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Fashion industry and sustainability: building circular economy and cooperation among stakeholders

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Abstract: The big impact in terms of pollution and waste in the fashion industry led us to focus on going more deeply into the research of which sustainable actions can be followed by companies, consumers, and the government. The world's population is growing, and the supply of crucial raw materials is limited. Extracting and using raw materials has a big impact on the environment. It is very important in social and environmental terms to start seriously adopting 'circular model systems', for companies first in order to better control different aspects and stages of design, production, and distribution. The circular economy system has interesting advantages over the linear economy system, but it is still not a perfect model. Today, we do not have examples of existing perfect circular economy systems. There are imperfections and wastes in the whole system. It is possible to say that the circular economy system is not perfect, but it is possible to work on improvements. The aim of this research is to remark importance of cooperation among political system, companies' system and consumer perspective, in order to improve efforts in adopting circular economy systems and innovations, with a special focus on fashion industry.

Keywords: sustainability; fashion industry; resource efficiency; cooperation; sustainable development; circular economy; innovation; waste management; supply chain; consumer behaviour; business ethics.

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Biographical notes: Valentina Raimondi earned her Master's degree in Global Entrepreneurship Economics and Management in 2018 from Insubria University in Varese (Italy). Her current work experience at ComoNExT Innovation Hub gives her the possibility to make studies and assessments on possible implementation of digital technologies to small and medium local companies the opportunity to promote innovation and sustainability paths.

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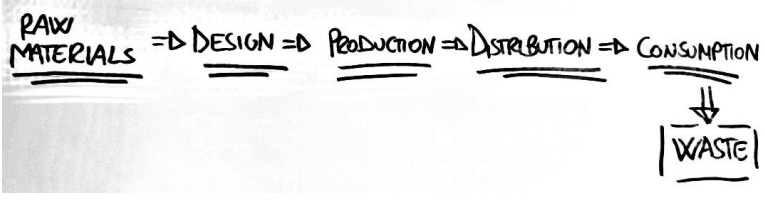
1 Introduction

The fashion industry as other manufacturing industries has a strong impact on the world's economy and on the natural environment, for this reason it is necessary for companies to understand the opportunities offered by circular models and connected innovations.

Society evolves continuously and even faster challenges on society are affecting our habits. There is the need of a radical cultural change that must be undertake soon by all the actors of the system.

Traditional manufacturing system is 'linear', but as we all know, this system is not any longer sustainable.

Figure 1 Linear model in manufacturing system

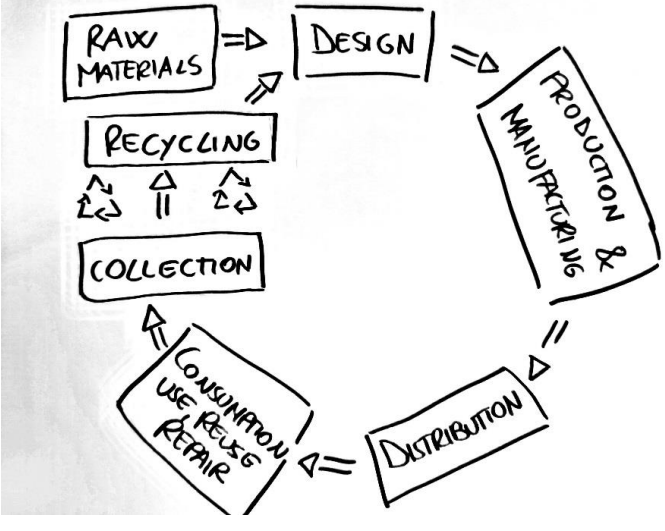


Source: Author elaboration [Iraldo and Bruschi, (2015), p.4]

In the last few years, most executives acknowledged the importance of sustainable, and already adopted practices to protect future growth, and used it as an opportunity to improve the reputation of the company itself.

Sensibility around the world is growing among consumers, according to sustainability themes, and many organisations are already insisting on sustainable practices.

Figure 2 Circular economy model



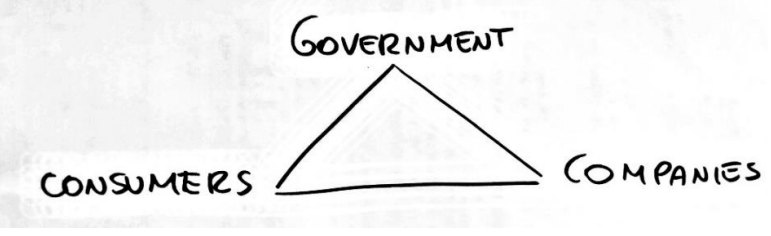
Source: Author elaboration [Iraldo and Bruschi, (2015), p.6]

Circular economy model is not a perfect model as represented above. Today, we do not have examples of existing perfect circular economy systems. There are some kind of imperfections and wastes related to manufacturing phase, distribution phase, collecting phase and in recycling phase too. It is possible to say that circular economy system may not be never perfect, but it is possible to work on improvements. European Parliament in 2018 declared that *circular economy practices* such as waste prevention, eco-design and reuse could save EU companies an estimated value of *600 billion* of euros, an esteem of 8% of annual turnover. At the same time, the parliament declared that it is possible to reduce of 2%–4% of annual greenhouse gas emissions (European Parliament, 2018). Benefits of adopting circular models could be the followings: reducing pressure on the environment and stimulating competitiveness, innovation, economic growth and creation of jobs. Consumers will also be provided with more durable and innovative products that will increase the quality of life and save them money in the long-term. Data from the official site of the European Commission show us some estimation of benefits of adopting circular economy models in EU countries (European Parliament, 2018):

- savings of €600 billion for EU businesses, equivalent to 8% of their annual turnover
- creation of 580,000 jobs
- reduction of EU carbon emissions by 450 million tonnes by 2030.

This research is going to discuss about sustainability actions that are already taken by companies and institutions and future actions that can be driven by consumers. In the following pages, there will be analysed government actions, companies' actions and consumer behaviours according to fashion industry sustainability issues. In order to demonstrate that in order to increase efficiency of circular models, there should be a contemporary effort by those three actors.

Figure 3 Systems around circular models



Source: Author elaboration

2 Literature analysis

Todeschini et al. (2017) argued that fashion industry is a resource-intensive sector where opportunities to reduce environmental impact and innovate business models abound. Circular economy model aims to overcome the linear model of production and consumption. New and existing companies are looking for ways to thrive in a competitive environment with innovative business models while respecting society and avoiding actions that harm the planet (Gazzola, 2018).

Circular economy model is not something completely new, already in 1993 has been promoted some principles of recycling the 4 R's of recycling which stays for 'reduce, reuse, recycle and recover' (Gutnik, 1993).

Practices of circular economy have long been part of human existence. For example, during the Bronze Age, it is possible to see one of the first examples of a circular economy. During the Bronze Age, metal market was based on recycling, re-melting and re-trading. In the ancient times, linear, and wasteful economy was an anomaly. Past can help inspire modern good practices (Kuijpers, 2019).

There are three systems that should be the promoters of the transition towards sustainability models (Parsons, 1966): economy as a functional system, politics functional system and cultural system. The last one represents the system in which economic and political processes get formed and legitimised. Those are the main systems that should promote a strong cooperation in order to face sustainability objectives. In this research, these three systems have been translated as following: government, businesses and consumer world.

A new model based on 'trust' among these three worlds, can promote all-round exchange of information about practices, knowledge and confidence to establish partnerships with the integration of interests and risks.

Many institutions and governments are promoting plans and guidelines in order to achieve objectives on sustainability arguments. Great sources of material for the section of this paper regarding governments 'actions' have been the research paper from IEFE Bocconi (Iraldo and Bruschi, 2015), called 'Economia Circolare: principi guida e casi studio'. Bocconi University and a more recent paper report of 2020 from IVA (Royal Sweedish Academy of Engineering Science) called 'Textiles – from waste to resource by 2030', as sources from official websites and publications of European Commission. Many European and global programs have been cited in this paper, like followings. In 2011 European Commission, with the Zero Waste Europe Program, defined strategies and guidelines to involve companies, consumers and local governments to minimise waste.

In September 2015, it was signed by members of the 193 UN member countries on 'Agenda 2030' Action Program for Sustainable Development. In 2015, have been published the '17 global goals'. Objectives are very optimistic and include drastic reduction of poverty, inequalities, waste and pollution.

More recent institutional initiatives in Europe like 'Horizon 2020', which became 'Horizon 2021–2027' for the next years, are also allocating financial funds in order to promote innovation and sustainable development.

This research continues talking about sustainable actions that can be followed by companies. On this part of the research, many have been the sources consulted. Main sources have been CEO Agenda 2020, used mainly in order to understand and define best practices for companies; International Labor Organization (ILO) studies and OECD studies on labour increase thanks to the adoption of circular systems; presentation of the 'resource conservative manufacturing model' (Asif, 2017) for companies and blockchain technology related to advantages for companies, government and customers, in traceability of supply chain (Pérez et al., 2020).

In addition, the author has been took some inspirations from papers from authors like: Dupreè, Murray, Baruzzo, Farigone, Prakash and Narashmhan.

Sustainable companies in the fashion sector are increasing their interest in the use of fibres, yarns, recycled fabrics in the development and production of new products. The

recycled materials used in textiles and clothing can be obtained throughout the textile and clothing supply chain and post-consumer collection methods (Lehmann et al., 2020). The control of the supply chain has been the starting point of the discussion of this paper in Section 4.

Sustainability practices for companies also include measures regarding, human capital which seems to a marginal argument when everybody talks about sustainability (Chalmer et al., 2018).

Prices of implementation of green technologies, for a company, may not necessarily reflect the real costs of their materials and components (Camilleri, 2018). In addition to this, there are also still weak policy actions regarding incentives for companies in invest in green technologies, redesign manufacturing, and service systems that will benefit the environment (Murray et al., 2017).

These points must be considered as an incentive to build strong systems of cooperation among companies, government and consumers, and remove imperfections in the circular economy model.

It is therefore important to know the perceptions of consumers regarding consumption and sustainability. On this section, the author mostly used an own research made during the university career in 2019. In this regard, a questionnaire has been created administered to students of the University of Insubria in 2019 on the theme of sustainable fashion, which will be analysed in Section 4.1 of this research.

3 Institutional incentives for sustainable actions

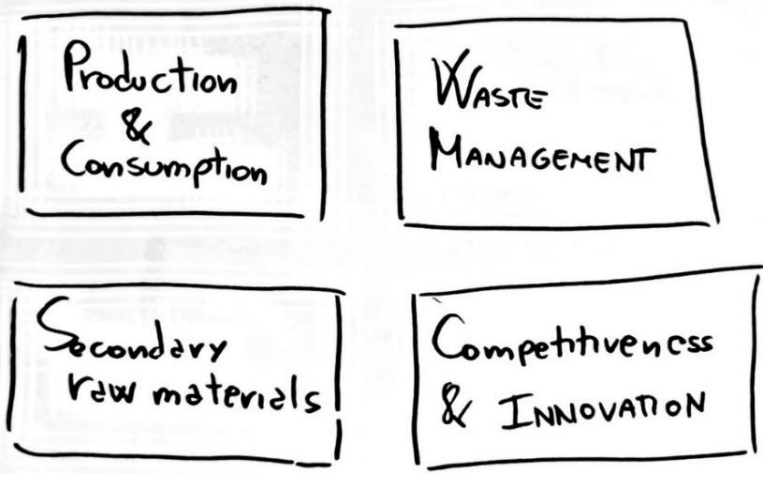
In September 2015, it was signed by members of the 193 UN member countries on 'Agenda 2030' action program for sustainable development. In 2015, have been published the '17 global goals'. Objectives are very optimistic and include drastic reduction of poverty, inequalities, waste and pollution. Governments, businesses, civil society and the general public have been influenced by this and other institutional decisions and started to adopt measures to try to achieve these goals (The Global Goals for Sustainable Development, 2015).

In 2011, European Commission was already working on Zero Waste Europe Program. To monitor objectives of this program, regional and national groups hold annual meetings in Brussels since 2011, in order to find the best strategy to involve companies, consumers and local governments to minimise waste. Here below some of the guidelines for businesses:

- Raw materials have to come preferable from recycled materials and not from new extraction. Any new extraction should be only justifiable when it comes from a regenerating source.
- Promote circular systems instead of linear ones.
- Production processes should be redesigned and funded on reuse and regeneration of materials.
- Energy consumption and waste generation should be optimised.
- Changing the paradigm from labour productivity to resources productivity.

At this point, it is possible to say that measures taken by politicians like 'Horizon 2020', the European program that allocated 80 billion euros for the period 2014–2020 to research and innovation, focusing in a strong way also on sustainable and eco-innovations. A new program will be launched after 2020.

Figure 4 European Commission monitoring areas for circular economy



Source: Author elaboration [European Commission (Eurostat), 2017]

Indicators that are used from European Commission to monitor the progress towards a circular economy, consists of ten indicators grouped in four main areas:

1 It is important to understand progress to circular models, to monitor *production and consumption*. Households and companies aim is to decrease the amount of waste they generate. In this case, EU Commission monitors: self-sufficiency of raw materials, green public procurement, waste generation and food waste.

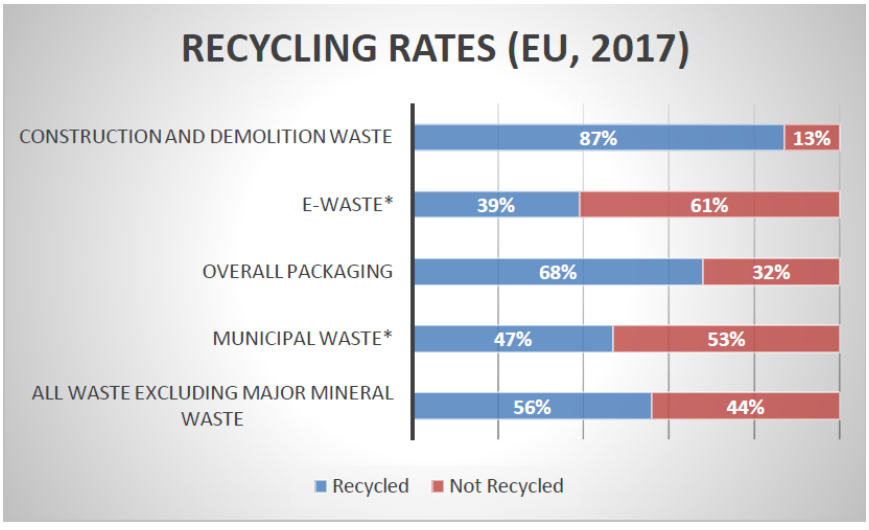
2 *Waste management* macro-area calculates the share of recycled waste returned into the economic cycle. In this case, EU Commission monitors: recycling rates (the share of waste which is recycled) and specific waste streams (packaging waste, bio-waste, e-waste, etc.).

   Figure 5 provides the most recent data on the topic, which are available in the Eurostat database.

3 *Materials and products* need to be re-introduced into economic value cycle. Recycled materials are able to replace raw ones, and so new extraction from nature. This is able to decrease environmental footprint of production and consumption. In this case, EU Commission monitors contribution of recycled materials to raw materials demand and trade of recyclable raw materials between the EU Member States and with the rest of the world.

4 Circular economy really contributes to economic growth and the creation of jobs. In fact, it stimulates the *development of innovations*. In this case, EU Commission monitors: private investments, jobs and gross value added and patents related to recycling and secondary raw materials.

Figure 5 Overview recycling rates of different waste streams (see online version for colours)



Notes: *Municipal waste:* bulky waste (e.g., white goods, old furniture, mattresses), and garden waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if managed as waste. It includes waste originating from: households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes waste from selected municipal services, waste from park and garden maintenance, and waste from street cleaning services.
E-waste stands for: electrical and electronic equipment (EEE) and includes: large household appliances, small household appliances, IT and telecommunications equipment, consumer equipment and photovoltaic panels, lighting equipment, electrical and electronic tools (with the exception of large-scale stationary industrial tools), toys, leisure and sports equipment, medical devices (with the exception of all implanted and infected products), monitoring and control instruments and automatic dispensers.

Source: Author elaboration [European Commission (Eurostat), 2017]

Figure 6 provides the most recent data on the topic, which are available in the Eurostat database.

Figure 6 Jobs, growth and investment in circular economy sectors (2017) (see online version for colours)

Source: Author elaboration [European Commission (Eurostat), 2017]

In practical, it is important to monitor previous indicator, but on the other side, governments should be able take following actions:

1 Develop educational programs for companies, consumers and public institutions. The aim should be to provide adequate education that could help companies in adopting more ethical practices, educate public institutions to create adequate standards and re-educate consumers in making more ethical purchases (IVA, 2020).

2 Provide common standards to ensure textile circular economy frameworks, and instructions on how to manage different materials wastes (IVA, 2020).

3 Provide a more ethical legislation on use of chemicals (IVA, 2020).

4 Promote and regulate traceability of materials. Important to bring and control circular flows and real information to the final consumer (Lehmann et al., 2020).

5 Provide a common labelling system, in order to give customers more information at the time of the purchase and sensitise ethical buying (IVA, 2020).

6 Incentivise production, offer, and demand of raw materials applying consistent tax reliefs (IVA, 2020).

7 Involve consumers in buying ethical and recycle clothes, for example reducing or eliminating VAT on recycled items, as consumers already paid VAT on the items when it was not recycled.

4 Build a circular economy system: company's perspective

Sustainability practices can bring advantages in firms' financial performance when they are well planned.

Companies following circular models can have: savings in terms of resources used (for example, water and energy), less waste of materials, reduction of costs deriving from sanctions related to legal impositions, technological innovations (this can increase for example the ability of the company to introduce new products), adoption of new systems of better relationships among stakeholders, and greater attention to the relationships with both the local communities and customers (Gazzola et al., 2016).

The linear economy model act as there is an unlimited natural resources and unlimited capacity to absorb waste and pollution by the environment. In addition, this model is still eradicated in the majority of companies and consumers (Cooper, 1999).

The transition to a more circular economic model, will be able to improve the environmental conditions of our planet and its inhabitants, is loudly promoted in all industrial and economic fields. The old linear model that for years dominated the market seems to have become extremely expensive (Lenci, 2018).

If fashion players will not start acting in a 'circular way', the linear model will soon reach its physical limits, and prices of raw materials will reach very high values.

Firms are continuously encouraged to evaluate new strategies, remodelled operations, management systems and production in order to identify value-added practices (Porter and Van der Linde, 1995). This should be the right moment to do it, thanks to many political and social pressures, evaluating sustainability opportunities.

Redesigned processes, modification of certain technologies and the eventual introduction of new technologies are keys to improve industrial operations and outputs (Camilleri, 2018).

Prakash (2002) selected some steps that companies should undertake at management level to create the right conditions for a circular system:

- lengthen the life of a product by repairing its parts
- lengthen the life of a product finding a new usage of it, reconverting, recycling or remanufacturing it
- design a product in a way that is more times reusable
- reduce the usage of new raw materials, waste can be sometimes regenerated.

Circular economy proposition promotes a 'closed-loop economy', this suggest rethinking completely the designed processes. Materials used for the production of goods and resources, whether they have biological parts or nutrients should be designed, since the beginning, in a way that they can re-enter the biosphere 'safely', or to recirculate without being harmful to environment and to people (UNEP, 2006).

The use of virgin material makes fashion companies more vulnerable to fluctuations in raw material prices.

Implementing a model of a circular economy would result in cost savings for companies, because they will be no longer exposed to fluctuations and the rise in prices of virgin materials. It would also allow space for innovations and a relationship of mutual trust with customers, which would be involved in the transition through awareness-raising campaigns on reuse and recycling. From the environmental point of view, a 'circular' textile sector would significantly reduce greenhouse gas emissions, waste of water and primary resources, spills of polluting materials and increase soil productivity. Therefore, working conditions could be improved by using substances that are not harmful to health.

Even if the sensitivity to waste has increased, efforts are still small-scale projects and to ferry the market to a circular model, it must start with effective environmental policies to reduce impacts, and adequate sensitising consumers who have a crucial role in influencing the market.

The 'fast fashion model', imposes a high rate of replacement of the dresses, at low price and of consequent low quality and prevalence of the mixed fibres. Mixed fibres are difficult and costly to recycle. The increase this type of non-recyclable waste is destined to increase waste in landfills (Cera, 2018).

Fashion industry is still far away from a circular system, where materials are designed and recycled in order to generate 'additional value' rather than 'additional wastes'. Many pioneers' companies are exploring 'circular models', unfortunately, it is a slow transition because of regulations, logistics, technical and economic resources and lack of complete solutions and appropriate infrastructures.

Adopting a sustainable and responsible policy means starting from the consideration of the interests of all stakeholders, who participate in the conception, production, supply, sale and use of the product.

Companies have to understand that there are strategic variables capable of generating competitive advantages:

- Dialogue and cooperation with raw material suppliers, with a view to sharing social and environmental standards.
- Control of the supply chain, i.e., the safety of the products in the various stages of construction, transformation and transport, integration of environmental factors in the production chain, prevention of corruption and exploitation of workers.
- Investing in innovation and research or thinking about the life cycle of the product trying to focus on increasing the percentages of recycled or regenerated materials.
- Check the possibilities of sustainable development in all production phases (production, distribution, sales, etc.).
- Management of emissions and environmental impacts.
- Focus on the quality of the work environment, therefore on the qualification of employees, management of careers and training, improvement of health and safety conditions, enhancement of skills, respect for freedom of association and right to collective bargaining and non-discrimination.
- Relations with communities, product safety in the final use phase, transparent communication, sharing of values, economic, social and cultural development of the territory, and post-consumer collection initiatives.

The achievement of these goals is complex and requires radical cultural change. Companies must be aware that it may soon become complex to move forward according to the same production models, due to the growing lack of resources and sudden legislative changes.

On the other side, there are pressures also from consumers that are becoming every year more aware on sustainability issues (Spaargaren, 2003).

Sustainability practices should be seen as strong opportunities for companies that can use it as competitive advantage in the market, rather than a need for change.

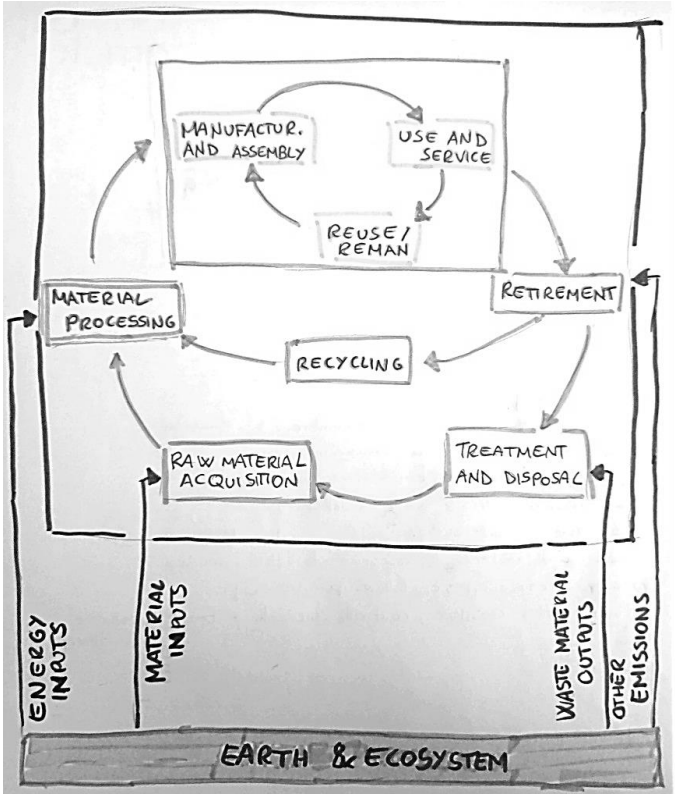
ResCoM stays for ‘resourcer conservative manufacturing model’ (representation in Figure 7). Differently from conventional manufacturing and remanufacturing systems, in this new model, products are used multiple times. A model in which strategies of reuse and remake are considered as integrated parts of the manufacturing systems.

Usually products or its components, when they cannot be reused or remanufactured in an economically and environmentally sustainable way, they are recycled just to recover materials. In a real closed-loop approach, recovery value is much higher; because products need to be designed for multiple lifecycles and during the design phase is mandatory to establish an end-of-life management strategy. In this way, the model represented in ‘Figure 7’ can work correctly (Asif, 2017).

During manufacturing processes of companies, there will be always some kind of wastes during each phase, it is not possible to turn discards to zero. The aim of this model is to lower discards at optimise recycling at minimum.

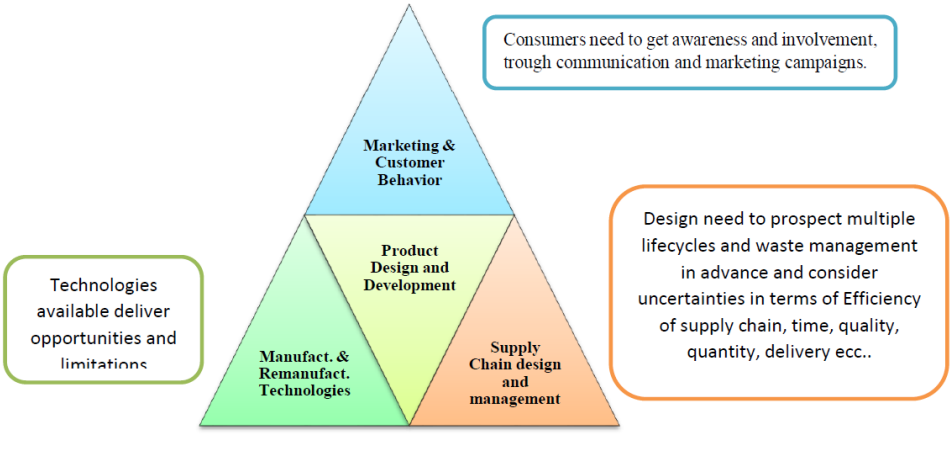
ResCoM-framework has some imperfections and does not consider externalities coming from government system and social system. There are mutual dependencies and interactions are considered and understood as shown in Figure 8 (Asif, 2017).

Figure 7 Resource conservative manufacturing model



Source: Author elaboration (ResCoM model) and Asif (2017)

Figure 8 ResCom model: dependencies and interactions with externalities (see online version for colours)



Source: Author elaboration (ResCoM model) and Asif (2017)

4.1 Control supply chain

The control of the supply chain is the starting point to build a sustainable value chain.

Many fashion brands lack of traceability and full visibility of their supply chain, and most of the times they do not know where the raw materials used in their products come from. Complexity of fashion system makes difficult for fashion brands to keep track of their materials (Lehmann et al., 2020).

Is this the real moment in which is important to establish right cooperation among suppliers, customers, institutions, and with all the stakeholders involved?

Following aspects need to be considered by fashion companies (Pérez et al., 2020):

- Shared transparency and visibility are essential to build a sustainable supply chain.
- Product maintenance aspects like washing, dyeing and drying have to be shared with retailers, suppliers and consumers.
- Logistic processes should be tracked in order to be optimised.
- Authorities can control and ensures that the products respect law standards thanks to shared data about the origin, history, raw material composition, etc.
- A great advantage for companies is 'real-time' sales and production data. This helps in making more precise sales forecasts, production management and control.
- Cryptographic protocols of blockchain technology, avoids alteration of data.
- Ability to share an ethical history of the supply chain helps companies to promote a positive brand image.

Many companies in quite all production sectors all over the world are increasingly using blockchain technology in order to provide transparency, traceability, authenticity and security to their supply chains (Pérez et al., 2020).

Textile and clothing supply chain traceability involve several steps, that translated into blockchain language are called 'blocks'. Some of them are listed below (Pérez et al., 2020):

1 *Raw material suppliers:* Information containing origin of the material, and physical properties, fineness, thickness, fibre composition and colour.

2 *Yarns and manufacturing of fabrics:* Information about all the network of transformation from yarns to fabric manufacturers responsible for machinery certification, products validation and worker's conditions.

3 *Production network:* Information about garment assembly network, which includes design, data sheet, the basic pattern, data about the scaled clothing, and the industry's operations for the final assembly.

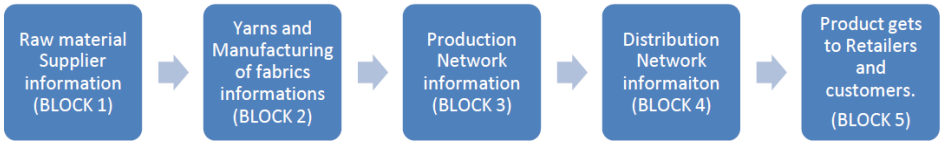
4 *Distribution network:* Information about the marketing network like agents, apparel companies, distribution centres or special stores.

5 *Customer and retailers:* At the end of the value chain, retailer first and finally the customer get the product with all the characteristics written in the labels.

Traceability is fundamental for identifying and improving the environmental, social and ethical impact of fashion production. It enables brands and their suppliers to identify

challenges and risks along their supply chain, as well as to understand and manage the opportunities related to the introduction of sustainable practices.

Figure 9 Textile sector, supply chain 'blocks' (see online version for colours)



Source: Author elaboration (Pérez et al., 2020)

4.2 Prevent wasted water, energy and chemicals

Eco-conception and eco-efficiency business models have born to increase waste prevention.

Those models can implement sustainable actions before a product reaches its end-of-life stage. Those models are willing to promote reuse, repair and refurbishment actions rather than discarding the product as waste (Dupré, 2018).

In the next few decades, share of carbon emission of textile industry could increase significantly. Fashion value chain activities largely affect climate, water and chemical pollution. This has to be considered as the highest priority for immediate action in most segments of fashion industry, from chemical tanning of leather for luxury brands to denim processing for high fashion street-style retailers. Many fashion brands significantly improved in this area, but a big gap still exist.

In the future, will grow the scarcity of clean potable water and water for industrial and agricultural productions. A future increase in demand and a possible introduction of fossil tax could drive up the cost of electricity.

Achieving an optimal amount of energy consumption during production, can account for as much as half of a fashion brand's contribution to climate change. There is potential for a more efficient use of water and energy. On average, textile processing can cut water use by 11% and energy use by 7% cutting also costs for energy and water. Companies can easily identify their wasteful practices and they can reduce wastes thanks to improvement programs (Lehmann et al., 2020).

Improving water and energy efficiency and usage of chemicals, could increase a fashion company's EBIT margin up to 2%–3% by 2030 (Global Fashion Agenda and the Boston Consulting Group, 2018).

Companies do not have to be sustainable only during production, but a big role is taken also by transportation.

A good example of a pioneering company on this purpose is Amazon, which launched the Zero Shipment Program. This program aims at reaching at least 50% of zero-emission deliveries by 2030.

To reach the goal, Amazon aims at the synergy of environmentally friendly adaptations such as the adoption of electric vehicles to carry out deliveries. As a tangible proof of the commitment, Amazon has announced that by the year it will present for the first time a report on its carbon footprint, which is the impact in terms of CO_2 emissions caused by the complex of acts (Rinnovabili.it, 2019).

Fashion companies' symbiosis among value chain, both in a horizontal and vertical way, can help to reduce: extraction of natural resources and generation of waste materials.

In addition, the promotion and incentive of reuse and repair is relevant for businesses and can be operated in collaboration with households (European Commission, 2012).

CEO's could see low economic incentives in saving energy, material and water. Companies usually transfer the manufacturing costs to customers in the form of higher sale prices.

This is why is important to create active cooperation between stakeholders, suppliers and distributors in order to develop a circular economy system that could create benefits to all of them.

On the other side, politicians and legislators may lack the capabilities and the right sensibility to encourage corporate sustainable behaviours (Camilleri, 2018).

4.3 Worker's respect and job growth

The global fashion industry contributes to economic prosperity and creates jobs, employing around 60 million people along its value chain.

It appears that the circular economy is more focused on the redesign of manufacturing and service systems that will benefit the environment (Murray et al., 2017).

Respect for human rights must be considered an ethical imperative as well as a good business. Secure and respectful work environments can bring important benefits at an economic level: higher productivity, few sicknesses of workers, fewer errors and better atmosphere. Studies demonstrated that in secure and equal work environments, productivity could increase of 18% in the manufacturing stage (Chalmer et al., 2018).

A good work environment, good treatment and security can be also key factor in employee attraction and retention. Big problems in these terms have been founded especially in the early stages of the value chain, are still exposed to hazards such as factory fires and the use of hazardous chemicals.

For example, during production, it is possible to use substitute hazardous chemicals, like tanning agents and leather dyes with more sustainable practices and materials. This practice can be good for the health of workers and is able to reduce the damage done to the environment.

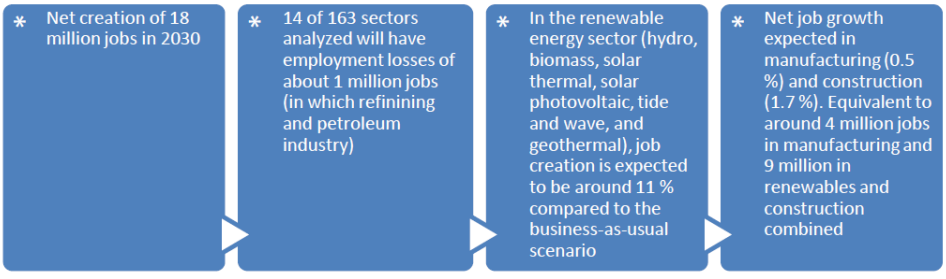
In order to achieve complete sustainability objectives, a company do not have to forget human capital. Only achieving both environmental and human capital rules, we can consider a company to be sustainable at all levels (Lehmann et al., 2020).

According to data and estimation from the ILO (2018a), in a scenario when companies are able to adopt closed loop models, worldwide employment can grow up to 0.1% by 2030 in comparison with a 'business-as-usual scenario'. Employment especially in sectors like services and waste management could grow respectively about 50 million and 45 million jobs (ILO, 2018a).

The ILO (2018b) estimation of job creation thanks to the adoption of 'closed-loop systems' are as represented in Figure 10.

The scenario presented by estimation of ILO in 2018 about the job turnover associated with a circular economy transition, can be associated with a new kind of 'new industrialisation transition' similar to the one that industrialised societies have experienced in the past.

Figure 10 ILO estimation on job creation, thanks to circular economy (see online version for colours)



Source: Author elaboration [ILO, (2018a), pp.42–43]

At a political level, implementation of policies related to circular economy and resource efficiency, influence aggregate income, aggregate supply, demand and employment. OECD et al. (2020) declared that additional fiscal revenues deriving from circular economy policies can be used to stimulate employment or to mitigate direct adverse employment effects of the policies.

How labour market can be impacted, due to development of new circular economy systems. It is possible to group dynamics, in four main categories (OECD et al., 2020):

- *Job creation* can be expected in the group of 'green' sectors and activities that are stimulated through circular economy policies.
- *Job substitution:* Where one labour activity is directly replaced by asnother (e.g., from landfilling and waste incineration to recycling).
- *Job destruction:* Will takes place in sectors with large environmental and materials footprints (e.g., banned products or practices).

4.3.1 Importance of government policies on jobs

OECD et al. (2020) says that average employment effect due to an 'Environmental Tax Reform' scenario lies at 2.3%, while the average effect will be marginally negative at –0.07% in a 'Non-environmental Tax Reform' scenarios:

> "Revenues from material taxes can be recycled in order to lower other distortionary taxes, in order to benefit the transition for gross employment. If revenues are returned in lump sum to households, the consequences to overall net employment are negligible or may even be negative."

4.4 Adopting sustainable materials

By 2030, world population it is supposed to reach 8.5 billion people, as a reaction to this phenomenon, garment production is predicted to increase by 63% (Lehmann et al., 2020).

There is the need for fashion leaders to start looking at their companies identifying and evaluating the environmental and social impact of their processes and material mix they use.

After checking this, the real objective will be to encourage them to shift their mix towards low environmental and social impact solutions. For example, using organic

instead of conventional cotton, respect animal, human and environmental welfare. To be sustainable means not just to be sustainable in production of clothes but also in services like delivery of clothes.

Mixed fibres, cotton-acrylic or cotton-elastane, are very difficult to recycle.

Garments at 100% in polyester, are relatively easy to convert into reusable material. Very different is the case of mixtures with natural fibres, for example, cotton and polyester. These mixes, to date, are essentially non-recyclable: the two components in fact cannot be separated at low cost (Chalmer et al., 2018).

This example let us understand that sustainability is getting more and more important and today companies like Amazon are driving this change giving good examples to other companies as 'pioneers'.

The fashion industry is still far from a true mix of sustainable materials but is investing in innovation in this area. Here are some examples of companies that currently work with highly innovative and sustainable materials:

1 *Wawe-O:* Is the T-shirt collection for women and men obtained from fishing nets transformed into regenerated nylon. The fishing nets are entirely recyclable, and the 'Aquafil' process aims to bring home 100% of the material to be recycled.

2 *H&M:* The exclusive 'conscious collection' from H&M is precisely in limited edition choice due to the presence of particular raw materials such as vegetable tanned skin and silk from controlled crops (Perotta, 2014).

3 *Orange Fiber:* Is a start-up setup by two Italian girls who have found a way to produce environmentally sustainable fibres from citrus peel. The tissues produced, once worn, would release vitamin C, useful to the organism.

4 *Bionic Yarn:* Produces a high-performance yarn obtained from recycled plastic.

5 *Pinatex:* An English company producing eco-leather from the fibres of pineapple leaves.

6 *Directa Plus:* An Italian company that produces textile fibres with graphene.

Therefore, the only alternative that ecological fashion will be able to undertake soon is precisely to transform recycled materials into fibres to be used to produce new yarns and fabrics, obviously with the precious help of technology.

New technologies can make the difference: they are decisive for devising fibres and production processes. It is therefore necessary to invest time and money in experimental research (Baruzzo, 2014).

5 Circular model: consumer perspectives

The research presented in this section wants to analyse consumer's perspectives on sustainability and circular economy regarding fashion industry. This research started with a survey, which was launched between the end of 2018 and the beginning of 2019 among students and professors of the University of Insubria. The aim of the survey was to understand the sensitivity of young people on the topic of 'sustainable fashion'.

The questionnaire was administered anonymously and in just two months, this received 1,401 responses. The sample analysed has the following characteristics: Italian students between 20 and 25 years of the University of Insubria, middle class households.

This survey has been spread in foreign universities, where, however, it found proportionately fewer answers. The foreign universities that participated in the survey were the following: SNSPA – National University of Political and Public Studies Administration of Bucharest (Romania), University of International Affairs of Almaty (Kazakhstan) and National Eurasian University of Astana (Kazakhstan). Interesting differences have been noted between Italian and foreign respondents, which we will discuss in the next few lines.

The survey was structured according to the following macro-areas: general information of the interviewees, fashion product features, online shopping, circular economy and sustainable fashion.

Below, we will deal only with the part of this data, functional to the objective of the article and so 'sustainable fashion' and 'circular economy' sections.

5.1 Question 1 – how important are the following aspects to make you decide to discard a dress?

Options that have been given to the respondents:

- I do not like it anymore
- it is no longer in fashion
- it does not fit
- it is damaged.

Table 1 How important are the following aspects to make you decide to discard a dress?

	I do not like it anymore	*It is no longer in fashion*	*It does not fit*	*It is damaged*
Very much	531	497	547	559
Pretty much	612	598	599	596
Neutral	133	147	134	124
Not that much	88	107	87	85
Not at all	37	52	34	37
TOT	*1,401*	*1,401*	*1,401*	*1,401*

Source: Author elaboration

Due to the phenomenon of 'fast fashion', the first two options have been generated the great majority of answers.

As an analysis of this graph, the greater part of these respondents is influenced by new tendencies and likes to refresh their wardrobe. On the other side of course motivation to discard a dress are also traditional situations in which the item is damaged, or it does not fit.

5.2 Question 2 – before throwing clothes away, would you consider important to do one of the following actions?

Options that have been given to the respondents:

- taking the item into a charity shop
- giving it to a friend or family member for
- second-hand use
- repair the clothes or modify them
- re-working that clothes into something else.

Table 2 Before throwing clothes away, would you consider important to do one of the following actions?

	Taking the item into a charity shop	*Giving it to a friend or family member for second hand use*	*Repair the clothes or modify them*	*Reworking that clothes into something else*
Very much	356	366	323	322
Pretty much	848	849	855	839
Neutral	110	103	107	105
Not that much	54	54	70	73
Not at all	33	29	46	62
TOT	*1,401*	*1,401*	*1,401*	*1,401*

Source: Author elaboration

On this question, our students, after having discarded a dress, declared to be used to bring clothes to charity shops or they give them to friends or family members. This is an important aspect for creating circular economy. On the other side, they do not consider too much to repair clothes or reinvent them. This can be explained by the fact that they usually spend not too much for one item and they do not have the technical skills to repair them. The cost that they have to afford to bring the item to a tailor, most of the time is not convenient. Another reason is the fact that trends changes very fast, as we explained the phenomenon of 'fast fashion'.

Another fairly predictable fact that can be seen is the low propensity to repair damaged clothes. Modern items are not projected to be repaired, because low quality of textiles and stitchings. Phenomenon of 'fast fashion' is another factor creating propensity to change clothing rather than repair it.

Low prices make people consider the item less valuable and so as a consequence they do not even think about repairing it.

5.3 Question 3 – how likely will you buy in second hand stores?

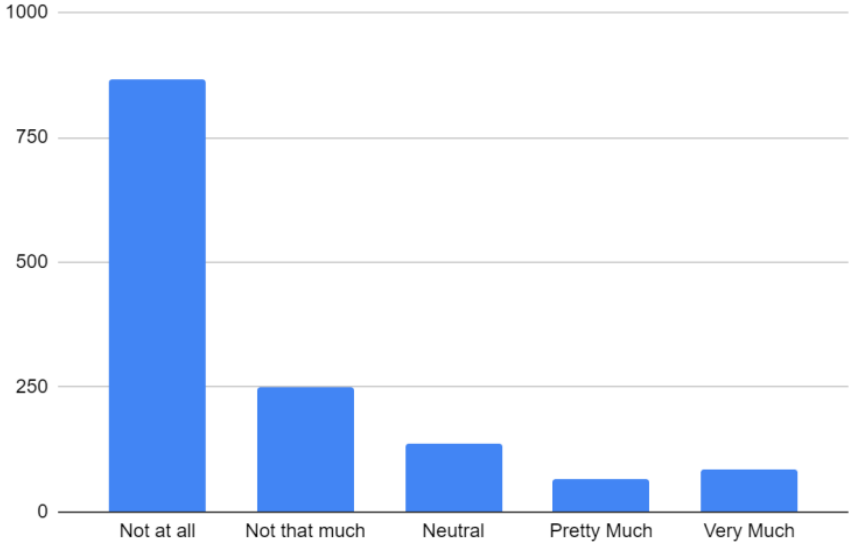
As we already said, the majority of our respondents are middle class households and so, in terms of economic possibilities, we suppose that they can afford to buy new clothes instead of used ones. This last question shows how people are not likely to buy in second hand stores, for three main reasons:

1 Buying in second hand stores in Italian culture, is a practice made usually by people who cannot economically afford to buy new clothes.

2 Used clothes are most of the times not in line with current fashion tendencies.

3 Buy in second band markets is, most of the times, just a personal choice for sustainability. Prices of used clothes are not that competitive with low prices of new mass market items.

Figure 11 How likely will you buy in second hand stores? (see online version for colours)



Source: Author elaboration

Today, especially in 'western countries', 'second hand fashion market' is just a niche market in which customers are mainly poor people and a very little percentage of people who just buy items there because they consider circular economy as a sustainability practice.

Table 3 Suppose that you want to shop ethically made sustainable clothes, how much importance will you give to the following aspects?

	Animal welfare	*Fair wages*	*Environmental impact*
Very much	420	458	450
Pretty much	670	636	705
Neutral	217	232	181
Not that much	59	46	34
Not at all	35	29	31
TOT	1401	1401	1401

Source: Author elaboration

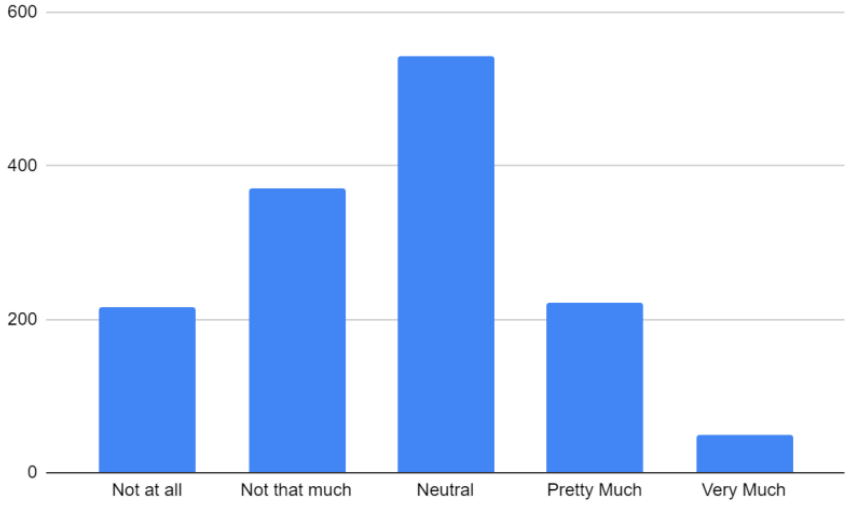
5.4 *Question 4 – suppose that you want to shop ethically made sustainable clothes, how much importance will you give to the following aspects?*

The number of people buying ethical clothes is increasing, but is still a niche. It was asked to respondents to think about to shop ethically and give, according to their values, more or less important to various aspects of sustainability practices. In Table 3, it is possible to see how those aspects are equally important for respondents of this survey.

5.5 *Question 5 – how likely will you buy clothes that are ethically produced?*

There is a growing sensibility in buying in ethical stores, but there are still some product characteristic barriers that will be discussed in the next question that have been submitted to our respondents. On the contrary, there were no differences based on the relevance of sustainability. Almost all the interviewees have shown sensitivity in this topic, but very few have declared to buy sustainable garments.

Figure 12 How likely will you buy clothes that are ethically produced? (see online version for colours)



Source: Author elaboration

5.6 *Question 6 – what would discourage you to shop at ethical clothing stores?*

In this section, the author grouped major factors that discourage people to buy ethical fashion items.

Those are the main reasons discouraging consumers:

- lack of knowledge of ethical fashion
- lack of integrity within brands that state they are ‘ethical’
- lack of trend led clothing
- high prices

- lack of ethical fashion stores.

Table 4 What would discourage you to shop at ethical clothing stores?

	Lack of knowledge of ethical fashion	*Lack of integrity within brands that state they are 'ethical'*	*Lack of trend led clothing*	*High prices*	*Lack of ethical fashion stores*
Very much	474	478	468	458	502
Pretty much	401	394	401	393	386
Neutral	340	340	350	355	328
Not that much	121	125	121	131	123
Not at all	65	64	61	64	62
TOT	*1,401*	*1,401*	*1,401*	*1,401*	*1,401*

Source: Author elaboration

As we can notice, a homogeneous data reflecting the fact that those are all factors that really discourage people to buy ethical.

As a conclusion of this survey, it is possible to say that:

- The great majority of respondents recognise that is important for everyone that sustainability practices have to be implemented in fashion market.
- Consumers can be part of the creation of a 'circular model' giving companies the materials and old clothes that can be regenerated.
- Consumers are affected by 'fast fashion' and are continuously looking at new tendencies, this is why it is good to look at second band markets, but better is to find a way to completely recycle old clothes paying attention to produce them with highly recyclable material mixes.

Companies must understand the social and economic opportunity that can be given by sustainable practices in order to eliminate discouraging factors of buying ethical. There is the need to transform ethical market from a 'niche market' into a 'new normal'.

6 Conclusions

From the first form of human civilisation, innovation has been towards economic and civil development. Now is the time to consider innovation as the main drive force also for a sustainable development.

Sensibility around the world is growing among consumers and companies, according to these themes, and many organisations are already insisting on sustainable practices. Potential cost savings deriving from more efficient and respectful use of natural and human resources are very high.

High performing companies are today able to integrate sustainable development strategies in firm's processes, in governance, and in business model, and exploit opportunities on this (Hoffmann and Coste-Maniere, 2012).

There is the need to encourage fashion brand leaders to work closely with their suppliers, start identifying wastes, and implement practices like tracking water, energy and chemicals consumption and pollution in the processing stage.

There is the need to create an economic infrastructure able to embrace sustainable product design (Cooper, 1999) and start considering 'circular economy' as a new model for economic development (UNEP, 2006).

It is possible to develop managerial solutions founded on circular economy vision, thanks to a motivational sprint and cooperation among different ecosystem actors (government, businesses and consumers).

In this paper have been analysed some best practices like:

- synergies between actors
- identification of scarcity of resources and raw materials
- good practices that can adopt businesses and governments
- new market opportunities;
- elements of consumer behaviours according to circular textile economy.

At the conclusion of this little research, it is possible to think about next steps for:

1 Politicians at first, need to act for:
   a Involving businesses and consumers in more ethical practices providing education and legislation for the use of chemical, waste management and tax relief according to production and selling of recycled items.
   b Supporting initiatives based on ICT infrastructures able to reduce transaction costs and guarantee adequate traceability on value chain.
   c Supporting initiatives on innovation, new companies creation and new patents able to help and facilitate a transition towards a better circular system.

2 Businesses need to revise their priorities putting ethics and environment first, making investments on innovation and consumer engagement campaigns. This could have a significative economic and social positive impact inside the company and positive externalities.

   Pioneering companies are leading the way towards more sustainable practices. This is just to say for all companies in the world that if they do not take action, they will have negative consequences for their future growth and profitability perspectives.

3 Finally consumers need to be educated and incentivised to buy ethical. Wealthy consumers are getting more informed and are starting to understand the importance environmental and social issues. With this purpose in mind, companies have to demonstrate sustainability efforts and base brand identity and reputation on sustainability and respect of ethical values.

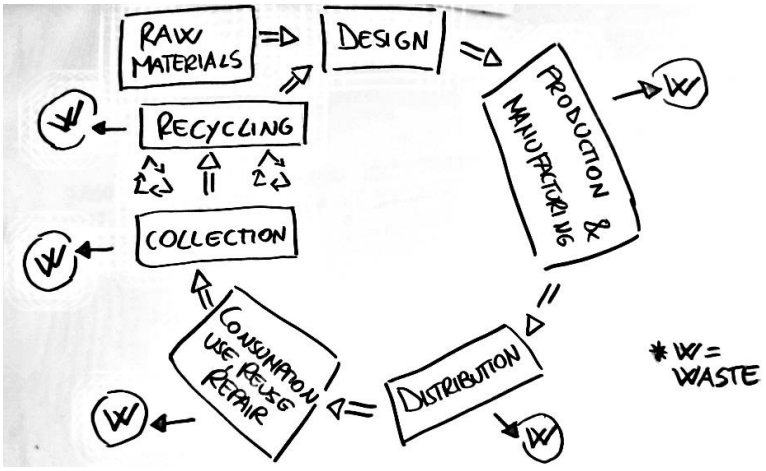
This new circular business model should be based on trust, in order to promote and increase exchange of information, possibility of acquiring knowledge and establish a partnership between companies that can be able to fulfil together interests and risks (Narasimhan et al., 2010).

There is the need to increase the importance of open innovation systems to include all stakeholders of fashion industry to cooperate and adopt new business models founded on sustainability values.

6.1 Limitations and future research

As discussed in the abstract and in the previous sections, limitations according to the circular model exist. Each phase on the model produce waste, also if in small parts (see Figure 13). From a scientifically point of view, it is not possible to turn completely to zero, additional waste, but is possible for companies to invest in continuous education and innovation and evaluate continuous improvements during value chain.

Figure 13 Loss of efficiency in circular model



Source: Author elaboration [Iraldo and Bruschi, (2015), p.11]

Sometimes, some apparently responsible initiatives may cause negative externalities. Making some examples:

- Alternative fuel that is produced from palm oil or soybeans has inevitably had large impact on the loss of large natural forests around the world.
- Green energy production necessitates large areas of arable land, putting huge pressures on food production (Kovács, 2008), especially in the poorest countries.
- Production of solar panels or lithium engines, and many others apparently sustainable products also have some sustainability lacks like the involvement of chemical industries, transportations of dangerous materials and loss of efficiency in the long time.
- Production of ethanol, which requires a lot of fossil fuel and has little return of energy.
- Wind farms and solar panels are made with minerals that are difficult to recycle.

- Working natural fibres for producing textiles requires a lot of water and on the other side synthetical fibres require less water, but there is a percentage of release of plastic waste during production and washing phases.

At a macroeconomic level:

- Product longevity is not always efficient and feasible in terms of resources and ecological terms.
- Prices of implementation of green technologies, for a company, may not necessarily reflect the real costs of their materials and components or savings during production phase.
- Increase of jobs due to a transition to a circular model, means increasing costs for companies, if not provided an adequate legislation.

All those negative externalities are results of incomplete and weak cooperation among systems. This failure must be considered as an incentive to build stronger systems of cooperation among companies, government and consumers.

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