have the different key actors⁵ in the food value chain been playing in the creation and development of your organization's green food market over time?

Q2.4.2 How do you see the trends and dynamics of your organization's local green food market development as opposed to markets abroad (Brazil, Denmark, EU, USA)?

¹For further info, please see the one-page PhD research description.

²Green food is understood broadly and includes sustainable, environmentally-friendly and responsible food products.

³Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.

⁴By over time we mean the time periods: 1980's, 1990's, 2000's, 2010-2015, and when applicable "Next 5 years".

⁵Please consider the upstream (food producers, food and packaging industries, retailers etc.) and downstream key actors (consumers, catering, public sector, NGOs etc.).

Appendix 4.E

Online questionnaire for retailers in Brazil

Introduction

Market Evolution, Eco-Strategizing and Green Competitiveness
in the Grocery Retail Sector

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Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions for your company's eco-strategizing* and green competitiveness, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the strategic interests and competitive implications for the Brazilian and Danish grocery sector.

**Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.*

For further info, please see the 1-page PhD research description.

Table of Contents

1 Strategizing, Market Maturity and Sales (7 questions)

2 Competitiveness and Business Model Impact (2 questions)

Notice: please specify your answers at the best of your knowledge. If you have any doubts, do not hesitate to contact us by telephone (98194-9643) or email (mfmazzero@usp.br). You are welcome to complete the questionnaire in 1 week. Your answers will hold secure during this period.

Starting off

Please fill in the following required information:

Company's name:

Your full name:

Your position:

Employee since (year):

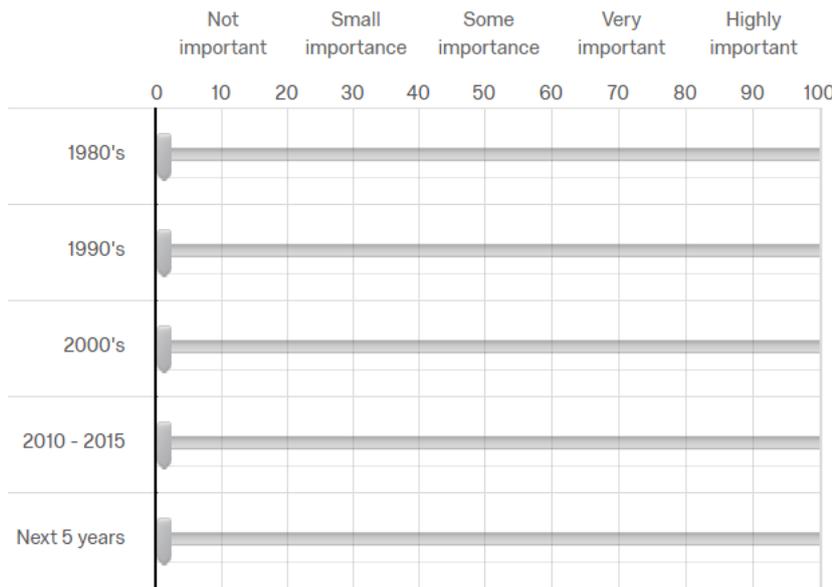
Email:

Telephone:

1 Strategizing, Market Maturity and Sales

Q1.1 What is the strategic importance of your company's green food sales over time?

Green food is understood broadly and includes sustainable, environmentally-friendly and responsible food products.



Further data comments/explanations:

Q1.2 Which issues do you estimate have been determining your company's green food sales?

	Environment	Health	Animal Welfare	Local	Taste and quality	Social	Other
1980's	<input type="checkbox"/>						
1990's	<input type="checkbox"/>						
2000's	<input type="checkbox"/>						
2010 - 2015	<input type="checkbox"/>						
Next 5 years	<input type="checkbox"/>						

Further data comments/explanations:

Q1.3 What segments of your company's green food market do you estimate have been functioning best (5), and what segments worst (1)?

	Bread and cereals					Fish and seafood					Fruits and vegetables					Meat					Milk, cheese and eggs				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>																								
1990's	<input type="radio"/>																								
2000's	<input type="radio"/>																								
2010 - 2015	<input type="radio"/>																								
Next 5 years	<input type="radio"/>																								

	Sugar, jam, honey, chocolate and confectionery					Fats and oils					Tea and coffee					Spices					Ready meals				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q1.4 Which strategy do you estimate have been adopted by your company towards promoting green food sales?

Corporate competitive strategy implies that green food sales is explicitly considered as a source of competitive advantage on top-level management.

	Just making available	Actively promote	Corporate competitive strategy
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q1.5 Please state when and how your company's key green activities have taken place, and estimate which of these have been most demanding and/or costly.

By green activities we refer to eco-strategizing, promoting green food products/sales and specific eco-innovation activities. Eco-innovation is a type of innovation which aim at and/or result in environmental gain, and it covers technical, organizational and marketing innovations.

		Green activities		
		Green product range (how many, decisions, effects)	Green products' campaigns (bonus, price and other types)	Marketing and promotion (efforts, new ways/channels)
1980's		<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's		<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's		<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015		<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years		<input type="text"/>	<input type="text"/>	<input type="text"/>

		Green activities		
		Store innovation (new concepts, design)	Use of private (own) and other labels (organic, fairtrade etc.)	Choice editing of products
1980's		<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's		<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's		<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015		<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years		<input type="text"/>	<input type="text"/>	<input type="text"/>

		Green activities	
		Green demands on suppliers	Partnerships with suppliers and other stakeholders for green market making
1980's		<input type="text"/>	<input type="text"/>
1990's		<input type="text"/>	<input type="text"/>
2000's		<input type="text"/>	<input type="text"/>
2010 - 2015		<input type="text"/>	<input type="text"/>
Next 5 years		<input type="text"/>	<input type="text"/>

Further data comments/explanations:

Q1.6 Please estimate how many percent of the different types of green food products your company has sold?

	Core eco-labelled products (organic and fairtrade)						Private (own) green label products						Other eco-labelled products (Swan, MSC, carbon footprint etc.)					
	Up to 5%	6%-10%	11%-30%	31%-50%	51%-75%	More than 75%	Up to 5%	6%-10%	11%-30%	31%-50%	51%-75%	More than 75%	Up to 5%	6%-10%	11%-30%	31%-50%	51%-75%	More than 75%
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q1.7 How much have the green food products represented in your company's annual turnover?

	Up to 5%	6% - 10%	11% - 30%	31% - 50%	51% - 75%	More than 75%
1980's	<input type="radio"/>					
1990's	<input type="radio"/>					
2000's	<input type="radio"/>					
2010 - 2015	<input type="radio"/>					
Next 5 years	<input type="radio"/>					

Further data comments/explanations:

2 Competitiveness and Business Model Impact

Q2.1 What segments of the green food market do you estimate your company has been profiting best (5), and what segments worst (1)?

	Bread and cereals					Fish and seafood					Fruits and vegetables					Meat					Milk, cheese and eggs				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>																								
1990's	<input type="radio"/>																								
2000's	<input type="radio"/>																								
2010 - 2015	<input type="radio"/>																								

	Sugar, jam, honey, chocolate and confectionery					Fats and oils					Tea and coffee					Spices					Ready meals				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q2.2 How has your company's business model been changing concerning the local (and international) green food market?

Business model is understood as the description of structures and mechanisms employed by the company to enhance its value proposition and to create, delivery and capture value through customer, supplier and other stakeholder relationship management.

	Business model		
	Internally	Customer interface	Supplier interface
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>

Further data comments/explanations:

Appendix 4.F

Online questionnaire for market support stakeholders in Brazil

Introduction

Market Evolution and Green Competitiveness
of Green Food Products

Marcelo F. Mazzero

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Sílvia H. Galvão de Miranda

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Research on the evolution of green markets is lacking, particularly related to corporate level performance. Our research investigates the dynamics of the market for green food products from the perspectives of retailers and market support stakeholders.

In order to capture the changing conditions on retailers' eco-strategizing* and green competitiveness in selling your organization's green food products, we seek to understand:

- the scope, key phases and milestones in the evolution of the green food market;
- the strategic interests and competitive implications for the Brazilian and Danish grocery sector.

**Eco-strategizing means the process of purposely adopting environmental sustainability into the corporate strategy.*

For further info, please see the 1-page PhD research description.

Table of Contents

1 Business Case (4 questions)

2 Competitiveness, Sales and Business Model Impact (5 questions)

Notice: please specify your answers at the best of your knowledge. If you have any doubts, do not hesitate to contact us by telephone (19 98194-9643) or email (mfmazzero@usp.br). You are welcome to complete the questionnaire in 1 week. Your answers will hold secure.

Starting off

Please fill in the following required information:

Organization's name:

Your full name:

Your position:

Employee since (year):

Email:

Telephone:

1 Business Case

Q1.1 How do retailers perceive your organization's green food products value(s)?

Green food is understood broadly and includes sustainable, environmentally-friendly and responsible food products.

	Grupo Pão de Açúcar			Walmart			Carrefour		
	Poorly	Adequately	Well	Poorly	Adequately	Well	Poorly	Adequately	Well
1980's	<input type="radio"/>								
1990's	<input type="radio"/>								
2000's	<input type="radio"/>								
2010 - 2015	<input type="radio"/>								
Next 5 years	<input type="radio"/>								

Further data comments/explanations:

Q1.2 To what degree do you estimate your organization has been attempting to influence retailers' eco-strategizing on the green food market?

Retailers' eco-strategizing means the process of (retailers) purposely adopting environmental sustainability into (their) corporate strategy.

	Grupo Pão de Açúcar			Walmart			Carrefour		
	A little	Some	A lot	A little	Some	A lot	A little	Some	A lot
1980's	<input type="radio"/>								
1990's	<input type="radio"/>								
2000's	<input type="radio"/>								
2010 - 2015	<input type="radio"/>								
Next 5 years	<input type="radio"/>								

Further data comments/explanations:

Q1.3 Which strategy do you estimate have been adopted by retailers towards promoting your organization's green food products sales?

Corporate competitive strategy implies that green food sales are explicitly considered as a source of competitive advantage on top-level management.

	Grupo Pão de Açúcar			Walmart			Carrefour		
	Making available	Actively promote	Corporate competitive strategy	Making available	Actively promote	Corporate competitive strategy	Making available	Actively promote	Corporate competitive strategy
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q1.4 Which agenda do you estimate have been pursued by retailers towards promoting your organization's green food products sales?

	Agenda's issues						
	Social	Environment	Health	Animal Welfare	Local	Taste and quality	Other
1980's	<input type="checkbox"/>						
1990's	<input type="checkbox"/>						
2000's	<input type="checkbox"/>						
2010 - 2015	<input type="checkbox"/>						
Next 5 years	<input type="checkbox"/>						

Further data comments/explanations:

2 Competitiveness, Sales and Business Model Impact

Q2.1 What segments of your organization's green food products do you estimate have been profiting best (5), and what segments worst (1)?

	Bread and cereals					Fish and seafood					Fruits and vegetables					Meat					Milk, cheese and eggs				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>																								
1990's	<input type="radio"/>																								
2000's	<input type="radio"/>																								
2010 - 2015	<input type="radio"/>																								
Next 5 years	<input type="radio"/>																								

	Sugar, jam, honey, chocolate and confectionery					Fats and oils					Spices					Tea and coffee				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1980's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1990's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2000's	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2010 - 2015	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Next 5 years	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Further data comments/explanations:

Q2.2 How profitable do you estimate your organization's green food products have been to the referred retailers?

	Grupo Pão de Açúcar					Walmart					Carrefour				
	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good
1980's	<input type="radio"/>														
1990's	<input type="radio"/>														
2000's	<input type="radio"/>														
2010 - 2015	<input type="radio"/>														
Next 5 years	<input type="radio"/>														

Further data comments/explanations:

Q2.3 How much do you estimate your organization's green food products have represented in the retailers' annual turnover?

	Grupo Pão de Açúcar						Walmart						Carrefour					
	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%	Up to 5%	6% to 10%	11% to 30%	31% to 50%	51% to 75%	More than 75%
1980's	<input type="radio"/>																	
1990's	<input type="radio"/>																	
2000's	<input type="radio"/>																	
2010 - 2015	<input type="radio"/>																	
Next 5 years	<input type="radio"/>																	

Further data comments/explanations:

Q2.4 How have your organization's retailers been performing on the green food market relative to their competitors?

	Grupo Pão de Açúcar					Walmart					Carrefour				
	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good	Very poor	Poor	Fair	Good	Very good
1980's	<input type="radio"/>														
1990's	<input type="radio"/>														
2000's	<input type="radio"/>														
2010 - 2015	<input type="radio"/>														

Further data comments/explanations:

Q2.5 How has your organization's business model changed concerning the local green food market?

Business model is understood as the description of structures and mechanisms employed by the company to enhance its value proposition and to create, delivery and capture value through customer, supplier and other stakeholder relationship management.

	Business Model		
	Internally	Customer interface	Supplier interface
1980's	<input type="text"/>	<input type="text"/>	<input type="text"/>
1990's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2000's	<input type="text"/>	<input type="text"/>	<input type="text"/>
2010 - 2015	<input type="text"/>	<input type="text"/>	<input type="text"/>
Next 5 years	<input type="text"/>	<input type="text"/>	<input type="text"/>

Further data comments/explanations:

5 Systematisation of main results, general discussion and conclusions

The objective of this chapter is to compare through retailers' role the evolution of the green food market in Denmark and Brazil. The systematised main results and general discussion of the Danish and Brazilian cases are explored concisely here. These two cases are presented in full papers in the chapters 3 and 4, respectively.

As Denmark has one of the highest green food¹⁷ market shares (9.2%) worldwide and which is led by the retail sales channel (97.0% concentration ratio in 2015), we consider the Danish market as the benchmark for the comparison structured here. Also, according to literature reviewed [e.g. (WILLER; LERNOUD, 2017)], while Denmark is considered a relatively mature market for organic food products, Brazil still is in its emergence.

Table 16 summarises the proposed set of indicators of the macro, meso and micro dimensions to analyse the green food market evolution presented in the methodological section of chapters 3 and 4. These indicators consist of the framework of analysis proposed to support the discussion that follows.

¹⁷ We are referring to organic food products and Fairtrade food products.

Table 16 – Framework proposed for the analysis of the green food market evolution

Dimension	Level	Indicator	Variable
Macro	Market	Direction and rate of the green food market development	Green food retail sales in Brazil Green food retail sales in the BRICS Green food retail sales in the world
		Sales channels concentration on the green food market	Organic food sales in the retail channel
		Convergence of retailers' strategic interest on green food sales	Strategic importance of green food sales
Meso	Sector	Convergence of retailers to eco-strategizing on the green food market	Green food sales strategy
		Impact of retailers' green food sales strategy on green food turnover	Green food sales strategy Green food turnover
		Retailer's performance on the green food market	Strategic importance of green food sales Green food sales strategy Green food turnover
Micro	Firm	Retailer's competitiveness on the green food market	Performance on the green food market relative to main competitors Share of the organic food market

We highlight that some of the results presented here are based on the perceptions of retailers' employees (management level) and market support stakeholders interviewed. Also, few results are built on only the expertise of one individual. This is the case of the sub-indicator "performance on the green food market relative to main competitors" of retailer's competitiveness on the Danish green food market. In some cases (Lidl Denmark, GPA group, Carrefour Brazil group, Walmart Brazil group), we also merged the data sources to fill gaps in the panel. For further details, please, refer to the methodological section of the chapters 3 and 4.

5.1 Macro dimension's indicators

The macro dimension's indicators measure the direction and the rate of the green market development, and the sales channels concentration on the green food market. Table 17 summarises the indicators assessed on both Danish and Brazilian papers (chapters 3 and 4).

Table 17 – Macro dimension's indicators comparison of the Danish and Brazilian green food markets, 2004-2015

Indicators	Denmark	Brazil
Direction and rate of the green food market development	Upward trend 11.7% annual growth rate	Upward trend 22.3% annual growth rate
Sales channels concentration on the green food market*	High 89.0% CR _{R, 2006-2015}	Medium 58.5% CR _{R, 2003-2015}

*Only organic food sales are considered. CR_{R, period} = retailers' average concentration ratio of the referred periods.

The first point to highlight is the high share of organic food products within the Danish and Brazilian green food markets. In the Danish case, the share of organic food sales was on mean 92.2% in the period 2004-2015. In the Brazilian case, the organic share accounted for 99.97% of the green food market, in average, in the same period.

The second point is, despite the differences in the magnitude of scales, as the Brazilian size of the green food market is small relatively compared to the Danish, their pathways are similar. Both green food markets are growing at a rate faster than the world's. In 2004, Denmark's retail green food turnover was €287.5 million, while the Brazilian was €31.2 million. In 2015, the Danish and Brazilian retail green food sales were €1,038.6 million and €361.5 million, respectively. This represents a remarkable annual growth rate of green sales in both countries.

The third point is that since the 2000s grocery retailers in Denmark and Brazil have become the main driving channel for green food with respectively high and medium concentration ratios. In Denmark, retailers accounted for an average market share of 89.0% in the green food sales during 2006-2015. In Brazil, retailers have on mean a share of 58.5% on those sales from 2003 to 2015. Supermarkets and hypermarkets are the two largest channels for organic food sales within the Danish and Brazilian grocery sectors.

It is worth mentioning that, in 2015, only 15% of the urban population in Brazil consumed some organic food products (ORGANIS, 2017). Also in 2015, the market share for organic products on food sales reached 8.4% in Denmark, which is the highest in the world according to the literature (WILLER; LERNOUD, 2017).

In conclusion, as large grocery retail groups are already highly dominant in the Danish green food market, in Brazil retailers are increasing its share in organic sales and becoming dominant as well. Both countries have a significant domestic market for green food products, in particular for the organic food. This indicates important shifts in the greening of the economy towards a more market driven development.

5.2 Meso dimension's indicators

The meso dimension's indicators measure the convergence of retailers' strategic interest on green food sales, the convergence of retailers to eco-strategizing on the green food market, and the impact of retailers' green food sales strategy on green food turnover. Table 18 summarises these indicators assessed on both Danish and Brazilian papers. Also, we consider that the market share accounted by the retail groups surveyed in Denmark and Brazil are sufficiently representative of the grocery sector in each country. Thus, it is reasonable to analyse the sectoral convergences and impact of these retail groups within the Danish and Brazilian retail sectors.

Still, we highlight that the generalization of the Brazilian grocery sector consider that the largest retail groups hold nearly a quarter of the food market sales and operate in almost the whole national territory. These two main characteristics make them a reasonable basis for generalization.

Table 18 – Meso dimension's indicators comparison of the Danish and Brazilian green food markets, 1980s-2020

Indicators	Denmark	Brazil
Convergence of retailers' strategic interest on green food sales	Convergent	Convergent*
Convergence of retailers to eco-strategizing on the green food market	Convergent	Convergent
Impact of retailers' green food sales strategy on green food turnover	Positive	Positive

*Although this indicator was not assessed because lack of data, it was inferred from the discussion in Chapter 4.

The evidence from Table 18 point to:

- Homogeneity in the strategic interest on green food sales in the Danish and Brazilian grocery retail sectors.
- Homogeneity in the Danish and Brazilian grocery retail sectors towards eco-strategizing on the green food market.
- A positive impact of green food sales strategy in the green food turnover of Danish and Brazilian grocery retail sectors.

The first point to highlight is that the GPA group's strategic interest on the Brazilian green food market shows an increasing trend similar to that one found in Denmark. Assuming that the retail groups Carrefour Brazil and Walmart Brazil also show trend lines upward regarding their strategic interest, which is implicit in the literature reviewed and from the perception of the market support stakeholders interviewed, at least a quarter of the Brazilian grocery sector have the same strategic interest pattern of convergence found in Denmark.

The second point is that retail groups' green food sales strategies are converging in the Danish and Brazilian grocery sectors. This sectoral convergence means, for example, that most retail groups are focusing on strategies types of just "making available" or "actively promoting" green food products, and very few are already explicitly considering green food sales as a "corporate competitive strategy". Still, it suggests that the most retail groups in Denmark and very few retailers in Brazil are operating in a highly competitive domestic food market and seeking to differentiate themselves through eco-innovative business models, or "green" business models¹⁸ as conceptualized in this thesis.

The third point is that the regression models estimated for the Danish and Brazilian green food markets suggest a positive impact of the green food sales strategy on retailers' green food turnover. In other words, as retailers align their strategies with environmental sustainability by marketing green food products effectively, their sales of green food products grow.

In conclusion, the evidence point to the alignment of the results of the meso dimension's indicators for the Danish and Brazilian grocery retail sector. The convergences of retailers'

¹⁸ For further details, please, refer to the section Green business models in Chapter 2.

strategic interest and retailers to eco-strategizing suggest that the green food products are the sales trend within the Danish and Brazilian grocery retail sectors. Also, the impact of green food sales strategies indicates a positive payoff on green food turnover in the Danish and Brazilian grocery retail sectors.

5.3 Micro dimension's indicators

The micro dimension's indicators measure the "green" performance and competitiveness of a retailer on the green food market. Table 19 summarises these indicators evaluated for the Danish and Brazilian cases (chapters 3 and 4). Also, in the papers, retailers' dynamic capabilities follow Teece's (2007, 2014) tripartite schema (sense, seize and transform), which are measured by the micro dimension's indicators and inferred from retail groups' strategic movements and business model developments over time.

Table 19 – Micro dimension's indicators comparison of the Danish and Brazilian green food markets, 1980s-2015

Indicators	Denmark							Brazil			
	Retail groups										
	Coop Denmark	Dagrofa	Lidl Denmark	Dansk	Supermarked	REMA 1000	Denmark	Aldi Denmark	GPA	Carrefour Brazil	Walmart Brazil
Retailer's performance on the green food market	H	M	M			NA			H	M	M
Retailer's competitiveness on the green food market	H	M	L			H / M / L			H	M	L

H=higher, M=medium, L=lower, and NA = not assessed by lack of data.

A visual assessment through the figures in chapter 3 and 4 allowed identifying the following greening patterns:

- The largest retail groups in Denmark and Brazil have the highest performance and competitiveness in their green food market. That is the case for the Coop Denmark and GPA as the largest retail groups respectively in Denmark and Brazil.
- The second and third largest retail groups in Denmark and Brazil vary in their green performances and competitiveness. Dansk Supermarked and Dagrofa, ranking as the second and third largest retail groups in Denmark, have respectively higher and medium competitiveness within the Danish green food market when compared with Coop Denmark. Carrefour Brazil and Walmart Brazil, as the second and third largest retail groups in Brazil, have medium green performances, and respectively medium and lower competitiveness within the Brazilian green food market when compared with GPA.
- Only in the Danish case, the small retail groups, i.e., the retail chains operating solely discount stores, have medium (REMA 1000 Denmark) and lower (Lidl and Aldi Denmark) competitiveness on the Danish green food market when compared with Coop Denmark. Nonetheless, Lidl Denmark has medium performance on the Danish green food market.

Also, we identified the following greening patterns from the discussions in the papers:

- Coop Denmark group started building its green dynamic capabilities very early during the emergence of the Danish green food market in the 1980s. Also, from the 1980s to 1990s, Coop Denmark's strategizing was proactive by "actively promoting" green food products and using a greener business model. From the 2000s onwards, Coop Denmark has been preemptively eco-strategizing through a green business model. Due to insufficient available data, we only infer that Dansk Supermarked group and REMA 1000 Denmark have started building its green dynamic capabilities in the mid-2000s.
- GPA group and Carrefour Brazil group started building their green dynamic capabilities in the 1990s when the Brazilian green food market was emerging. Also, from the 1980s to 1990s, GPA's strategizing was reactive by just "making available" green food products and using a conventional business model. In the 2000s, GPA's strategizing evolved to proactive, i.e. "actively promoting" green food products and using a greener business model. From 2010 onwards, GPA has been preemptively strategizing through a green business model. Due to insufficient data, we only imply

that Walmart Brazil group have started building its green dynamic capabilities only at the end of the 2000s.

In conclusion, the micro dimension's indicators imply that retail groups' strategizing to green food sales and related green dynamic capabilities building have been core to reach the levels of the Danish and Brazilian green food markets. Also, these indicators suggest for few retail groups in Denmark and Brazil that their eco-strategizing and green dynamic capabilities have been essential to sustaining "green" competitive advantage in their respective green food markets.

5.4 General conclusions

As the sustainable, environmentally-friendly and responsible food products become more evident, this thesis offers an important extension to the limited extant literature on the evolutionary and strategic management approaches on environmental sustainability through inquiring about the greening of the Danish and Brazilian food markets by grocery retail firms. Exploring the way the greening process has been occurring adds an understanding on another fundamental part of the dynamics of the greening of the economy in Denmark and Brazil, which is the greening of their food markets by retailers' "green demand".

Firstly, we point out that the green food market was scaled up mainly by large retail groups in both Denmark and Brazil. The Danish and Brazilian green food markets took shape when grocery retailers' "greener" strategic interest began growing by mid-1980s in Denmark, and in late 1990s in Brazil. Also, local organic food suppliers, market support stakeholders and other stakeholders (consumers, for instance) had a relevant role in the development of these green food markets. Still, it is relevant though to investigate the role of other players (food producers, distributors) for a "full story" on how the green food market co-evolved in Denmark and Brazil.

Secondly, because the food sector in Brazil is much less concentrated than in Denmark, the major retail groups' market share is not as large as in the Danish green food market. Nonetheless, the retail channel is dominant for the organic food sales in both countries. In Brazil, the green food sales channels, especially for organic foods, are to some extent diffuse, with a still significant participation of farmers' markets, government food procurement, and specialised shops.

Thirdly, Denmark and Brazil have interesting similarities regarding the green food market. Denmark and Brazil have green food market upward trends characterising their paths along the last three decades and expected to continue it until 2020. The organic food sales in Denmark and Brazil continue growing faster than in Europe and in the world, even though their gross national income per capita is decreasing.

We may conclude that our findings indicate that retail groups' strategizing towards environmental sustainability and related dynamic capabilities have been key to develop and sustain competitive advantage in the recent greening of the Danish and Brazilian food markets. Denmark is at a higher level of green food turnover than Brazil. This situation in Denmark suggests a more mature stage of its green economy, where a market-driven development may be seen as becoming important.

Furthermore, in a market such as the food market where green products are considerably more expensive than conventional ones, the Danish green food market level seems to be closely related to its green economy stage. Nonetheless, the Danish green food market is still a small share of the total food market (almost one-tenth) but with expectations of continuous rapid development. In Brazil, the green food market is still in its emergency but with signs of gaining pace and momentum as the important players are developing green business cases.

Theoretically, our analysis has contributed importantly to illustrate the co-evolution of green variety (grocery retail firms' strategizing) and selection (greening of the food markets) mechanisms. Also, it sheds light on the neglected demand side (retailers' green demand) of the greening of the economy. Hereby we have demonstrated that an evolutionary perspective brings many insights on the green economy and the dynamics behind it.

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