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2024-08-01

Deposited version:

Accepted Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Ferreiro, M. de F. & Salavisa, I. (2019). Innovation and business models towards a sustainable food system. In P. Liargovas, A. Kakouris (Ed.), Proceedings of the 14th European Conference on Innovation and Entrepreneurship, ECIE 2019 . (pp. 313-318). Kalamata: Academic Conferences and Publishing International Limited.

Further information on publisher's website:

10.34190/ECIE.19.119

Publisher's copyright statement:

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Innovation and Business Models towards a Sustainable Food System

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10.34190/ECIE.19.119

Abstract: Business models (BMs) and their link with cleaner, green production have been the subject of growing attention in the recent research on sustainability. Businesses are increasingly dealing with the challenges and opportunities associated with transition towards sustainability due to the adoption of new strategies to innovate and implement more suitable solutions for the new context. Many studies on a broad array of sectors and countries, notably farming activities and the food system in general (Smith, 2006; Spaargaren, Oosterveer and Loeber, 2012), have already documented this shift. This paper addresses the emergence and development of new business models (BM) envisaging the transition to sustainability. As little attention has been given to the food sector in this regard, the research presented reflects on BM innovation both generally and in the specific case of the food sector by presenting the case study of an innovative farm in Lisbon Metropolitan Area (Quinta do Oeste). The study is part of a Project on Spatial Planning for Change (SPLACH). The case study allows the identification of several aspects to make the food business more sustainable in certain parts of the value chain, specifically production and commercialization (short chain supply). The study was carried out with primary data collected through extensive interviews with key actors, namely the farm's representative, and visit/detailed observation of the farm. The research shows how sustainable food production and commercialization have given rise to new offerings and demand. In terms of originality, this research aims to contribute to and stimulate the discussions on the need to create novel and more sustainable business models in the food sector. The research identifies different elements that contribute to the innovation of BM for more sustainable farms, more specifically the importance of entrepreneurs' values as a driver of sustainable pathways and the centrality of producers' networks in the implementation of innovative BM. The study also highlights the need to address research gaps in the theoretical and methodological dimensions of the food system transition.

Keywords: food system transition; sustainable business models; organic farming; technological innovation; commercialization practices

1. Introduction

Transition to sustainability is at the top of the political and policy agenda in most countries. It requires structural transformations in several distinctive domains, involves a range of actors and organisations, and calls for new policies.

Low-carbon transitions in agriculture and the food system pose major challenges. They involve a multitude of actors, from farmers to consumers. Niche innovations are still relatively incipient due to the high costs of organic products, entrenched diet preferences, a powerful and conservative industry and weak policy incentives, both pecuniary and regulatory (Geels et al, 2017). However, the variety of bottom-up experiments involving consumers, producers, municipalities, associations and public entities that is taking place in this domain makes this a very interesting case (Spaargaren, Oosterveer and Loeber, 2012).

These experiments have come about because of the search for better quality food, ethics values and environmental concerns, among other reasons. They quite often combine to trigger changes in social practices related to nutrition by both the consumer and producer.

In this paper, we will focus on the production side, more specifically on the organic farming business in Portugal. We will demonstrate how new organic food producers are using modern and conventional productive knowledge and practices and new commercialization methods, through new business models.

The paper is organized as follows: section 2 presents the main characteristics of the food system in its specificity; section 3 summarizes and discusses recent approaches to sustainable business models and how this literature is appropriate to study the food system transition; section 4 consists of a brief presentation of the methodological options of this paper; section 5 presents a case study; and section 6 concludes.

2. Food system transition and the emergence of new farming business models

In agriculture, transition means a shift from “the ‘productivist regime’, characterized by production growth, high yields and input intensification, to a regime built around the principles of sustainable production” (Brunori et al, 2013, p.28).

The new post-productivist regime (Smith, 2006) is characterized by organic practices, at odds with the mainstream, that include respect for the carrying capacity of nature and healthy conditions in animal husbandry. Crop rotation and natural fertilizers have been retrieved from the old tradition for soil preservation. Natural forms, such as mechanical weeding, have also been re-adopted to avoid the usage of pesticides. Rather than specialization, the ideal model of the new businesses is mixed farming with a variety of crops and activities in a single farm (Smith, 2006).

Therefore, in spite of the potential benefits of technological advances, some authors claim that the specificity of this system means “technology may be categorically dismissed as a potentially productive analytical entry point for work on sustainability transitions in food and agriculture” (Hinrichs, 2014, p.147).

Whereas the energy system transition has depended largely on the emergence and scaling up of new renewable energy technologies, the food sector transition has to rely on the combination of a myriad of experiments, where technological innovations play, at least for the moment, a much less prominent role (Geels et al, 2017). New organizational and commercialization solutions appear as most relevant, namely under the form of new business models.

Many of the new BMs that have emerged have the interesting characteristic of relying on both traditional knowledge and sophisticated new technologies in farming and commercialization.

On the one hand, the new farms resort to inputs from biotechnological advances to improve cultivation methods and test products and soil; they also use the internet for functions such as advertising, implementing orders, invoicing, etc. On the other, they use established traditional knowledge about soil conservation and farming practices. Rather than specializing, they try to combine crops like berries, orchards, vegetables, etc. and complementary activities, such as farm shops and restaurants, the organization of field trips and short training courses, technical consultancy, etc.

In commercialization, new and old also combine in diverse ways that involve farmers’ markets, box schemes, traditional food shops, new organic products, retail chains and incumbents’ food departments dedicated to organic produces. The expansion of short supply circuits that minimize the harm caused by long distance commodities transportation, sometimes overseas, is another example.

The new businesses have to become economically viable to survive. As their products are more costly than in industrialized farming, they have to explore a market niche where quality rather than price is valued most.

Therefore, they depend upon the creation of supportive networks of customers, retailers, local authorities and public entities who prioritize food quality and express environmental concerns. These networks permit the sharing of knowledge and information, they organize and fuel joint commercialization channels and provide moral support to the pioneers. In addition, they reinforce the sense of belonging to a group that has a strong identity, one that contrasts with the mainstream behaviour and value patterns (Ingram et al, 2015).

Public entities can also play a relevant role in this case through quality food procurement by schools and hospitals canteens. Moreover, public campaigns aimed at promoting healthy diets gradually stimulate the market expansion for quality food – fresh, seasonal, organic – with less impact on the environment (Bui et al, 2016; Cohen and Ilieva, 2015).

3. Business Models and Sustainability

The Business Model concept focuses on how firms, their partners and customers deal with the creation, delivery and capture of value (Osterwalder et al, 2005, cit in Kurucz et al, 2017: 193).

Recent research on sustainability within management sciences addresses innovation in business models (BM), with an explicit reference to sustainable goals. The food sector, however, has not been privileged either in this research topic or in the transition literature generally. This gap is explained by the specific nature of the sector (agriculture-based) and its evolution patterns.

Hinrichs (2014), for instance, explains the state of the art on this issue as due to:

- Firstly, the focus on technological solutions of the dominant transition literature is in opposition with the biological features of food and agriculture;
- Secondly, there is widespread critical appraisal among sustainable agriculture scholars of capital intensive technologies for sustainability transition in food related activities;
- Thirdly, the research on transition pathways in this sector has privileged social and civic movements in support of sustainability rather than economic aspects.

Research on BM's role in the implementation of sustainability goals has been centered on the following areas: i) BMs and their relationship with sustainability; ii) and innovation in BM leading to transition to sustainability.

The literature on the first aspect notes the difference between conventional BMs and sustainable BMs. According to Kurucz et al (2017), the conventional BM "aims at the creation of economic value through the exploration and exploitation of market opportunities through strategically designed, competitive business models. However, this approach ignores a fundamental downside: the possibility that natural, social, and economic value is destroyed outside of business models' conventionally defined scope"(Kurucz et al, 2017: 193). Indeed, this is a fundamental aspect. The same authors highlight the limitations of conventional BMs and the need to present a specific approach strategically and explicitly aligned with sustainability goals. Therefore, the shift towards a BM aimed at sustainability involves "innovations that create significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organization and its value-network create, deliver value and capture value (i.e. create economic value) or change their value propositions" (Rosca, Arnold and Bendul 2017: 137).

The literature identifies a reference framework in sustainability terms (Framework for Strategic Sustainable Development-FSSD). This framework is considered in the design of BM for sustainability purposes, such as the Model Canvas (BMC), Strongly Sustainable Business Model Canvas (SSBMC), and Future-Fit Business Benchmark (F2B2). These types of BM design share the same purpose (sustainability) and incorporate different tools, languages and actors. In the case of SSMC and F2B2, for instance, research considers the role of relational leadership and collective meaning in order to translate and share the complexity of knowledge involved in the sustainability debate (environment, social and economic) (Kurucz et al, 2017). To this end, some authors (Upward and Jones, 2016) add the need to mix different disciplines and, therefore, the importance of interdisciplinarity in 'strong sustainable business models'.

The following alternative definition of BM emerges from these approaches: "[the business model is the construct by which] an enterprise determines the appropriate inputs, resource flows, and value decisions and its role in ecosystems, whether natural, social, or economic. Sustainability measures are those indicators that assess the outputs and effects of business model decisions" (Upward and Jones, 2016, p.98).

The design of BMs that explicitly incorporate sustainability present some common traits, namely:

- A disciplinary scientific approach: boundaries crossing and integrating different scientific areas (interdisciplinarity), providing and expressing the complexity of sustainability matters, and their corresponding translation in 'simple' business principles and indicators.
- A first technical-methodological step, with the use of creative tools and participative methodologies, in order to identify distinctive actors/stakeholders in the value chain and the promotion of their cooperation and knowledge exchange through networks.
- A second methodological-technical step, with the creation of sustainability indicators and the assessment of business outputs in sustainability terms.

As previously mentioned, there is scant research on the relationship between BMs and sustainability in the food sector. The conclusions achieved by Karlsson et al (2018), for instance, are very similar to the above insights on BM and sustainability. In fact, and by establishing this link in the case of a Swedish biogas farm, the authors identify three fundamental aspects for the success of a BM: i) commitment, participation and management of stakeholders relationships and, therefore, the “importance of establishing networks or cooperatives with stakeholders and business partners to create BMs that contribute to the sustainable development of the economy, the environment, and society” (Karlsson et al, 2018, p.2769); ii) an out-of-the-box thinking by “including fringe stakeholders”; iii) adoption of a user-friendly business-modelling tool (Karlsson et al, 2018, p.2769).

To sum up, the research on the food sector transition to sustainability should consider the specificities of this sector, namely its territory-based nature and the multiplicity of actors involved and their relations. The case under analysis presented herein is a good illustration of BM innovation for sustainability purposes.

4. Methodology

The first step of the empirical study was to gather information about the most innovative experiments in organic farming in the Lisbon Metropolitan Area (LMA), and to select individuals for face-to-face interviews.

The second step, based on the theoretical background, was to build a semi-open questionnaire to be applied to the business representatives. The questionnaire is organized in blocks, namely on the origins and evolution of the experiment; the profile and motivations of the interviewee; the existence of public support for the initiative; the characterization of the activities and the distinct business model dimensions, notably the productive and commercialization strategies, including the relationships and networking with suppliers, customers and similar producers; and the technological options in farming and commercialization.

The third step consisted of a scheduled visit to the venue and facilities of the selected farm (cultivated plots, greenhouses, warehouses, transformation facilities, farm shop and restaurant), and applying the questionnaire in a face-to-face interview with the farm’s main representative. After obtaining permission, photos were taken and the interview audiotaped. The products were tasted over a meal in the farm restaurant. Finally, the tape was transcribed and interpreted in the light of similar experiments reported in the literature.

5. Case study

Quinta do Oeste, a family organic farm business located in the Lisbon Metropolitan Area (LMA) was selected for our case study. A visit was made to the farm in October 2018, when we conducted a semi-structured interview with the farm’s main representative (owner and manager) and ate an organic food meal at the restaurant in the farm complex.

The current owners’ family acquired the farm in the late 1960s. At the time, it was dedicated to fruit production. Between 2007 and 2009, the heirs began the process of converting part of the farm to an organic production system with a view to incorporating differentiated products and creating a registered trademark.

The farm currently has 14 hectares dedicated to biological certified production. A further 13 hectares, essentially the old orchard that they have not been able to reconvert, is farmed using conventional methods. They produce, transform and distribute agri-food products and provide environmental and awareness training through workshops and field trips, including for schools.

In addition to their own production, they also buy from intermediaries to complete their offer (e.g. fruit, potatoes, onions and carrots). They sell 600 hampers a week in LMA through home delivery. They also sell directly to the public in their own shop and in local markets (e.g. Príncipe Real, Campo Pequeno, Cascais). The farm’s main activities are complemented by a restaurant on-site where they serve high quality meals made of organic products.

In 2010, they obtained financing from the PRODER programme to convert facilities (greenhouses, and plant processing/packaging). More recently, they received support from the LEADER - Local Action Group to remodel the restaurant facilities. Both programmes rely on European Union funds (Common Agricultural Policy). This means that public funding has been important to the success of this initiative.

The interviewee also noted the importance of informal collaborative networks with other organic producers, not only for the exchange of knowledge and information but also for the supply of products to complete their offer. This seems to be a common trait of this emerging sector in Portugal and elsewhere (Smith, 2006). A strong sense of belonging to a new community, which endorses full responsibility on environmental issues, is reinforced through these networks. Reference was also made during the interview to customers' growing awareness of sustainability values, which has allowed Quinta do Oeste to start the process of using alternatives to plastic in hampers more quickly.

The bet on brand development and communication was essential to the business strategy. Social networks (Facebook, Instagram, etc.) were just emerging when the project began but it is now essential both to feed these channels and to get their input in the company's web site. Together, they also function as virtual stores.

The marketing strategy also targets big companies by sending newsletters to firms that act as delivery points, such as Roche, Microsoft, EDP, etc, and offering their employees discounts. This illustrates how Quinta do Oeste has built a sustainable business model, combining traditional knowledge, sustainability values and practices, and the intensive use of technological platforms. Table 1 depicts Quinta do Oeste's particular business model and shows the main elements and relationships along the value chain.

Table 1: Case study: a value chain approach

Value Chain	What	Where	How
Production	Seasonal organic vegetables and fruit	Local farm (14 ha; owner) Other producers (local and regional)	Traditional techniques New techniques Informal networks (trust-based)
Transformation	Seasonal organic vegetables and fruit	Local farm and restaurant (14 ha, land ownership)	Traditional techniques New techniques
Commercialization	Seasonal organic vegetables and fruit	Local and regional (LMA) Local shop (owner)	Internet consumer registration and orders Domestic and enterprise delivery (own vehicles)
Consumption	Seasonal organic vegetables and fruit	Local restaurant, local and regional consumers (LMA)	

The case is characterized by options and values involved in the different steps of the value chain. In fact, the BM has been designed through a combination of the entrepreneur's personal values and options (e.g., ecological and environmental values) and sound management principles and rules. The entrepreneur's education in management is an important aspect of her approach to business and explains the development of complementary activities, like the workshops and fieldtrips, the local restaurant and the shop. In fact, the business revenues are stabilized by these multiple activities.

The key elements of this BM case are as follows:

- Land ownership.
- Local production combined with production from other Portuguese regions within informal and trust-based networks. These networks allow the delivery of products that are temporarily unavailable or not produced at Quinta do Oeste. In addition, they permit the sharing of information, knowledge and encouragement.
- Seasonal products allowing the respect of natural cycles and the environment (land, ecosystems, water).
- The integration of different parts of the value chain in the same enterprise: production, transformation, commercialization, and consumption.
- The centrality of the web platforms, which allows them to offer consumers and the community a range of important services: registration as a customer, weekly orders of hampers, information on seasonal products (e.g., their life cycle, nutrients and importance to health), information about other activities at the farm (restaurant, cooking workshops).
- The multi-dimensionality of this case as a sustainable business in the food system: economic (production, transformation, commercialization, consumption), environmental (organic production), and social (field trips, knowledge dissemination within a large community).

Integration and diversity are key words in this case: knowledge (old and new), communication tools (informal, web), sustainability goals (economic, social and environmental), and value chain components (production, transformation, commercialization, consumption). Based on these principles, the sustainability, economic and social dimensions of this experiment have proved to be successful.

6. Conclusions

Quinta do Oeste is an interesting case of BM innovation aimed at sustainability in the food sector. Quality food and sustainable practices are the main objectives of this business, which has proved very successful.

The results from this research are in line with insights offered by previous studies on BM and sustainability. This is the case of the importance of an explicit and strategic commitment to environmental and ecological values, and concern for the rules and eco-practices of the different stakeholders (producers) participating in the informal producers' networks supplying organic hampers to LMA consumers. Finally, Quinta do Oeste's mandatory bio certification schemes confirm the relevance of assessment to sustainable BM mentioned in the literature review.

This case also stands out for its sense of commitment to environmental and ecological values through a broad and multidimensional approach (ecological, economic and social). More specifically, it targets a specific market segment that is very sensitive to food quality and sustainable farming practices rather than to food price, captures a higher share of the value created through a sales scheme based on short supply chains, and develops complementary activities, such as a restaurant, a shop in the farm complex and the organization of field trips.

The case highlighted key aspects of the research on transition pathways to more sustainable BMs in the food sector, namely the need to reflect on specific theoretical frameworks. In fact, and unlike sectors such as energy, the food system involves an enormous number of very diverse actors in terms of type, size and power.

The specificity of the food system means that the consumer side and the change in societal values such as the concern for the planet, health, and quality of life must also be taken into account.

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