



The Ecocanvas as a business model canvas for a circular economy

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ABSTRACT

Today's linear economic model is increasingly problematic. Creating a closed-loop model in production and consumption is a preferred alternative to address environmental and social damages associated with the linear economy. This paper proposes the Ecocanvas as a single tool backed by a methodology for enabling businesses to coherently formulate unique circular value propositions based on a lifecycle perspective. The tool is valuable for rethinking and personalizing sustainability and circular economy by more practically tackling the three dimensions of sustainable development while being adaptable to the organization's context. To a better understanding of the Ecocanvas value, this paper describes the tool's key features and elements through a detailed analysis of small to medium scale winery business models. We contribute to the debate on sustainability and business model literature while providing a practical tool for industry and policymakers transitioning towards a circular model. In addition, this paper contributes to the circular economy body of literature through the development and application of the Ecocanvas that focuses on a holistic approach. As a practical contribution, this study develops and provides a structured, well-researched, and tested tool supported by a methodology that can be used by many stakeholders. Further research could explore the practicality of the Ecocanvas methodology through case studies in different sectors of activities and contexts.

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1. Introduction

The global population, which currently stands at 7.3 billion individuals, is estimated to reach 9.7 billion by 2050; such an increase in population cannot be sustained by an already declining global supply source. A rising demand and consumption rates, significant environmental pressure, and inequality gaps directly accompany this increased population (Pla-Julian and Guevara, 2019; Malik, 2014; UNEP, 2015).

Today's economic growth has so far largely been based on purchasing, consuming, and disposing materials after a single-use. This linear economy, in which natural resources are turned into products with the leftover value being discarded instead of being reduced, reused, or recycled (Sariatli, 2017). This problematic economic model, has over 61% of non-renewable materials used to produce short-lived products that have a lifespan of less than one

year (De Wit et al., 2018; Jonker et al., 2018). It is also resulting in a high turnover rate of obsolete products (Jonker et al., 2018) that primarily end up in landfills. As such, the conventions of the linear economy cannot continue to supply growing demand on natural resources as "nature approaches tipping points where the world irreversibly loses its capacity to sustain the biosphere" (Sariatli, 2017). As environmental issues grow in severity and intersect with social issues, the ethical concerns of consumers are rising (Lee, 2008; Uusitalo and Oksanen, 2004). Anticipating that consumer concerns will continue to rise, customary businesses will be more pressed to shift toward eco-friendly and socially responsible means of production (Andries et al., 2019; Giddens et al., 2016).

To better control resource extraction, moderate scarcity, and price volatility while responding to future demands, a conceptual instrument has emerged from the sustainability movement known as the circular economy (Ellen MacArthur Foundation, 2013; Pla-Julian and Guevara, 2019; Witjes and Lozano, 2016). Based on the principle of "closing the life cycle" of products by reducing the consumption of resources, the circular economy belongs to the

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sustainable development framework (De Sousa Jabbour et al., 2019). As such, according to the Ellen MacArthur Foundation, a circular economy is “an industrial economy that is restorative or regenerative by intention and design” (2013; p.14). Entrenched at the core of environmental science and sustainable development concepts (Elia et al., 2017; Sauvé et al., 2016), the circular economy paradigm differs by introducing a new perspective where “economic growth is decoupled from resource consumption and pollutant emissions as end-of-life materials and products are conceived as resources rather than waste” (Elia et al., 2017). One can describe it as a regenerative and reforming system in which resources, as well as waste, emissions, and energy leakage, are minimized through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling (Geissdoerfer et al., 2017). Consequently, the circular economy involves an improved and efficient usage and valuation of resources that will in return require new business models implemented by companies (Jabbour et al., 2019).

Transitioning to a circular economy requires systematic change at all levels, including eco-innovation and technology, as well as optimization in the chain of production with a focus on alternative business models, broader relationships with suppliers and clients, and logistical changes (Witjes and Lozano, 2016; Stephan et al., 2019). The circular economy could boost global competitiveness, foster sustainable economic growth, and generate new job markets (Smol et al., 2017).

Despite being a step in the right direction, sustainability-oriented thinking has not been able to create the significant change and integration needed within the organizations and among their stakeholders (Adams et al., 2015; Geissdoerfer et al., 2017; Joyce and Paquin, 2016). The circular economy gives more practicality on how to mitigate environmental damages but undervalues social issues (Murray et al., 2017). The transition, away from a linear economy, is challenging as it involves incremental changes within the following four building blocks: material and product designs, new business models, global reverse networks, and enabling conditions (Lewandowski, 2016; Planing, 2015). Additionally, circular economy business models represent a key challenge in terms of implementation, due to the design of closing the loop products, as well as the difficult management of material flows (De Sousa Jabbour et al., 2019). Therefore, to achieve the economic transition, policymakers and the private sector should be working hand in hand (Ellen MacArthur Foundation, 2015; Lewandowski, 2016; Van Renswoude et al., 2015). Rethinking the application of sustainability and social inclusion in the circular economy requires continued innovation and development of green businesses and organizational models that can drive responsible economic growth (Norden, 2012; OECD, 2011). According to Ellen MacArthur Foundation (2017), the transition to a circular economy is based on the following fundamentals: (1) circular economy design, (2) new business model, (3) reverse cycles, and (4) enablers and favorable system conditions.

Therefore, this paper focuses on the second fundamental feature of the transition to a circular economy by presenting the Ecocanvas as a practical tool for rethinking, developing, and integrating social and environmental exchanges into business models. The Ecocanvas gives us the opportunity to address the weaknesses of both conceptual approaches, which are the sustainability and circular economy concepts, by placing the focus on personalizing and rethinking how the economy, society, and environment integrate into a given business and context.

Ecocanvas coherently allows businesses to create a unique circular value proposition from a lifestyle perspective. The tool allows organizations to rethink circular economy and incorporate environmental and social aspects “by creating a methodological

approach to help businesses become more sustainable to the new paradigm of the circular economy” (Cerantola, 2019). It aims to provide entrepreneurs and enterprises with a visual tool that explicitly integrates circular economy strategies into the different additional layers of the model. The tool is adapted to users who desire to re-conceptualize their current business model or discover and communicate sustainable and circular potential innovations. To highlight and clarify the Ecocanvas’ practicality, this paper describes the model’s key features and elements through a detailed analysis of small to medium scale wineries’ business models. This paper will provide a road map for wineries and other industries that wish to examine the potential of circular business models for themselves.

We narrowed down the scope of our study to only include small and medium-sized wineries, as most of the available research on business sustainability and sustainable use of resources targets larger industries (Fassin et al., 2011; Singh et al., 2020). In order to illustrate how to use the Ecocanvas, this paper will take the wine industry as a case study for how to drive more responsible economic growth. During the winemaking process, large amounts of wastewater and waste are generated (Ruggieri et al., 2009), where 70% of the water intake is transformed into wastewater (Knowles and Hill, 2001). A high provision of materials and energy are required throughout the wine process, starting from grape growing, to winemaking, followed by glass bottle manufacturing, to product transportation, subsequent refrigeration, and bottle disposal activities (Aranda et al., 2005; Ardente et al., 2006; Nicoletti et al., 2001; Notarnicola et al., 2003; Pizzigallo et al., 2008; Point et al., 2012). This process contributes to the generation of environmental emissions as well as resource depletion. According to Ruggieri et al. (2009), two to three million tons of waste per year are generated by wine industry in Spain alone, of which 80–85% is organic. Formed during the winemaking process, winery waste can be described as by-products that can subsequently be extracted and used for different purposes (Devesa-Rey et al., 2011).

In order to achieve the objectives as mentioned above, the paper is divided as follows: in sections 2 and 3, the development and justification of the circular business model are reviewed. In addition, the theoretical framework, as well as the current economic, social, and environmental challenges that have led to the creation of the Ecocanvas, are presented. As for section 4, the Ecocanvas’ applicability to the wine sector is discussed through a detailed analysis of the model and the different blocks. Section 5 discusses the implications of the Ecocanvas for theory and practice. Finally, section 6 concludes the paper with a summary of the primary outcome of the study, as well as the limitations and areas for further investigation.

2. Building the Ecocanvas

2.1. Origin of the Ecocanvas

The Ecocanvas used in this paper was created based on Osterwalder and Pigneur, 2010 original business model canvas, which is a widely used tool. We relied on the definition of Osterwalder and Pigneur (2010) for defining the business model as a tool that “describes the rationale of how an organization creates, delivers, and captures value” (p.14).

Osterwalder and Pigneur, 2010 business model canvas was created through nine building blocks that cover four main areas of a business: customers, offer, infrastructure, and financial viability (p.15). The business model canvas classifies the businesses’ processes and internal activities in nine interlinked categories, each representing a building block. The first building block represents the customer segments, which is the heart of any business model. This

category defines the various groups of customers or organizations that any enterprise aims to target based on the common needs and behaviors (p.20). The second building block comprises the value proposition, which defines why a customer chooses a company over another. The value proposition category is characterized by a combination of products and services that create value for a certain type of customer (p.22). The third building block (channels), describes the means that a company uses to reach out to its customers in order to deliver a specific value proposition. The different channels are composed of communication, distribution, and sales channels (p.26). The fourth block (customer relationship), focuses on the type of relationship a company builds with each of its customer segments (p.28). The following category is the revenue stream, which is best described as the earnings a company is generating (p.30). The sixth building block (key resources), categorizes the most important resources and assets needed prior to the business model (p.34). The seventh category is the key activities, which involves the main activities that should be implemented and related to the business (p.36). This category is followed by the eighth building block (key partnerships). In this block, the business' stakeholders and key alliances are identified (p.38). The final category of the canvas is defined by the cost structure, which represents all the operating costs depending on the business model (p.40).

The business model canvas proposed by Osterwalder and Pigneur (2010), allows its users to align profit with purposes such as environmental and social aspects (Joyce and Paquin, 2016; Osterwalder and Pigneur, 2011). As such, the environmental and social value is hidden behind the economic and for-profit oriented canvas (Joyce and Paquin, 2016). However, some of its limitations lay on the practical aspects of integrating environmental and social purposes. According to Rodrigues and Lopes (2018), it is necessary to integrate additional tools, methodologies, and techniques in order to make the business model canvas more dynamic. Adding social and ecological aspects to an existing planning tool is not enough to realize socially or environmentally-friendly business activities in practice (Breuer et al., 2018). In fact, the majority of business model tools are criticized for their lack of integration of the required elements for innovating and transforming business models in the circular economy (Antikainen and Valkokari, 2016). Hence, there is a need for a tool that integrates the three features of sustainability and creates a circular value for businesses.

2.2. Added elements

Building on the original business model canvas, the Ecocanvas constitutes a circular upgrade of the tool. The Ecocanvas was created as a unique and simple visual tool that allows the user to creatively explore a more inclusive and holistic business model (Cerantola, 2019).

The core and main added feature of the Ecocanvas is its triple perspective granted by the three additional blocks, comprising three forces: economic and legal, environmental, and social forces. These additional categories are interconnected to support more broadly the creative exploration of the circular value creation within a company. Since uncertainty represents a critical issue for decision-makers to sustain their businesses over time, through the years, companies have been commonly integrating strategic foresights and scenario planning in their core businesses (Costanzo and MacKay, 2009; Godet, 2010; Vecchiato, 2012). The Ecocanvas gives users the opportunity to integrate a foresight approach at different stages of the business model by embedding the context and time parameters.

The added blocks aim to consider important aspects and create value among a broader range of stakeholders. The Ecocanvas, seen as a sustainable business model, goes beyond targeting customers and shareholders groups by explicitly considering environmental

and social agents (Manninen et al., 2018; Stubbs and Cocklin, 2008) that are usually overlooked in the traditional business model canvas or lean canvas. Therefore, they are described as follows:

1. Current and future economic and legal challenges such as regulations, market innovations, and macroeconomic issues can represent a risk for the company. For instance, the introduction of an emission tax or an emission trading scheme on a national level to fight climate change, represents an additional business risk due to the lack of a mitigation technology and increased costs (Bui and De Villiers, 2017; CERES, 2007; Reinaud, 2005). Despite representing a risk to businesses, governmental regulation is fundamental in the successful implementation of eco-innovation and business sustainability. As such, the study carried out by Fernando et al. (2019) justifies the importance of integrating standardized environmental criteria in policies and facilitating enterprises to have access to investments in infrastructure development through loans and grants. A technological risk exists due to the lack of a technology to mitigate carbon emissions, and related costs emanating from fossil fuel-based power generation. These challenges affect the market rules and operating system, which lead to a transformation of the whole business model, starting from the connection between Cost of Structure and Revenue Streams to finally influence the rest of the blocks.
2. Current and future environmental challenges such as water scarcity, climate change, pollution, and environmental threats can directly affect businesses' supply chain, and production activities or logistics. According to Hoekstra (2014), "the growing scarcity of freshwater due to rising water demands and a changing climate is increasingly seen as a major risk for the global economy" (p.318). This increase in environmental challenges leads to a rethinking of a company's business strategy, which influences the following blocks: Key Resources, Key Partners and the Problem/Solution blocks, and consequently the Structure of Costs (left side of the value proposition creation) (Cerantola, 2019).
3. Current and future societal and technological challenges, such as digital technology, manufacturing, and cultural shifts, will shape customers perceived values, beliefs, and behaviors over time. This leads to important changes in Stakeholder Relationships, Channels and Sales, and consequently to the Revenue Streams. A "Business as usual" strategy represents a constraint to economic growth and future development (Dobbs et al., 2011). As such, environmentally friendly business activities are crucial because companies face internal and external pressures coming from employees, customers, environmental agencies, as well as governmental agencies (El-Kassar and Singh, 2019). For instance, De Sousa Jabbour et al. (2020) studied the relationship between the stakeholders, which can represent a barrier or a driver, and organizational mechanisms responding to climate change challenges and opportunities. As such, their findings revealed the necessity of strengthening collaboration between them because of their interdependent relationship.

These three blocks are used to map and classify forces that might be challenging in the business model. Mapping the foresights is a process that aims at (1) identifying key driving forces that change an organization's environment, (2) determining the positive and negative impacts of potential futures, and (3) taking measures and fostering creativity and eco-innovation that will improve an organization's long-term competitiveness (Spaniol et al., 2019). Furthermore, in each of the environmental and social blocks, a section related to their respective impact is included. This additional part is provided in order to evaluate all the potential impacts that the business model would generate when operating.

3. Justification of the tool

In this paper, we present a new business model canvas called the Ecocanvas, as the business model canvas does not lend itself to practical integrations of society, environment, and economy during business model development. The Ecocanvas is representative of the practical environmental gains afforded by a circular economy perspective. It also enables the inclusion of social dynamics during the formation of business models, which is underrepresented in customary applications of the circular economy. The Ecocanvas takes the circular economy a step further by enabling a deeper, more structured, and personal rethinking of how additional social and environmental values can be captured or created. In this way, the Ecocanvas can facilitate the formation of a clearer and surer transition amongst organizations and entrepreneurs towards a more responsible economic development.

The original development of the eco-version of the business model canvas (Osterwalder and Pigneur, 2010), served as a starting point for the development of a holistic methodology, that is uncovered in this paper but critical to understand how the Ecocanvas works. The Ecocanvas methodology has been tested for several years and optimized many times, leading a straightforward modular template composed of 15 tools. Each of the tools is directly linked to one or more building blocks of the Ecocanvas. The main purpose of this systematic methodology is to guide and support users through the Ecocanvas business model exercise.

The main objective of creating a methodology made of 15 interconnected tools (Appendix A) was to extend the focus and the analysis based on a lifecycle perspective and a circular strategy. The life cycle approach, defined by Patala et al. (2016) as a “comprehensive framework to analyze the full range of environmental, social and economic impacts of product life cycles and supply chains”, is used to identify the various stages where a circular and environmental value is created (Manninen et al., 2018).

The Ecocanvas is currently widely used under a creative commons license even for commercial use to enhance its transformation potential and wide adoption. The Ecocanvas is also known and widely accepted by the sector. It was adopted by academic circles, as it has been used and tested at several business schools and universities (Cerantola, 2019). Moreover, its convenience for the users and applicability has been tested in the last seven years, in different projects and sectors, such as waste management, water supply, energy from waste, tourism, and fashion industry, with a special focus on agro-food and winery.

From a practical point of view, the Ecocanvas' target audience is constituted of (1) entrepreneurs, (2) companies, (3) consultants, mentors, and incubators, and (4) professors and education environments. The first group looks for a step by step process to put together their ideas and validation endeavor with the aim of getting a big picture of all the blocks, and be able to embed the social and environment as a whole, not as an added part but as the core of their business proposal. The second looks for orientation in the circular mapping of their value chain since they deal with many dimensions, and the methodology offers a guided way to put things in order, spot real opportunities quicker, and take actions identifying the main problem to be tackled. As for the third group, they look for a framework that connects the Business Model Canvas and entrepreneurial tools they already know with the circularity vision as an added value for the projects or company they support. The fourth group looks for a practical way to approach the Circular Business Design.

4. Application of the Ecocanvas

The practicality of the tool is explored in this section through a case study of small and medium scale wineries. Although it gets less

attention than traditionally “dirty” industries, such as chemicals, forestry, and manufacturing, the wine industry faces similar institutional and stakeholder pressures to improve its environmental performance (Gabzdylova et al., 2009; King and Lenox, 2000). The main benefits of using the tool are to develop a more comprehensive understanding of the building blocks of the proposed business model, to be aware of and quickly spot weaknesses and strengths, and to support the validation of the hypothesis and the rapid reframing of business ideas (Cerantola, 2019).

Given that the Ecocanvas consists of 12 blocks, each one of them will be explained in a detailed manner in Appendix B. The entire methodology consists of up to 15 complimentary tools created to help fill each of the 12 blocks. Therefore, each block is directly linked to one of the 15 tools (Appendix A) that are used to guide the users (See Figs. 1 and 2).

4.1. Needs and challenges

The needs and challenges identified in the wine sector are four-fold: environmental, social, customer/market, and personal motivation. Even though the wine industry is not normally perceived as a dirty industry, the wine sector has a hidden side to it where it has to deal with many environmental issues (Gabzdylova et al., 2009). There is an urgent need to reduce environmental impacts by converting waste into nutrient using valorization techniques, as well as reducing the vulnerability of the production system and supply chain, and eco-designing the products using environmentally friendly labels, lightweight and reusable bottles, and eco-friendly caps (e.g., Devesa-Rey et al., 2011). Currently, many wineries are looking for innovations that enhance wine waste valorization in order to choose the most available and appropriate techniques (Oliveira and Duarte, 2014). Using such innovations, grape marc and seeds can be extracted and processed to obtain oils, anthocyanins, and catechin polymers (Devesa-Rey et al., 2011; Karleskind, 1992; Thorngate and Singleton, 1994). Ethanol and tartaric acid can also be recovered through grape marc distillation (Oliveira and Duarte, 2014; Yalcin et al., 2008), and nutritional supplements can be produced from the extraction of antioxidant flavanols, which may be of an economic advantage for wineries (Alonso et al., 2002; Oliveira and Duarte, 2014; Sakata et al., 2010). The composting or co-composting of grape marc, stalks, and sludge generated from wastewater treatment plants, represents an environmentally friendly alternative to the improvement of soil fertility as well as an alternative to the wine waste's final disposal site (Arvanitoyannis et al., 2006; Oliveira and Duarte, 2014).

4.2. Customer segment

The growing awareness and extensive media coverage on environmental issues, such as climate change, environmental pollution, and the use of natural resources, as well as the increase in consumer consciousness, are the growing forces that encourage the organic food market to flourish (Van Doorn and Verhoef, 2011). Therefore, the ideal customer of the environmentally-friendly wine was identified as a female eco-restaurant owner who chooses only organic products with eco-friendly packages that have reduced environmental impacts, even if it means selling them at a higher price. A similar study on organic and locally produced almond milk in Spain was carried out by De-Magistris and Gracia (2016), where three types of customers were identified. Two of the customer segments are aligned with the customer segment described in this section, which highly values organic and local products and would be willing to pay a premium price. This restaurant attracts clients who are passionate about eco-consciousness and are environmental activists, such as postgraduate students, vegetarians,

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Fig. 1. Ecocanvas: Circular business model.

vegans, and yoga lovers. The owner travels a lot and is on the lookout for sustainable products that she can bring back home. She feels satisfied and proud to contribute to the success of responsible national business by buying organic and sustainable red wine.

4.3. Key resources

Based on the lifecycle of the product chosen, key resources have been addressed through the process, starting from buying the raw material, to manufacturing, selling, consuming, and disposing of, including all the logistics and management in between (Garcia et al., 2012). The lifecycle is customized based on the type and amount of resources, energy, and water needed and consumed by the company to create the product, service, or process. The buying step was used as an example to highlight the way key resources are chosen for wine production: the grape seeds, the land, scaffolding the vineyards, water irrigation systems, barrels, lightweight bottles, eco-friendly labels and caps, composting equipment such as compost spreader and turner, fertilizers (in conventional companies which are looking to become more sustainable) and detergent for washing the equipment.

4.4. Circular value chain

To create a unique circular value proposition, defining the key resources is not enough; wineries are also required to map out all stakeholders that can be influenced and have the capability to affect the business as a whole. All the specific agents to the wine

sector include the customers, local communities, suppliers and financiers, employees, competitors and markets, and public authorities. Customers will get the option to choose out of a broader wine portfolio. The product will also respond to the emotional and functional needs of the customer segment. Local communities will also be positively affected by a reduction of the surrounding environmental and social impacts, a growth in job opportunities, and an increase of awareness of environmental aspects. Old suppliers might be affected by the production of a new type of wine since wineries may need to collaborate with new suppliers of eco-friendly packages, such as bottles, labels, and caps. Besides, if old suppliers are to stay in business, they should envision to demonstrate transparency of their environmental and social engagement by making sure to reduce their impact on the environment and society (Reuter et al., 2010). Therefore, when suppliers comply with environmental requirements that are set by the firms and customers, then the supply chain becomes green (Singh and El-Kassar, 2019). Additionally, in a study conducted by Mani et al. (2020), authors found that suppliers who collaborate with the firm to achieve sustainability will positively affect the environmental performance of the organization. In addition, employees will benefit from green training and environmental awareness, since it was identified by Jabbour et al. (2019) that integrating green training, environmental awareness recruitment and selection, as well as environmental performance evaluation along with rewards could help the companies in accelerating the implementation of green supply chain practices. As such, the integration of environmental ethics would influence the company's environmental

A · ECOCANVAS: CIRCULAR BUSINESS DESIGN



Fig. 2. Ecocanvas: Circular Business Model applied to the wine sector.

performance and competitive advantage (Singh et al., 2019). Financiers will also be impacted since the introduction of a new product in the market requires funding. Local and international markets will be broadened due to the introduction of new sustainable products, which will cause a ripple effect on competitors and increase the presence of wineries in sustainable and organic products, events, and organic grocery stores.

4.5. Environmental foresight

The visualization of the environmental foresight may affect wineries business in the coming years, whether it is positive or negative. With the use of the P.E.S.T.E.L tool (Appendix A), some of the environmental foresights were identified as follows:

- Climate change: climate plays a pervasive role in the success of agriculture and the suitability of crop growth (Jones and Webb, 2010). However, climate ranges are narrower for growing wine grapes, limiting these areas to cultivation only. Therefore, producing an optimal quality of wine makes these niches very narrow, putting the cultivation of wine grapes at a higher risk from climate change than other crops (Jones and Webb, 2010).
- Resource scarcity: soil change and degradation, surface water, groundwater, soil, and air contamination (Gabzdylova et al., 2009). In addition, wine businesses today are confronted with rising energy prices and mounting concerns about chemical exposure (Gilinsky et al., 2016).

- Environmental regulations pose a risk to any business. For instance, many sustainability and circular economy regulations have arisen in Europe, Japan, and China. As part of the Europe 2020 strategy and the Eco-Innovation Action Plan launched in 2010 to support and provide sustainable and inclusive growth, the European Commission has adopted an ambitious program, named "2018 EU Circular Economy Package". The plan consists of an EU Action Plan for the Circular Economy established to support Europe's transition to a circular economy by promoting sustainable economic growth, boosting global competitiveness, and creating new job opportunities and workforce (European Commission, 2015). In addition, national bodies over the world took part in this transition, such as Japan, which developed a "Basic Law for Establishing a Recycling-Based Society" in 2002 (Geissdoerfer et al., 2017), and in 2009, China created the "Circular Economy Promotion Law of the People's Republic of China" (Geissdoerfer et al., 2017; Lieder and Rashid, 2016).

As for the environmental impacts, applying a circular model has positive environmental impacts like limiting the use of fertilizers and pesticides, using compost as an alternative, decreasing the consumption of resources by treating and reusing wastewater, using lightweight glass bottles, and improving the surrounding environment, such as healthier soil, water, and air. For instance, the study conducted by Arvanitoyannis et al. (2006) shows that wine waste valorization can support sustainable agriculture. As such, compost from winery wastes can be used as a soil conditioner. In addition, wine-processing sludge can work as an effective

adsorbent of heavy metal pollutants.

4.6. Social foresight

Shedding light on social foresight is as important as identifying environmental foresight; therefore, by using the P.E.S.T.E.L tool, we were able to envision the social changes that may affect the wineries. They were determined as:

- 1) The consumer's awareness of environmental issues will increase even further, mainly through traditional and social media, since their contribution is significant in raising environmental awareness because of their power to influence a more global group (Scholtz et al., 2016; Verma, 2016).
- 2) Consumers' attitudes and trends will shift to environmental and organic products.
- 3) A growing organic wine portfolio in wineries will drive and increase competition. For instance, the literature suggests that companies that are economically-oriented but also consider environmental and social aspects have a higher chance of attaining a long-term competitive advantage (Reuter et al., 2010).
- 4) The common trend is heading for more sustainable business models as more and more consumers are now demanding that businesses act responsibly (Srinivas, 2015). In the wine industry, the implementation of sustainable practices, such as pollution prevention, natural resources control, and product innovation, are driven by stakeholder's pressure (Berns et al., 2009; Carrillo-Hemosilla et al., 2010; Gilinsky et al., 2016).
- 5) Consumers will be expected to look out for product footprints, mainly during the packaging and manufacturing processes (Srinivas, 2015). Furthermore, the trend of creating new eco-labeling and environmentally friendly products is growing. As such, marketers and firms are increasingly including eco-labels, as well as more detailed environmental information in their offerings (Taufique et al., 2017).

The environment is certainly not the only aspect being positively affected for producing a red organic wine also impacts the community wellbeing, reduces the risk of diseases that are induced by chemicals ingested through the wine (Weisenburger, 1993) or through the contaminated surrounding drinking water sources, and reduces the number of sulfites. Additionally, the red organic wine tastes better due to a more concentrated flavor.

The product would also boost the economy of the surrounding area where the wine is produced. Hence, introducing a new product to the company also involves creating more job opportunities.

4.7. Cost structure

Estimating the cost of activities and resources that are needed for the operation of the business is certainly a major step. Therefore, a cost structure prior to the wine sector is divided into fixed costs and variable costs. Examples of fixed costs include rent, administration (marketing, sales, and communication of the new product), depreciation such as machinery costs for compost, trucks, vinification and bottling process, tanks, barrels, and vineyard planting. The variable costs include packaging and eco-label, pest management, vineyard equipment and tools, organic fertilizers, fuel, certifications, and taxes (Marone et al., 2017).

4.8. Stakeholders relationship

After identifying all the challenges that wineries will face, it is essential to understand the relationship with each stakeholder.

However, in this block, only the relationship between wineries and customers was outlined. Wineries are required to create a close relationship based on trust with their customers. They need to establish clarity and transparency to gain and retain loyal customers by guaranteeing good quality products and services via concrete and responsible practices. For instance, transparency is becoming a more important topic that should be fostered by businesses. As such, according to a study carried out by Merlo et al. (2018), the results show that customers are willing to pay a premium price when they exhibit more trust and are faced with a transparent business. In the case of small and medium scale wineries, excellent owner-customer rapport, and face-to-face friendship enhance the relationship between stakeholders. Furthermore, it was found that the quality of service, as well as the experience during the customer's visit to the winery, can have an impact on future wine sales (O'Neill et al., 2002).

4.9. Communication and sales

This block describes the various means that are used to engage and attract customers and stakeholders to deliver the value proposition. Wineries could promote their brands and products through various channels such as social media platforms (Instagram and Facebook), campaigns (TV and billboards), platforms (Google ads), and verbal communication. As Schmitt (1999) mentioned in his study, customers "want products, communications, and campaigns that they can relate to and that they can incorporate into their lifestyles. They want products, communications, and marketing campaigns to deliver an experience". Therefore, focusing on the emotional side of the product while communicating the real environmental and health benefits of organic wine would attract customers. Moreover, the brand's online presence is reflected through every type of online communication strategy, mainly a website, which is considered to be the backbone of this experiential marketing. Additionally, collaborating with environmental influencers might be a way to promote organic wine. Local and international open-door community events at the winery or wine fairs could be organized to promote the products. Accordingly, wineries could introduce their products to supermarkets, organic supermarkets, organic restaurants, online wine platforms, and wine sellers and stores.

4.10. Unique circular value proposition

Two Unique Circular Value Propositions are delivered via the product to the identified customer (the restaurant owner). The first one is a bottle branded in a sustainable, young, and dynamic way to target postgraduate students, vegetarians, vegans, and yoga lovers that support the local economy and reduced environmental impacts. The second circular value proposition is turning the agricultural waste, which is problematic, into a source of fertilizers for grape growing. By using compost, the winery will be able to save money in addition to reducing its environmental impacts due to waste disposal. This compost will act as a natural fertilizer and will provide an important source of nutrients for growing grapes (Devesa-Rey et al., 2011).

4.11. Revenue streams

The following step consists of defining the revenue streams generated for the value that is created and delivered to the market. Prior to our case study, the income and cash flow included 1) local and international sales of wine bottles to supermarkets, restaurants, bars, and cafés, 2) sales of by-products through valorization techniques, 3) wine tourism (wine events, visits to wineries and vineyards) and

private funded tastings, 4) equipment rental, and 5) sales of the unused compost in the winery to farmers surrounding the winery.

4.12. Circular business model and innovation

Through a set of circularization strategies, this block helps in defining the key features of the circular business model. Many sets of action throughout the whole process of winemaking could be implemented to transform the business into a more circular and sustainable one. However, in this specific case study, we decided to tackle the waste aspect of the process. Many valuable resources are wasted during the production of wine. These could be valorized to fit other purposes, for example, wastewater can be treated and reused for irrigation or cleaning, grape waste can be used to generate gas, energy, and compost, conventional bottles can be replaced with more light-weight or recyclable bottles, broken bottles can be sent to recycling facilities, wine by-products such as polyphenols from grape seeds can be valorized, some by-products could be used in food and nutraceuticals, tartaric acid could be extracted and used during winemaking, and oenocyanin acid can be utilized as a natural food colorant. Renewable energy can also be employed in the production of the wine (e.g., Caviro, 2011; Devesa-Rey et al., 2011).

Wasted resources are the lost resources during the value chain of a specific product. Some wasted resources are grapes, water, small amounts of glass bottles, and energy (Ruggieri et al., 2009). Wasted life cycles are the products that are wasted after one use. Some of the wasted life cycles are glass bottles, corks, caps, and packages that are used for a minimal number of times and disposed of later on. Waste use or capacity is the rate and the frequency of use of a specific service or product within the value chain. A relevant example could be the compressor, which is used once a year for a specified period to produce wine or the harvesting machine used once per year. The waste added value consists of the materials and values that could be recovered or recycled at the end of their useful life. Some products that have the potential to be valorized are grape pomace, grape seeds, grape lees, glass bottles, caps, corks, and wastewater (Devesa-Rey et al., 2011). Barrels that are no longer suitable for storage can be reused for decoration or planting in the wineries or could be sold.

5. Implications, limitations, and recommendations for future research

The proposed Ecocanvas has implications on the circular economy and business model theory and practice. First, the study responds to the call in the literature for a deeper understanding of the relationship between circular economy and sustainability, and the particular influence of both concepts over the performance of business models, as suggested by Geissdoerfer et al. (2017). Specifically, this study contributes to the literature on sustainable and circular business models, as well as environmental management research by conceptualizing the embodiment of a circular value proposition and introducing an economic, legal, environmental, and social foresight approach in a business model. The proposed tool in this study focuses on a more holistic approach by also integrating the social forces into the circular economy literature, which addresses a weakness mentioned by Geissdoerfer et al. (2017) and Murray et al. (2017). On the other hand, it addresses the flaw of the sustainability conceptual approach related to vagueness and difficulty of operationalization (Middleton et al., 1993; Yuan et al., 2006), by being a simple visual tool, straightforwardly linking the Ecocanvas' building blocks, to be used by new and established enterprises alike. As such, the study proposes a tool as a methodological response to the lack of connection between sustainability and business, and it addresses the weaknesses of both the

sustainability and circular economy conceptual approaches.

As for practical contribution, this study has several implications for practitioners and experts in the field. The research discusses the key points that can be used by small and medium enterprises who wish to integrate a circular economy. The Ecocanvas is a conceptual business model that intends to facilitate the user's experience while creating a circular value proposition, as there is a bigger awareness on the part of organizations on the current (and future) economic and legal, environmental, and social challenges, pushing them to start preventing and mitigating their impact. From a human capital viewpoint, the Ecocanvas can be used by organizations to better their internal operations. For instance, Yong et al. (2020) discuss the positive impact of green human resources management on the organization's performance. From an economic perspective, the Ecocanvas can help organizations and their partners to reduce cost, improve and enhance processes, create value and potential new markets. From an environmental perspective, the benefits of using the Ecocanvas are multiple. The tool allows organizations to minimize their environmental footprint, and work towards alternatives that reduce or even have a positive impact. Finally, given the holistic perspective of the Ecocanvas, the tool can be used by a multitude of players in a simple and efficient way, as this tool is intended to be user friendly and achieve the biggest impact.

This paper is not without limitations. First, as this paper used an ideal case of a medium-sized winery, future research could use a real case study to understand how the relevant principles of the circular economy could be applied to ensure a shift towards more sustainable consumption and production. In addition, the use of a real winery could capture the weaknesses and the strength of a company that transitions towards a more circular approach. Second, given that the study focuses on one specific example, which is the wine industry that belongs to the agricultural sector, it would be interesting to use a comparative approach to test the Ecocanvas in different sectors and different contexts. Finally, unlike other tools that are meant to provide a high-level summary analysis (Joyce and Paquin, 2016), the Ecocanvas is a full methodology encompassing many tools. Hence, the Ecocanvas might be time-consuming for some users. As such, this study, along with its appendices, can serve as a sample to other organizations (in the wine sector and beyond) to familiarize themselves with the tool and the business model analysis process in order to use it and apply it more efficiently.

Future studies can focus on improving some areas of the tool, such as mapping the foresights as well as including the positive and negative impacts of the added elements on the business.

6. Conclusion

The Ecocanvas is an innovative sustainability tool that is specifically designed to support entrepreneurs interested in creating a circular value proposition for their businesses. On the one hand, moving towards a circular economy entails a deep understanding of the framework of new business models (Carrillo-Hemosilla et al., 2010; Pla-Julian and Guevara, 2019; Witjes and Lozano, 2016). On the other hand, organizations face challenges in understanding their business model implicitly (Dobson et al., 2018; Joyce and Paquin, 2016; Stringer, 2013). The Ecocanvas has many advantages differentiating it from other models. The Ecocanvas gives us the opportunity to address the weaknesses of both conceptual approaches, sustainability, and circular economy, by placing the focus on personalizing and rethinking how the economy, society, and environment integrate into a given entity and context. Additionally, compared to the original business model canvas, it has a more complete and inclusive approach. It is a standalone tool, which has 15 other tools linked to it, to ensure that users go deeper

into the development of their ideas by applying the entire methodology. Entrepreneurs can use this tool to forecast future threats and opportunities, which can help them anticipate and reduce risks that may arise and impact the business. In addition, the Ecocanvas includes blocks that are related to environmental and social impacts. Those blocks will help businesses to include the environmental and social costs in their strategies.

This paper aims to extend the existing research about sustainable business models by proposing a circular business model framework, which is the Ecocanvas. To show the practicality and utility of the tool, we have developed an extensive case study that focuses on small to medium scale wineries. Originally built on the business model canvas, the Ecocanvas expands the economic centered approach by adding three blocks: economic and legal, environmental, and social forces. Through an entire methodology used to help in filling the Ecocanvas, small and medium scale wineries will be able to develop a unique circular value proposition through the lifecycle of any product or service. The circular economy Ecocanvas model creates value that allows us to redefine sustainability and integrate environmental and social aspects along with the economic dimension.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Alain Daou: Project administration, Supervision, Formal analysis, Conceptualization. **Camille Mallat:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Ghina Chammas:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Nicola Cerantola:** Conceptualization, Methodology, Validation. **Sammy Kayed:** Funding acquisition, Writing - review & editing. **Najat Aoun Saliba:** Project administration, Supervision.

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Appendix A

Tool Title	Description
A1 Ecocanvas: Business Needs and Challenges	This tool helps in spotting the needs and challenges of a project/organization as a starting point. In order to transform the current business model, users are required to list all the needs and challenges they have detected so far. This is important to set a course towards circularity. The needs and challenges are divided as: Environmental, Social, Customer and Market, and Personal motivation.
A2 Ecocanvas: Business Values, Mission, and Vision	In this tool, the Mission, Vision, and Values of the organization are included. With the aim to transform towards circularity, users should begin with the basics: identifying what the organizational values are at the bottom of the pyramid and then declaring their mission to achieve that vision.
A3 Ecocanvas: Selecting a Product, Service, System	This tool should be used to choose the organization's products or services. With previous tools, users might have developed a clear orientation about which type of product/service or aspect of their business has to be made circular. If not, this tool allows users to recognize circular potential.
A4 Ecocanvas: Setting Project Objectives and KPIs	After defining the needs and challenges, users should declare their objectives. With this tool, companies or users can define their objectives and the way to measure them throughout the project. While using the tool, they should think about KPIs that are SMART: Specific (simple, sensible, significant), Measurable (meaningful, motivating), Achievable (agreed, attainable), Relevant (reasonable, realistic and resourced, results-based), Time-bound (time-based, time-limited, time/cost limited, timely, time-sensitive).
B Ecocanvas: Unique Circular Value Proposition	This tool is used to build a definition of the unique circular value proposition based on the needs and challenges of each customer. The tool guides users in identifying their customer segments based on their functional and emotional needs.
C Ecocanvas: P.E.S.T.E.L Analysis	The P.E.S.T.E.L tool stands for Political, Economic, Social, Technological, Environmental, and Legal factors. In this component, users identify those factors that can affect the business and, above all, evaluate their positive or negative impact on their business. The objective is to try to respond to future situations and increase the business's resilience.
D0 Ecocanvas: Stakeholders Map	This tool guides users to map and list all the relevant stakeholders: External and Internal.
D1 Ecocanvas: Mapping Lifecycle Flows	The Circular Mapping tool helps determine the INs and OUTs of the lifecycle of a user's product by mapping the process starting from buying the raw material to manufacturing, selling, using, and disposing of; it also includes all the logistics and management in between. The lifecycle is customized based on the type and amount of resources, energy, and water the company needs and consumes to create the product, service, or process.
D2 Ecocanvas: Mapping Lifecycle Flows (Product)	This tool is similar to the previous tool, where the inputs and outputs of the value chain should be identified, and the waste and emissions generated.
E Ecocanvas: Identifying Circular Opportunities	In this tool, users can observe and evaluate the flow of resources, life cycles, capacities, and values that are wasted in their current product-service model. Once they have mapped them out, they need to answer questions and generate new ideas on how to give a second “life” or better use of the company's products and services.
F0 Ecocanvas: Circularity Strategies	Circularity Strategies enable users to start applying principles and strategies from the areas they are able to influence the most in their organization. Different strategies are provided for each step of the value chain: DESIGN, BUY, MAKE, SELL, USE, DISPOSE, FINANCE, and SUPPORT.
F1 Ecocanvas: Defining the Circularity Proposal	In the previous tools, users will have learned and thought about strategies to transform their product, service, or business model. In this tool, users need to generate a proposal by using the identified strategies.
F2 Ecocanvas: Circularity Proposal Evaluation	This tool focuses on defining the strategy/innovation intended to be applied by the company. Users must also write the feasibility criteria that are important and relevant to the business.
G Ecocanvas: Circular Transformation Roadmap	In this final tool, users must break down their circularity proposal into milestones and tasks based on a set timeline.

Appendix B

I - Need/Problem/Challenge	To set a course towards circularity, the first step is to identify a business's needs, problems, and challenges. The tool A1 - Ecocanvas: Business Needs and Challenges can guide companies to fill in this block. Companies are required to list the entire environmental, social, customer/market, and personal/motivational business needs and challenges. They can decide to focus on the most urgent ones later on.
II - Customer Segments	This block consists of dividing a market share into its constituent segments and defining social, economic, and behavioral needs and wants. It responds to the following questions: Who is affected by the problem or has the need? Who are your main customer segments? To guide the users in identifying their customer segments, companies may use the Unique Circular Value Proposition (tool B) based on the problems and needs identified by the company.
III - Key Resources	The key Resources component involves the identification of the physical, human, financial, and natural capital needed by a company to ensure operation. In order to identify those elements, the users may apply the tool D1 known as the Mapping Lifecycle Flows. This tool helps determine the INs and OUTs of the lifecycle of a user's product by mapping the process starting from buying the raw material to manufacturing, selling, using, and disposing of, in addition to all the logistics and management in between. The lifecycle is customized based on the type and amount of resources, energy, and water the company needs to create the product, service, or process. The type and amount of byproducts (i.e., waste, air, water, and soil emissions) are also specified.
IV - Circular Value Chain	The Circular Value Chain involves all specific agents that are influencing or are being influenced by any sector. The tool used to help companies fill in this block is the Stakeholder Map (Do tool). The stakeholders can be defined as either internal or external stakeholders. They include public authorities, media, and social networks, customers and users, competitors and market agents, local communities, supporters, suppliers and financiers, and knowledge centers.
V - Environmental Foresight and Impact	The Environmental Foresight component addresses all the environmental aspects that affect the business, whether positive or negative. The tool used to support this block is known as the P.E.S.T.E.L Tool, which stands for Political, Economic, Social, Technological, Environmental, and Legal factors. In this component, the users identify those factors that can affect the business and, above all, evaluate their positive or negative impact on their firm. The purpose of this analysis is to become prepared to respond to future situations and increase the business's resilience. As for the environmental impact, it includes the positive or negative impact generated by the product-service system.
VI - Structure Cost	The Structure Cost includes all sources of expenditure a business will incur by implementing the activities and using the resources outlined above.
VII - Social Foresight and Impact	This block deals with all the social aspects that affect a business, whether positive or negative and include new habits, enabling technologies, values, etc. The P.E.S.T.E.L tool is also used to support the Social Foresight block. This section also includes the social impacts, whether positive or negative, generated by the developed product.
VIII - Stakeholders Relationship	The Stakeholders Relationship block describes the business relation with the stakeholders listed above, especially with customers and beneficiaries.
IX - Communication and Sales	This component describes the means to engage and attract customers and stakeholders to deliver the value proposition. It also allows users to identify various communication and sales channels used to provide or promote products or services.
X - Unique Circular Value Proposition	The circular value should be unique to be competitive in the market. This component of the Ecocanvas helps answer these questions: What is your unique value proposition for each customer segment? What is the unique value (that cannot be copied) that you generate?
XI - Revenue Streams	Revenue Streams refer to the different types of income and flows generated from the value created and delivered to the market.
XII - Circular Business Model And Innovation	The Circular Business Model and Innovation block represent the key features of the circular business model.

Appendix B: Ecocanvas block definitions.

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