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Innovative Circular Business Models: A Case from the Italian Fashion Industry

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Abstract

Transition to a sustainable economy signed by a circular vision and culture asks firms for huge investments to innovate their own management, strategies, business models, products, and marketing approaches. The Agenda 2030 and the 17 Sustainable Development Goals (SDG) are an important framework for businesses to change their approach and contribute positively to the global movement to fight climate change. The question is what and how micro, small, and medium enterprises (MSMES) can contribute to reduce their impacts while creating more value for them and their stakeholders. This paper aims to answer to this question presenting a case study from Italy where an artisan small firm is innovating to create more positive impacts in circular terms. The focus will be on circular economy and the firms' material and energy strategies. In doing so, the paper will try to answer the following questions: how easy is for micro and small firms to apply circular economy strategies to contribute to reduce their environmental impacts? Does their strategy coherently compose energy and material flows? The case study will refer to the fashion system in Italy.

Keywords: circular economy, renewable energy, material flows, sustainable business model, innovation

1. Introduction

In Europe, according to the EU Commission [1, 2], the textiles and clothing sector is a strategic and important manufacturing industry that employs 1.7 million people for a turnover of EUR 166 billion. The European Union (EU) is the second largest exporter in the world for textiles and fashion. Like all the other sectors in Europe, it has been affected by many structural changes deriving from a dynamic combination of external forces, especially technological (big data, virtual reality, artificial intelligence, and blockchain), economic, and political, as well as environmental (the case of the circular economy) ones.

By definition, the fashion industry—and first of all the textile and clothing industries—refers to activities covering different steps in the production and value chain: from the transformation of natural or synthetic material into yarns and fabrics to the production of products such as synthetic yarns, bed linens, industrial filter (textiles), and clothing (from finished fabric to clothes, technical and home textiles, retail, and B2B).

According to the latest data [1], the European fashion industry was composed of around 180,000 firms, accounting for a 3% share of value added and a 6% share of employment in total manufacturing. The main actors of the sector are micro, small, and medium enterprises (MSMEs), a wide group of companies with less than 10 employees that covers 99% of the workforce and produce almost 60% of the value added [3].

The changes and challenges of the latest decade have driven these companies to focus on the production of higher value-added products and niche markets where competition is not on price but quality, research, and innovation. In fact, as stated by the EU Commission [1], European producers are world leaders in the markets for technical/industrial textiles and high-quality garments with a high design content. This shift from mass low-quality and value-added productions to high-quality and value-added new designed solutions requires continuous investments and efforts to maintain its global competitiveness. Political choices and solutions should support this industry to maintain and then increase its positive tension toward the future. European policies and plans should guide sectorial policies keeping the wider vision and strategy linked to the needs and problems of firms while helping these actors to create new value balancing economic, social, and ecological impacts.

From the environmental point of view, the impact of the fashion industry is huge. The apparel sector alone—that globally reached USD 1685 billion [4]—because of its (still) linear model (fragmented and relatively low-tech supply chain processes and systems), produces major environmental impacts such as the use of large quantities of water and chemicals, high emissions of greenhouse gases, and generation of waste [5].

The Ellen MacArthur Foundation (EMF) [6] has recently assessed the global impact of the textile. The global annual data registered total greenhouse gas emissions (GHG) for a value around 1200 million tons; for water usage, 93 billion cubic meters; fertilizers for cotton, 8 million tons; pesticides for cotton, 200,000 tons, and chemicals for 42 million tons, and dyestuffs for 1 million tons.

The same Ellen MacArthur Foundation [7] advocates for the “circular economy” as the sustainable solution to reduce the negative externalities in the environment. The circular economy is an economic system [7–10], in which materials continue to circulate through continuous phases of reuse and recycle to keep value within the system as much as possible. There are many benefits of a transition to the circular economy: the economic ones are accounted for around EUR 1.8 trillion by 2030 [11], while the socioeconomic benefits are expressed in terms of enhanced energy efficiency, reduced carbon emissions, and the creation of employment in the EU [12]. According to the EC [13], the benefits for a textile sector transitioned to a full circular economic system should bring benefits such as a reduction in resource needs while creating new jobs due to the rise or increase to relatively new phases in the production process (collecting, sorting, and recycling of clothing). According to some studies, these socioeconomic benefits yet miss a robust available evidence [14].

By reviewing the literature from academia and society, this paper aims to focus on the challenges MSMEs (especially micro and small firms) of the fashion industry (primarily clothing) have to deal with, manage, and overcome to contribute to climate change issues while increasing their value added and/or shared value with their local communities and stakeholders. The novelty of the paper resides on the presented case study, unique in Italy by now, and the fact that it clarifies the content of these challenges—or future and potential socioeconomic benefits—and points out what micro and small firms need to contribute to sustainable development.

2. Literature

At the beginning of May 2019, the European Commission has issued five main EU policy recommendations for its 2019–2024 strategic agenda in order to give future indications for the next direction of the new EU system; the emanation of the elections was held at the end of May 2019. As usual, the EU policy recommendations are based on the results obtained by the European system in the previous policy period (i.e., 2014–2019). The recommended main policy priorities are five and named as protective Europe, competitive Europe, Fair Europe, Sustainable Europe, and Influential Europe. For the aims of this chapter, the most interesting is “Sustainable Europe” that regards the way the EU supports and promotes the embracement of the circular economy paradigm through sustainable consumption practices and the minimization and the eventual reversion of the damages caused by climate change. Connected to the idea of a Sustainable Europe, there are also the Fair Europe policy for which the EU should promote social inclusion and equality of opportunity under the European Pillar of Social Rights and “Competitive Europe” that is about the support to increasing researches and investments for environmental and technological developments.

The idea of the circular economy has a strategic and necessary choice for the sustainable development of a smart and competitive Europe, which started in December 2015 when the European Commission adopted the Circular Economy Package. [15, 16] The program was ratified by the Commission in 2014 [17], and then the newly appointed Commission withdrew the program and reintroduced and accepted it after revisions in December 2015. The package dictates the transition from a linear to a circular economic model to the members of the EU. The necessity of the transition to the circular economy system is supported by the related and estimated economic data: EU savings of around €600 billion by 2030 and the creation of more than 170,000 new jobs. These and other goals have been reported in March 2019 [18–21] when the European Commission adopted a comprehensive report on the implementation of the Circular Economy Action Plan. In fact, in the report there are the main achievements reached by the Action Plan in the last years and the future challenges.

It is clear that the EU recognizes a strategic plan and central to its development a fair and inclusive economic system based on research and investments guided by the new paradigm of the circular economy at the macro level and new business models, organizational systems, and products at the micro level. Thus, in order to understand and discuss the case study presented in the following paragraph, this part focuses on official documents and academic papers that define and describe the circular economy and the way the circular economy is changing the industry of fashion and textiles.

2.1 The academic contribution to the development and definition of the circular economy

The origins of the term circular economy go back in time till the 1960s, when Boulding [22] started discussing the limits of our planet (biophysical limits) and introduced important concepts such as closed systems, the total capital stock, the reproduction of limited stocks of inputs (material, energy), and the importance of waste recycling. Later, in the 1990s, Pearce and Turner [23], applying the first and second law of thermodynamics, developed and proposed a new economic model introducing for the first time the term circular economy. Afterwards, a growing body of literature from various disciplines has emerged [24, 25].

The first is a system approach whose aim is to transform the industrial material flows investing on design and knowledge: this is the cradle-to-cradle (C2C) design theory and standard. According to Braungart et al. [26], it is fundamental to overcome the traditional linear production system based on material flows and find a different way from “traditional” sustainability or eco-efficiency concepts. The latest ones are limited since the risk is to push the system toward an extreme dematerialization at the expenses of innovation and economic growth. The C2C approach on the contrary is based on the concept of eco-effectiveness, whose main element is design. In fact, design and innovation are key to create, maintain, and increase value, quality, and productivity within the production process and economic system. Value and quality of materials depend on the quality of knowledge and information flows that spread among all the actors in the value chains [27, 28]. The strategic role of design and innovation for circular economy is not unique to the C2C approach and standard. In fact, the concept and term circular economy typify the modern idea of regenerative and responsible product design that originates from many different whole system design concepts and authors such as Walter R Sthal [29], Gunter Pauli (Blue Economy [30]), and Karl-Henrik Robert [31] (The Natural Step). Also, as Brendon Rowen reminds [32], influences come from the Hannover Principles and the cradle-to-cradle approach [28]. Among the Hannover Principles that are worth mentioning are the right of humanity and nature to coexist in a healthy, supportive, diverse, and sustainable condition; the recognition of interdependence; the acceptance of the responsibility for the consequences of design decisions upon human well-being; the viability of natural systems and their right to coexist; the creation of safe objects of long-term value; the elimination of the concept of waste; the idea to rely on natural energy flows; the understanding of the limitations of design; and the seek for constant improvement by the sharing of knowledge. These principles with others added later to the initial ones have been grouped into the cradle-to-cradle design protocols or standard. The C2C standard evaluates and assesses product design, processing, and manufacture criteria and administers a certification of the final product. These products are specifically designed to flow effectively through the various channels of the circular economy system.

Another system approach is the research body of academic literature that is named industrial ecology. The approach is systemic and holistic [33] so that industrial systems are considered part of and connected to higher-level systems of which have the same operational rules in terms of materials, energy, and information [34, 35]. Energy and material are flows that circulate in socioeconomic systems. Their optimum use and management [36] would derive from cultural and economic evolution as well as technological and structural changes. To this perspective, this kind of changes can derive only from innovation (production, manufacturing) and new design (products, services) developed to save resources (energy, material) and reduce the unrecyclable waste. The final goal is to close the loop, that is, to direct materials (and the embedded energy) back to production processes.

The principles of industrial ecology applied at the micro (firm) level bring in the debate and the concept of industrial symbiosis that focuses on intra-firm collaboration through market exchanges for which the waste or unused material of some firms can become resources for other firms in other industries leading to the creation of new sustainable products and markets [37, 38].

Other two bodies of knowledge organic and original to the circular economy are the product-service system theory and the blue economy. The product-service system theory states that production systems should focus on the right mix of tangible products and intangible services in order to match and satisfy the functionality or desire of the final customer. Economic and environmental positive returns match when the efforts of production are on the value created and delivered and not on the

total sales [39, 40]. The second, the blue economy addresses innovation as strategic to guide businesses in developing new products and processes inspired by natural ecosystems [30].

This wide and growing body of literature has influenced over the years the concept of circular economy and the related (several) definitions. Some definitions share the idea that a circular economy emerges when closed loops of material flows and energy are created and there is evidence of reduction in the use of resources, negative environmental impacts like pollution, and waste [41] or an increase in the rates of industrial symbiosis or the quantity of reused, repaired, or transformed products. Creating closed loops systems for energy and material flows through different and innovative techniques refers, de facto, to maintain as much as possible the created value added within the economic system for obtaining the maximum value from each resource or slowing down the loss of value per item. Other definitions [25] refer to bring more attention, investments, and efforts—to make the circular economy equal or central to the sustainability transition discussion—to other fundamental aspects such as the strategic role of renewable resources, the role of energy efficiency and conservation, land management, soil protection and water, competitiveness and employment, the improvements in living and economic models, as well as social well-being.

2.2 The circular economy's concepts and definitions in society

Although already diffused and adopted especially in academia, the term circular economy was officially defined for first and then entered the wide public domain, with the establishment of the Ellen MacArthur Foundation (EMF) in 2009. The Foundation was established to focus on educating, promoting, and implementing globally the circular economy principles through different initiatives. Since then, the term has been widely spread globally.

Nowadays, the concept of circular economy refers to a new paradigm, a new way of thinking design, production, management, and consumption. In such terms, it is a relatively new system of operations whose aim is to overcome the classic and unsustainable linear production system—known as the “take-make-dispose” model.

The transition from the older model to the newer one should “close the loop” of production through the minimization of waste along the value chain. The reduction of waste along all the value chain or production system contributes first to the maintenance of value within the economic system for more time and then to the reduction in use of incineration and landfills giving waste new meaning and value for the reuse or regeneration of new products.

New and better design should lead the production system to reduce waste at each stage of the process. At the same time, the reduction and after the reuse of waste proceed together with the reduction in the depletion of resources used along the production process. The reuse of resources includes the possibility of reclamation by the original manufacturer for use in new products. In an efficient economic system, this means financial savings for the manufacturers, as well as reduction of negative ecological impacts while retaining material value.

As reported in the World Economic Forum, the MacArthur Foundation and McKinsey's report [42] as well as in the first three reports on circular economy by the MacArthur Foundation [8–10], a more specific definition refers to it as an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts toward the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models.

The principles of this economy are:

1. To design out waste that implies the products are designed and optimized for a cycle of disassembly and reuse that is different from disposal and even recycling since there should be large losses of embedded energy and labor.
2. The strict differentiation between consumable and durable components of a product. Consumables in the circular economy refer to biological ingredients nontoxic and possibly even beneficial, which can be returned to the biosphere. Durables refer to those components made of technical nutrients such as metals and most plastics that must be designed from the start for reuse and products subject to rapid technological advance are designed for upgrade.
3. The energy required to fuel the cycle should be renewable by nature to decrease resource dependency and increase systems resilience.

These principles inform the main *four methods or ways* to reach and create value in a circular economy. These are the *power of the inner circle*, *the power of circling longer*, *the power of cascaded use*, and *the power of pure inputs*. The value should arise from the price difference between used and virgin materials (arbitrage opportunities) that show up in the production processes. The first—the power of the inner circle—refers to reaching potential savings on material, labor, energy, and capital that are embedded in the product, in the production process, and to the reduction or minimization of associated externalities like greenhouse gas (GHG) emissions, water, and toxicity. The third, the power of cascaded use, refers to diversifying reuse across the value chain of material used in the production chain. The fourth—the power of pure inputs—refers to the efficient management of uncontaminated material streams to maintain quality, extend product longevity, and increase material productivity.

3. The strategic role of the circular economy in the EU

In the final report published on March 2019 [43] on the implementation of the Circular Economy Action Plan—the EU Commission presents the main results of implementing the Action Plan adopted in 2015 and lists the future challenges the EU economy will face to reach the goal of a more competitive Europe based on a circular and climate-neutral economy where pressure on natural and freshwater resources as well as ecosystems is minimized.

The EU Commission states that the 54 actions adopted with the Circular Economy Action Plan on December 2015 have been completed. The plan was launched to realize the goal of a resource-efficient and competitive European economy. The transition to the circular economy has produced the following effects: (i) helped the EU to create more jobs (a 6% increase in 2016 in comparison to 2012 and equal to more than 4 million workers in sectors relevant to the circular economy) and (ii) opened up new business opportunities, new business models, and markets domestically and outside the EU (in 2016 circular activities—repair, reuse, and recycle—were accounted around €147 billion in value added while standing for around €17.5 billion worth of investments [44]) (The EU Monitoring Framework for the Circular Economy [45]).

The final report recognizes the strategic importance of the Action Plan for the transition to the circular economy since it promoted for the first time a systemic approach across the entire value chains and mainstreamed circular principles

into different areas such as plastic production and consumption, water management, food systems, and the management of specific waste streams. Moreover, the modernization of the European industrial base—to support the EU global competitiveness—must pass through the preservation and restoration of the EU's natural capital. In other words, the circular economy is the only vision to share and invest on with the collaboration of all stakeholders, from EU institutions to member states, social organizations, and businesses.

For the benefits of the aims of this chapter, it is fundamental to contextualize the following case study showing the definitions, characteristics, and impacts the European framework on the circular economy has or should have on businesses.

3.1 The building of the circular economy and its challenges

Circular economy can be defined in different ways according to the ends of the analysis: a global trend, a challenge, an economic model, an industrial policy, new markets and innovative business models, and innovations in products and services.

The analysis of the EU documents is crucial to show the main characteristics of the circular economy that are common to all the definitions and that impact all the involved stakeholders.

First, the circular economy is a new economic system and model that requires a different way of thinking and implementing design and processes. Design is especially essential for ensuring circularity. For the EU Commission, the circular design of products is essential as it is the energy efficiency of the processes (Ecodesign Working Plan 2016–2019 [46]). One tool to guide new design investments and innovations and monitor their development and applicability is based on standardization processes and requirements such as the EU Ecodesign and energy labelling measures. These include rules on material efficiency (end-of-life treatment, ease of repair, availability of spare parts) and horizontal criteria to measure durability, reusability, reparability, recyclability, and the presence of critical raw materials. Developed by the European Standard Organization (ESO), these criteria should be applied in existing and new standards [20].

3.2 Circular design and production processes: the role of SMEs

Design is essential and promoting circular design is key to transition: new circular products and services that reduce resource use and foster materials' reuse, recovery, and recyclability are strategic to leave the old linear economic systems and models in favor of new ones. Circular products and services are produced according to different production chains and processes. The circularity aspects introduced by the Commission—energy consumption and material use, waste prevention, recycling, and reduction of hazardous chemicals—have become reference standards for the adaptation or construction on industrial plants by setting them into specific Best Available Techniques Reference documents (BREF and Industrial Emissions directive [47]). As in the case of products, industrial plants are submitted to new standards regarding circularity that become essential to obtain certification scheme as the EU EMAS (Eco-management Audit Scheme) to show organizations' environmental performance. The improvement of organizations' environmental performance is strategic to maintain, define, and increase the competitiveness of these organizations that are for the majority small- and medium-sized enterprises (SMEs). These firms are at the core of the transition. Their strategies, organizations, business models, product, and service designs are at the center of any transition to circularity. This situation asks them to invest urgently to improve their resource efficiency and production processes. Investments are not just financial or

technological but first cultural: they require a change in the mindset and mentality of the entrepreneur and of the top management of firms and then of all the workers and partners of these companies.

3.2.1 Circular economy considers waste a resource

Other essential elements of a circular economy are waste management systems (WMS). The EU has invested to consolidate the European model as one of the most effective in the world (a revised waste legislative framework in July 2018 [48]) through a revised legislation that regards many themes and important topics for companies such as a clarification of legal status for recycled materials and by-products, reinforced rules and new obligations on separate collection (e.g., textiles), and the minimum requirements for the extended producer responsibility (EPR). At the core of the revised legislation, there is the challenge for the Commission to show that an efficient WMS can create and give new business opportunities. And that is especially true if firms' investments are oriented toward energy and material-efficient recovery technologies as well as policy interventions that try to make better use of economic instruments and improve planning to avoid incineration overcapacity. The efforts of the Commission have been channeled to maintain value within value chains and production processes in order to avoid unnecessary loss of valuable resources through landfilling and incineration [49].

3.2.2 Circular economy as closing loops of recovered materials

One of the objectives of the EU plan on circular economy is to increase the use of secondary raw materials (SRM). Today market operators face many challenges. The main four [50, 51] are improving substance traceability and information flows, better enforcement and use of other measures to ensure a level playing field between the EU and non-EU operators, improved harmonization and mutual recognition of end-of-waste criteria, and reinforcing circular economy aspects in instruments such as the Ecodesign directive. Knowledge and information are key to develop an efficient, transparent, and competitive market of SRM.

3.2.3 Innovation and investments and open challenges for the transition

Once the process has started, it is necessary to support it over the years, in different places, and at any level. Moreover, to reach the defined goals by the set timelines, it is fundamental to accelerate the transition. Investments in innovation and adaptation are key to make the industrial sectors ready to create more value in a competitive and environmental way. In order to support the acceleration toward transition to circular economy, the EU has disposed the Circular Economy Finance Support Platform as the main tool to manage more than €10 billion in public funding in coordination with the European Investment Bank [52].

The circular economy is now an irreversible, global mega trend the EU is investing in to make it the backbone of the EU industrial strategy to support the transition toward a circular and climate-neutral economy. The ambition to become the most competitive and sustainable region in the world requires a holistic approach and collaboration with many different stakeholders, first SMEs (strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050 [53]). The EU has to manage and overcome many challenges to reach the related goals.

First, the reflection paper toward a Sustainable Europe by 2030 [54] reminds that to make the circular economy the backbone of the EU industrial policy and the EU world leader in designing and producing circular products and services:

1. Circularity should be expanded to many new areas and sectors as well as tools such as life-cycle assessments of products, the Ecodesign framework, the work on chemicals, the nontoxic environment, eco-labelling and eco-innovation, critical raw materials, and fertilizers need to be accelerated.
2. Consumers should be empowered to make informed choices.
3. Sustainable public procurement should be enhanced in the public sector.

Second, according to the 71 regions identified as at risk of missing the 2020 recycling targets or facing specific challenges, the member states and businesses must implement the revised waste legislation and develop markets for secondary raw materials (SRM) to reach the objective of maintaining the material's value within the economic system for much more time in a cost-efficient and safe way.

Third, the Action Plan states that the EU should support research, innovation, and investment in the priority sectors identified, and the holistic approach adopted for the European Strategy for Plastics in a Circular Economy should be expanded and applied to other sectors such as IT, electronics, mobility, the built environment, mining, furniture, foods and drinks, and textiles.

Fourth, the Bioeconomy Strategy [55] and the revised renewable energy framework [56] will be further steps toward using biological resources in a circular way, respecting the ecological boundaries and contributing to halting biodiversity loss.

As stated in the strategic long-term vision for a prosperous, modern, competitive, and climate-neutral economy by 2050, the transition toward a circular economy and a climate-neutral economy should be pursued together, based on a strong industrial ambition and reaping the EU businesses' first-mover advantage in these areas. Finally, climate change and energy enter the circular economy path within the efforts to cut global greenhouse gas emissions. Investment and research should lead businesses and especially SMEs to invest in new circular business models, recycling, energy and material efficiency, and new consumption patterns. The promotion of a joint approach in firms and communities to reduce production costs is key; support new partnerships between businesses, efficient use, and treatment of raw materials; and create new markets through industrial symbiosis.

In conclusion the EU has been investing to become the global leader in the circular economy through its strategy to make it the backbone of the EU industrial system and to support the transition toward a circular and climate-neutral economy. The ambition to become the most competitive and sustainable region in the world requires the collaboration of many different stakeholders, first of all businesses. The next paragraph shows the case of an artisan fashion firm investing to change its business model according to circular economy principles.

4. The case of an Italian fashion firm and its supply chain investing in circularity

The case here presented refers to a company producing quality clothing items for women. The production network is distributed in two Italian regions: in the North of Italy, in the region of Veneto, and in centre of Italy, in Tuscany between Prato and

Florence. The annual production is about 40,000 clothes. This informal network is led by an artisan micro-firm (less than ten collaborators and revenues for less than 3 million Euro). This firm produces for niche markets high-quality clothes designed and made in Italy. It was established as an innovative startup more than 10 years ago due to its innovative approach in design, communication, and use of technical performant materials (e.g., adopted in the sportswear industry). This approach was appreciated by the market and the professional world by the awards received in quality and innovation at fashion events in Italy and abroad.

4.1 The business model and the value chain structure

The value of its production resides in the original mix of design and performant material used for all the collections, not just one single garment. According to them, there are no similar companies in Italy, and that makes the company a kind of unique. Recognized international benchmarks and competitors are firms such as Maison Margiela, Ann Demeulemeester, and Yohji Yamamoto. These brands are similar for the cutting and production stages. They also use similar materials but not for all their collections. The Italian firm is more focused and specialized till the point that it is possible to say (their definition) that its designers create with an international mood but produce with an Italian artisan quality and fitting. In terms of realized volumes, the firm is more like Japanese boutiques.

The firm was established to produce quality clothing items for women in a responsible way since its beginning. The value produced and delivered by the firm relies on a researched mix of innovative design and use of selected technical material. This is made possible because the firm has a proprietary design and produces through a network of selected small and micro laboratories belonging to the typical Italian fashion districts of Veneto and Tuscany. The key resource is immaterial, the human capital or the embedded knowledge, represented by this productive system made of Italian artisans. The network is like a widespread production model, in which each subject is custodian of special knowledge and skills, which come from an ancient craftsmanship but look to the future. The value chain extends from the design of clothes made by the leading firm through the purchase of quality fabrics (usually certified synthetic material) from selected local suppliers to the widespread manufacturing system (craftsmen and specialized laboratories of the Italian territory). The chain includes partners in distribution and sales logistics (dedicated show rooms and a network of shops in Italy, it also sells abroad through e-commerce and some shops). The traditional business model has allowed this artisan firm to move from 5000 of the beginning to about 40,000 items in 2018.

4.1.1 Social innovation as responsibility: prodromes of something beyond CSR

Responsibility has characterized the firm since its beginning and has developed through the years focusing first on the social aspects of production. During the years, the social innovation aspects have been increased and delivered to the national audience through an original project for social empowerment. The project—promoting campaigns against the violence on women (e.g., genital mutilation)—has been accepted and recognized as strategic to support innovative campaigns in support of women's rights by many stakeholders. The firm has been able to create a collaborative network between the government, national NGOs and social cooperatives, national public and private media, and other fashion companies and media to promote civil messages delivered through new products made by disadvantaged people (e.g., economic or political immigrants). This experience has been received many positive feedback and awards such as participation to

national conferences at the Italian Parliament or international events organized in Italy and Europe.

4.1.2 Connecting social impact and climate change concerns: how?

After a few years of experience in delivering innovative initiatives in the social field, the firm has started to think on how to expand its initial project to include climate change concerns and increase its potential impact including environmental sustainability. Circular economy seems to be the answer. From now on the company is studying how to change its business model to support its social innovation initiative through a circular economy business model: how sustaining it with a new responsible and sustainable production model based on circularity.

4.2 The circular economy project: focus on energy and material flows

The firm on the basis of external audit, analyses, and assessments has found that there are inefficiencies in the production cycle such as risks on virgin fibers (price volatility and security of supply, quality of certification schemes), low wearing time of sold clothes, and excessive quantity of unused garments after sale. More specifically, there has been ascertained the existence of unused fabric surplus, inventories of finished products, and large quantities of waste that can become resources.

The firm has developed a strategy to use resources more rationally in upstream and downstream, decoupling the consumption of materials from their use through the application of circular economy principles. The change affects the whole value chain of the company manufacturing processes. The firm intends to intervene with sectoral projects in five areas considered as strategic to transform the economic model from linear to circular and regenerative: (i) responsible supply chain, (ii) warehouse management system, (iii) circular new design, (iv) sustainable production, (v) retail 4.0. Given the complexity of the intervention, the firm has chosen to proceed in successive steps and to start from the stage relative to the management of the warehouse (flow of material) and energy management (energy flow).

The project of rationalization of the warehouse activities, which is the nodal point of production, aims to make management more efficient through the reengineering of the processes with the aid of advanced technologies and with the initiation of industrial symbiosis processes. The firm believes that in order to develop its business model in synergy with environmental protection and social progress, it is necessary to start from the management of material flows. The lower use of fabric quantities minimizes material flows in the main and inverse direction of the supply chain more than other technical solutions do, also reducing the energy flows, incorporated into products, or relating to production cycles and transportation. The quantities of waste and losses for each processing phase are also proportionally reduced. In this sense, the project envisages a proactive strategy in terms of sustainable development, acting in two directions: rationalization of the management of the raw material and a “second life” for excess quantities. The development of the project includes change in the management of the warehouse and in particular of the ordering systems (technological innovation); elaboration of guidelines for suppliers and processing cycle (social innovation); promotion of the project in the national, and international context (sustainability communication and marketing); and activation of relationships for the implementation of industrial symbiosis (economic innovation). The project aims to optimize warehouse management, reducing inventories and using the remaining materials in other industrial processes external to the company (industrial symbiosis and new product development). The optimal management of material requirements and supplies, being linked to the trend of a

variable demand, requires the support of advanced technologies to reengineer the management activities. The project, therefore, activates an inter-sectoral cooperation (resource efficiency and industrial symbiosis), implements technological innovations (sustainable business model, technologies and information management, traceability of materials), and modifies the warehouse management according to the rules of circular economy (lower consumption, more efficiency). The proposed solution also allows the creation of a cross-sector network and the development of new brands for productions activated in symbiosis with other manufacturing sectors.

The expected results are reduction of production costs (warehouse costs by 10-20% in the first 2 years), expansion of markets, increase in the value of manufactured goods (increase in the ratio of revenues/units of purchased material), implementation of excellent and virtuous networks (partners in industrial symbiosis), lower risks of supplying raw materials, more renewable energy resources and higher efficiency, and more innovative design.

5. Discussion and conclusions

What is the impact of an artisan firm and its partner network investing to change its business and production model? One way to answer to this question is to discuss what has emerged from the previous analysis in terms of impact, mainly sustainable impacts.

The first impact to discuss is the *economic* one that can be read in terms of competitive advantage or market and scalability. About the opening of new markets deriving from the project, interviews to the owners make emerge the presence of some critical factors. The transition to the new business model will face: (1) speed of change; (2) acceleration dictated by the market and not by the regulatory system; and (3) availability of immediately applicable solutions (not just technological, but technical and financial). Due to its position in the firm's value chain, the project affects the business model either upstream, the supply chain (quality of raw material and related risks), or downstream, the processing cycle. In principle, the main target of the firm does not change (well educated women with high spending capacity), even if this could increase due to the introduction of circular products in the market and the activation of industrial symbiotic processes. This could allow the firm to find new partners in different sectors with whom developing new value chains. A systemic approach and a strategic network of partners become essential to the realization of positive impacts and returns. The relationships at the various levels and with the individual operators along the supply chain will continue with the traditional methods of the Italian manufacturing excellence integrated by the elaboration/evaluation of the information acquired (feedback) to create new and superior value for the "traditional" market. The type and size of the traditional market/target is presumed not to increase during the first 2 years. New markets will open up to the extent that processes of industrial symbiosis will be activated and new products will be generated in different economic sectors: there are many unknown factors at the operational level, but the firm has already identified a series of "promising" sectors for the activation of the symbiotic processes such as furniture, work clothing (technical, medical, etc.), footwear, leather goods, automotive, etc.

About the possibility to scale up solution, the project has a potential development in terms of scalability, replicability in other areas and market segments, creation of a network of "virtuous" operators in the textile sector, and growth of industrial symbiosis initiatives. The project is scalable because the parameters can be tailored to the objectives and to the typical production of the company/industry to which

they apply. The project can be replicated because the conceptual plant is independent of the type of production and can be adapted to any type of product or specific production in the fashion and textile industries.

Other transversal criteria regard the *environmental and the social impacts and equal opportunities*. The environmental impact will be significant due to the reduction in consumption of nonrenewable raw materials, harmful substances released into the natural environment, and CO₂ emissions. As described before, the environmental impact coming from an efficient management system applied to the warehouse is significant for the reduction in both direct and indirect terms. In terms of social impact, the project regards hybridization of knowledge and skills; job opportunities especially in terms of new employment in favor of young employees, in cooperation with labor unions, and disadvantaged women, in cooperation with NGO; and application of SDGs criteria in the supply chain and in the production line. As it emerges from these brief lines, the project maintains central to its vision the theme of equal opportunities and access to training and knowledge since it in no way must limit participation, especially of women. On the contrary, it makes strategic the involvement of young designer artisans and women in terms of education, training, startup processes, female entrepreneurship, and social innovation.

6. Conclusions

The paradigm shift in the textile clothing sector is in a nascent state: the real competition is with the aversion to change. Implementing a circular economy model means changing policy, management, information, and finance: the transition requires a systemic and holistic approach with the involvement of many stakeholders. Cultural barriers condition the regulatory framework and produce operational difficulties. At the same time, these are conditioned by the regulatory framework itself; then, they concern the public opinion, economic operators, and final users equally. For the benefits of the project, the main operational obstacle lies in the different relationship that must be established with the supply chain and production line operators. This obstacle is overcome through a recovery of efficiency of information flows accompanied by technological innovation, the development of guidelines for suppliers, and coaching actions for the production line. The project is conceived for micro and small enterprises with the aim of enhancing their value, specificity, and excellence. It is based on circular economy principles that find a possible operational application to resource efficiency combined with technological and organizational innovation in warehouse management system. For the firm and its value chain to reach their sustainable and circular goals, it is evident that the European strategies, plans, and material helps are essential. Micro and small firms can overcome inner and contextual limits working together with strategic partners at different levels: workers unions, business association, universities, social organizations, and corporations become key for the transition of fashion micro and small enterprises to a circular and prosperous future.

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