

Sustainable Triple-Layered Business Model Canvas

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Developing more sustainable business models (BMs) has become increasingly crucial for the survival of agri-food industries as environmental and social pressures are escalating, and the fruit and vegetable (F&V) industry is no exception to this pattern.

Keywords: sustainability ; business model ; triple layered business model canvas

1. Introduction

Sustainability transition is affecting all components of the food system, fundamentally changing the way food is produced, marketed, and consumed ^{[1][2][3]}. This is being largely driven by the major breakthroughs in national and international commitments toward the adoption of transformative agendas for ensuring food security and nutrition whilst strengthening sustainability and supporting inclusive livelihoods in agriculture and food systems ^{[4][5]}. Yet, there is a globally growing consensus about the need to move toward different food systems with less land and fewer fertilizers and pesticides, less food waste, a high-tech food chain that requires fewer resources and energy, and more equitable distribution of costs and revenues among supply chain participants.

In this changing environment, one of the major challenges in the agri-food sector is the pressing need for the adoption of more sustainable business models (BMs) which take into consideration environmental, social, and governance factors in order to create long-term value for investors, consumers, and the society as a whole ^{[6][7][8]}. Indeed, developing more sustainable BMs is becoming increasingly crucial for the survival of agri-food industries as environmental and social pressures are escalating. Pressures originate from different types of stakeholders (workers, consumers, value chain participants, local communities, government, NGOs), and largely result from resource scarcity, the climate-land-water-biodiversity crises, and socio-economic inequalities ^{[1][9]}. Sustainability commitments constrain food businesses to produce and market food of the best possible quality, in sufficient quantity for a growing population, trying at the same time to minimize the environmental impacts generated, and even to regenerate the environment in which food is produced.

Food production should also adapt to and comply with new policy orientations which all have more focus on sustainability. In the European Union (EU), the main policies include the new CAP 2023–2027 and its new instruments like eco-schemes ^[10], the EU Farm to Fork Strategy within the framework of the European Green Deal and the climate neutrality objective by 2050 ^[11], the EU 2030 Biodiversity Strategy for protecting nature and ecosystems ^[12], the EU fiscal policies to mitigate climate change including the foreseen Carbon Border Adjustment Mechanism (CBAM) as a tool that will force foreign importers to cover the cost of their carbon emissions ^[13]. This is in addition to other national and regional policies increasingly more sustainability-oriented ^[14].

The fruit and vegetable (F&V) sector is no exception to this ongoing path toward further sustainability ^{[15][16][17]}. In Spain, F&V represents the most relevant agricultural sector in terms of production, added value, export propension, job creation, and maintenance of the population in rural areas ^{[18][19][20]}. Spanish F&V production reached 28 million tons in 2020 with an average production value of EUR 15,800 million, which places Spain as the leading producer in the EU and the fifth globally ^[21]. F&V production represents 50% of the Spanish plant production, and 30% of the total agricultural production. In addition, 50% of the national production is destined for foreign markets, generating in 2020 EUR 14,600 million and a positive trade balance of about EUR 11,200 million ^[21].

The Spanish F&V supply chain is highly adapted to the type of market it serves, involving a wide range of products and a huge variety of agents operating from the producers to the end consumers ^[22]. **Figure 1** summarizes the schematic diagram of the F&V supply chain covering both fresh and processed products, and portraying the main stages, participants, areas of activity, and their respective interrelations.

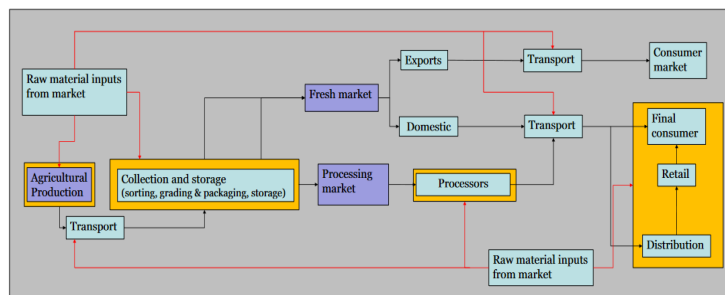


Figure 1. Structure of the F&V supply chain.

Sustainability is at the heart of the challenges the Spanish F&V industry will face in the future ^[17]. Major challenges can be summarized as follows: (i) food safety requiring precise control of products that allows quick corrective actions in the event of any incident; (ii) quality and freshness within increasingly integrated and agile value chains; (iii) traceability and transparency based on data that move from the field to the consumer and also in the opposite direction; (iv) environmental sustainability tending toward the control and reduction of environmental impacts through measuring footprints, optimizing the use of water, fertilizers, energy, and phytosanitary products, minimizing food loss, and improving biodiversity; (v) social sustainability ensuring a decent income for farmers, generation of employment, gender equality, and contributing to integrate minorities and promote rural territories; (vi) cost efficiency through applying precise and real-time control of all costs per unit of marketed products, with a vision from the field to the market, and making efficient use of all human and material resources; (vii) integration of management and collaboration from the field to the market in a highly demanding value chain in terms of quality and costs; (viii) digitization of operations and data flows as a key tool to measure and obtain tangible improvements in all business activities, particularly in the field of environmental sustainability, as it helps to make better decisions and automate many actions aimed at the efficient use of scarce resources such as water, fertilizers, phytosanitary products, energy, and materials for containers and packaging. In addition, digitization facilitates the reduction of food waste from the field to the market, the synchronization of pre- and postharvest, as well as logistical efficiency and more segmented and precise marketing ^{[23][24]}.

In this context, sustainable BMs play a crucial role in addressing the overmentioned challenges that the F&V sector is and will be facing in ensuring access to safe, nutritious, and affordable products while protecting the environment and the well-being of consumers and stakeholders. It can be hypothesized that sustainability transition coupled with supply chain innovations prompt new BMs in the F&V sector that enable the move from the standard economic-centered BMs towards more sustainable BMs, explicitly integrating environmental and social concerns. However, sustainable business modelling is still poorly understood despite its importance to managers, scientists, and policymakers confronting the complexities of business environment changes ^[2]. While sustainable BMs are an emerging topic in the whole agri-food industry including the F&V sector, few tools exist yet to support companies and organizations implementing them ^[25]. This clearly reflects the lack of knowledge about how sustainability objectives can virtually be implemented in BMs of the F&V sector to deliver not only economic but also environmental and social value.

2. Sustainable Triple-Layered Business Model Canvas

The overall approach is based on the business model (BM) concept where the standard, economic-centered BM is innovated and transformed into a sustainable BM through the integration of sustainability practices and concerns. It should be pointed out that there is no exact definition of BM in the literature, but various conceptualizations basically based on the reason for which a BM is being used and the researcher's theoretical perspective ^{[26][27]}. For instance, according to Amit and Zott ^[28] a BM depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities. Johnson et al. ^[29] proposed a definition of a BM as "creating and delivering value by well connecting four factors: customer value proposition, profit method, core resources, and core producers". Therefore, it can be stated that BM is a logical description of the techniques through which a business creates, communicates, and gains value with related customers.

Firms and organizations whose focus is primarily on profitability without paying attention to social and environmental issues can limit the achievement of their economic goals ^[30]. This was the main reason behind the emergence of sustainable BMs as an alternative to traditional BMs, with a focus not only on attaining growth and minimizing financial costs but also on considering environmental and social factors. Sustainable BMs can be conceived as creators of competitive advantage and sustainable value ^[31], and a contributor to sustainable development. The sustainable BM avoids waste and achieves more financial performance which benefits society, the environment, and the economy ^{[32][33]}. Hence, sustainable BMs shape not only a firms' production and distribution of products and services but at the same time

their manner in contributing to the environmental and the social improvement of communities. In sustainable BMs, companies integrate their social, environmental, and economic activities in order to create value for their customers and the whole of society. By following a triple bottom line approach, sustainable BMs consider a wide range of stakeholder interests, allow the embedding of sustainability into business purposes and processes, and can serve as a vehicle to coordinate technological and social innovations with system-level sustainability ^[34].

In this line, Joyce and Paquin ^[35] suggested a new BM representation termed the Triple Layered Business Model Canvas (TLBMC), aiming to adopt the three-layer approach in which emphasis is addressed not only on economic but also on social and environmental orientation of the BM. The TLBMC is a holistic managerial tool that combines the economic, environmental, and social concerns, while coherently integrating them in the business system. The TLBMC represents a substantial shift in sustainability innovation aligning consistently the traditional (economic) Business Model Canvas (BMC) proposed by Osterwalder and Pigneur ^[36] with other two social and environmental layers ^[37]. The 3-layer structure of the TLBMC is extensively explained in Joyce and Paquin ^[35]. Each layer has nine standard building blocks. The TLBMC is perceived as a significant contribution to the field of sustainable BM innovation ^{[37][38]}, and a practical tool with a straightforward learning curve in terms of development, visualization, and communication of sustainable innovations in the BM ^[39].

Moreover, the TLBMC helps in overcoming the unconventional sustainability challenges through the conceptualization and connection of various types of value creation modes within a BM perspective. The three different layers of sustainability presented by the TLBMC facilitate the understanding and the capture of the interconnections between a business action and its economic, environmental, and social impacts, which leads to creatively presenting more sustainability-oriented and innovative BMs. This model also enables a structured representation of business activities and issues in such a way that they can be more understandable, visible, and useful for business planning.

Other features of the TLBMC are the use of inside-out approaches, which implies starting with the existing BM and then exploring the potential changes and improvements. For impact analysis, the model can use life cycle analysis (LCA) in the environmental layer to measure the environmental impacts through various indicators like CO₂e, eco-system quality, human health, resource depletion, and water use. It also uses a stakeholder approach in the social layer to evaluate social impacts using methods such as social-LCA and Social Return on Investment (SROI), and implementation of the ISO 26000 standard for social responsibility (i.e., identification of key stakeholders and mapping with them the boundaries and indicators of economic, social and environmental impact analysis). The perspective of the stakeholder approach is to balance the interests of all partners rather than maximizing gains for only one participant. As for economic impacts, they can be assessed by investment appraisal methods such as Net Present Value (NPV), Life Cycle Cost (LCC) analysis, and profit margins ^[40].

Admittedly, when applied in practice the TLBMC model should be conceptually adapted to the specific context of each study case, and then empirically validated with the required data. Researchers take both the F&V sector as a whole (meso-level) and a selected company (micro-level) as key units of analysis. Researchers assume that applying the triple bottom line analysis to the whole sector can be useful as a step toward developing more tailored BMs at company level. Although micro-level analysis can be undertaken through several approaches including case studies as explained in the next section, it is worth recalling that most of the agri-food system analyses actually emphasize the meso-level of the system ^[41]. While the macro-level perspective tends to perceive agri-food transformations as top-down processes induced by techno-economic change at global level, meso-level approaches show that bottom-up change is an option where the focus is on institutional and organizational change as well as collective action ^[42]. Socio-economic change is particularly important at the meso-level as most agri-food producer and consumer institutions and organizations as well as regulatory systems are primarily operational at the meso-level (sectors, regions). Meso-level institutions mediate between macro-institutional level at which general rules are established and the micro-institutional level within which transactions are organized ^[43].

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