

# Redesigning Fashion Industry: A Transformational Circular Approach

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*The research intends to explore the various aspects of the circular economy with the fashion industry as a backdrop to find how a circular supply chain and circular model thinking can provide lasting, sustainable solutions to the many environmental ills that are prevalent in this industry. The findings of this research give insights into the minds of retailers, manufacturers, and customers of materials of clothing; to see how viable the inclusion of circular economy models can be to the existing industry. These insights will be invaluable to new entrants in the market who want to have a green supply chain with reduced wastage and minimize the negative impact on the environment.*

*Keywords: Circular economy, Sustainability, Business Model, Fashion Industry*

## INTRODUCTION

The fashion industry is the most polluting in the world after the oil industry, with less than 1% of the materials recycled (Malik, Akhtar, & Grohmann, 2014) and the rest going straight to fill landfills and other natural contours to harm the ecosystem. The pollution from this industry is not just limited to the final goods disposed of but also stems from the release of microfibers from the fabrics when washed. These microfibers get released into the soil and bodies of water and end up causing enough waste to equal that of 50 billion plastic bottles (half a million tonne of plastic) (Eileen Fisher). These microfibers are so small and ubiquitous that they may even end up on our dinner plates, and further on into the digestive tracts of animals, including humans.

While there are emerging renewable energy sources to combat the damage done by the oil industry, there are no such relieving trends to be seen in the fashion industry. The fashion industry makes use of a linear supply chain, which starts with procuring raw material to produce finished goods, which finally end up as waste in landfills or other unusable conditions. The concept of a circular supply chain in a circular economy, where the society and all the stakeholders treat items of fashion and clothing as articles with potential for a utility after their primary life cycle is over, is believed to be a viable solution to the harm the waste from this industry causes. Walter Stahel, together with Braungart and McDonough, was the first to introduce the concept of a circular economy (Braungart et al., 2007; Stahel, 2010). A circular economy is a substitute for the linear economy where products and services get maneuvered in closed loops or cycles (Zink & Geyer, 2017). It is regenerative by design; a circular economy aims to elongate the life of the resources used in a product to its maximum extent while extracting maximum value from it and then

establishing a system to regenerate the product at the end of each service life. The circular approach of the economy is one that is expected to lead us to a more sustainable society in the future (Ghisellini, & Ulgiati, 2014).

While the thought might seem too radical to change the paradigm of an entire industry entirely, it is economically viable. The fashion industry is known to have one of the highest product profit margins with fewer setup costs and investment. (Bhardwaj & Fairhurst, 2010). This encourages the stakeholders to adopt more sustainable ways of doing business, to ensure long-term positive effects on people, profits, and the planet.

If the circular economy model is adopted and included, then the limited resources of the planet can be used to fulfill adequately the needs of the growing population with little to no waste at the end, which gives a pronged benefit (Ayres, 1996). The adoption of a circular economy can be attributed to a rise in their brand values, improving operation efficiencies, and finding synergies with other industries, opening new revenue sources, and new opportunities for the market participants.

The insights from this research will be invaluable to new entrants in the market who want to have a green supply chain with reduced wastage and minimizing the negative impact on the environment. The merits of this research are not just limited to the participants of the fashion industry but can also extend to other industries.

## LITERATURE REVIEW

Sustainability, an integral and essential issue of the twenty-first century—is often coined with corporate social responsibility (Aguilera et al. 2007), prudent decision making, and an emerging green initiative at some companies (Bansal and Roth 2000). While sustainability has long been developed as a thought primarily (ecological, economic, and social), a major focus has been on the ecological dimension of sustainability (Simpson & Radford, 2012). "Sustainability" has been defined by various scholars, with the prominent being an activity that can be continued indefinitely without causing harm; one should treat others the way they wish to get treated, and fulfilling the needs of this generation's needs without compromising those of future generations (Fletcher 2008). Thus, having environmentally sustainable business practices can be a plus point for a company. It is not only good for the organization and the future but also builds a culture of accountability in the company (Enright, 2013). From a business perspective, sustainability issues can affect a business in different ways (Tantram, 2017), i.e., may change customer requirements, public behavior, and attitudes and makes it hard for factories located in polluted areas to hire and retain workers – it may also tamper with an investor's interest.

The fashion industry revolves around a linear model – “take, make and waste” and is an industry that strongly depends on the single use of raw materials, and that is believed not to be suitable in the long term (Bianchi & Birtwistle, 2012). A McKinsey & Company report labeled "Charting our Water Future" forecasts that water consumption needs will exceed supply by 40 percent in 2030.

Geographies with dense fashion industry work—(where there is cheap labor) are at high risk of environmental disruption that leads to labor disruption, supply chain inefficiency, and a decrease in output. According to the Organisation for Economic Co-operation and Development (OECD), countries most impacted by rising sea levels are one of the fashion's most significant manufacturing hubs: China, Vietnam, India, and Bangladesh OECD (OECD, 2015).

The industry provides the world with comfortable, protective garments, as well as hundreds of millions of jobs. At the same time, more than \$500 billion of value is lost every year because of clothing that is seldom worn and rarely recycled. Current Industry practices also put pressure on resources, pollute and degrade the environment, and create negative societal impacts. Since global clothing sales are on track to increase fivefold by 2050, the industry's footprint could expand to catastrophic proportions if the business goes on in the same way (IPCC, 2014).

A customer's relationship with his clothing can be particularly complex. Together with the online movement, many fashion companies are experiencing a steep decline in brick-and-mortar traffic. They are simultaneously looking for ways to reduce store operating costs, re-evaluate store networks, and innovate

the in-store experience to attract customers. The digital shift has hit some harder than others. Sluggish sales in the department store channel, combined with a desire to improve margins and control brand presentation, markdowns, and customer data, are causing brands to move to direct-to-consumer-models.

Traditionally the textile industry has been a linear economy with a focus only on the selling of new clothes. In a new textiles economy that is the circular economy, a diversity of sales and service models would cater to different types of clothing, which in turn would satisfy customers' needs and wants while ensuring high utilization rates. The desire for novelty and diversity would be fulfilled by a vivacious rental market and resale market, offering flexibility, a range of choices for the user, and new opportunities for businesses. The need for long-lasting garments would get met by offering quality assurance guarantees and repair services on every new purchase.

Sustainability will be at its best of innovation in the fashion industry shortly, with the collaboration with the circular economy to unlock technical innovations, operation efficiencies, and mission orientation. Fashion companies have started to understand the importance of sustainability. Top fashion companies will step ahead to close the loop of the entire product lifecycle by taking baby steps towards recycling and regeneration. As light shines on a circular economy, sustainability will evolve from being thought or an idea to be a fundamental and outlining part of the entire fashion value chain. An important reason behind the growing sustainability movement is the realization that sustainability is an advantage to a company. Especially millennials are interested in more-sustainable solutions (Williams & Page, 2011).

From a design perspective, a designer should be able to convey a story through his/her work or clothes. Designers get often inspired through nature, and incorporating sustainable design would add meaning for both the designer and the customer rather than from a purely aesthetic context (Smith, 2017). An example of a company that implemented a circular economy in their fashion line is Calvin Klein. Emma Watson, in the Met Gala 2016, wore a dress designed by Calvin Klein made from recycled material in collaboration with Livia Firth's Green Carpet Challenge. For the easy disposal and 100% recyclable at the end of life, the dress was designed using recycled polyester fibers, produced using non-toxic dyes.

### **Circular Economy**

The circular flow of income in any industry is a simplified yet significant aspect of their functioning. The flow, however, illustrates how businesses interact with the other economic participants within the key macroeconomic markets that coordinate the flow of income or goods throughout the system (Zink & Geyer, 2017). As said earlier, this aspect is critical to understand, especially for every business professional, because it provides everyone with a valuable tool for understanding the economic environment in which businesses operate. The notion Circular Economy gained traction in 2010 with the Ellen MacArthur Foundation, but the concept has origins that are deeply rooted and directly connected to any single author or date (McKinsey 2013a). However, McKinsey (2013a) has identified the following five main principles of Circular Economy, i.e., Design out Waste, build resilience through diversity, rely on energy from renewable, Waste is food, and Think in systems.

Even though the concept of the circular economy and its benefits are quite easily understood, the actual implementation and change towards a circular economy is an obstacle for its diffusion (Loins et al. 2013). Further, changing circumstances call for changing business models (Teece 2010)

The solution to the predicament of an unsustainable global linear flow economy would maybe be the physical flow concept in which the flows get reversed. The circular economy suggests that materials should initially get recovered for reuse, refurbishment, and repair, then sent for remanufacturing and only later for raw material utilization, (which is the focal point in traditional recycling) and finally landfill disposal should be the last option. In this way, the product value chain and life cycle retain the highest possible value and quality if possible and are also as energy efficient as it can be, Leading to environmental gains when compared with the traditional good old linear extract-produce-use-dump system (Korhonen et al., 2018).

The pertaining development of the circular economy has been revolving within the concept of 4R, which brings the meaning of Reducing, Reusing, Recycling, and Renewing (Vasiljevic et al., 2017).

While a handful of companies such as Michelin, H&M, BMW, and Alstom, there has still been some confusion on whether the circular economy model is fixed or will get developed further or refined (khalamayzer, 2018). Big data has been one of the most disrupted technologies in the field of business by providing an efficient way of product forecasting (Snapp, 2017). It has allowed other factors within the circular economy to develop, such as regeneration of resources, preservation of resources, re-use of waste resources, redesign of business model, collaboration for a joint venture, and incorporation of the latest technology (Spring, 2017). In addition to this previous concept such as product sharing platform begins to re-emerge and so does different success metrics as it was previously criticized in the past (Ayres, 1996). Companies such as Unilever have also begun to be a part of the circular economy movement by designing a guideline called "Design for Recyclability" which represents a new business model, better recycling, and expanded use of refills (Murry, 2017).

The path to a sustainable future will always reflect several principles of the circular economy such as the 3R which was then further developed to be 4R with the addition of Renewing moreover, this continues to progress as a new concept and perspective begins to immerse, in order to address the fundamental issues related to it (Gjozinska, 2017). However, Ellen MacArthur Foundation has come up with four relevant constructs that are recently known as the 4R to standardize the understanding of the circular economy, i.e., Redesign, Redistribute, Reuse and Recycle (MacArthur, 2017).

### **Circular Economy and Fashion Industry**

Exponential growth in population and increased urbanization has resulted in more and more waste produced every year. While this has been a significant concern, it has also resulted in a paradigm shift where the importance of sustainable production and business practices gets realized. One of the solutions for tackling this problem is shifting to a circular business model using the resources to their full potential, and by following sustainable methods of recycling and reusing. If the fashion industry adopts this model, the focus will shift to using non-polluting materials, maximizing the utilization of raw materials, and using a more direct and less waste-producing supply chain.

Adopting a circular business model is almost a necessity at this juncture because of the following two reasons: Resources are limited, and meeting with the needs of this growing population will be difficult, but this can be done by shifting to a circular model and reducing the waste produced. Secondly, in the coming years, there will be water insecurity on a global scale. Water insecurity is the unavailability of enough drinking water to support human beings. Adapting to circular ways can help us prevent such a scenario (Franco, 2017).

The most basic application of a circular business model in the fashion industry would be first to get rid of all the harmful substances and materials that release microfibers which are used in the production process, spreading awareness to increase the product life, excessively increasing the amount of recycling and avoiding the use of the new raw material. Also, switching to renewable sources of energy and using non-renewable sources for the most necessary purposes (Kunz, N et al., 2018).

### **Technological-Innovation**

Technology and science have catalyzed the development, innovation, and implementation of circular business models - driving new processes, new communication channels, breakthroughs, new ideas, and new operational efficiencies that allow efficient resource use, which helps build economic growth across industries on a global scale. Digital, physical, and biological technologies are proliferating and demonstrating exponential growth in their application and uptake. Few examples include:

Rubicon-Global: A cloud-based, big-data platform connects waste producers across the US, Canada, and 18 additional countries. These platforms enable optimized truck routes, creative reuse of waste material, and the detailed analysis of waste data also enables creativity space.

NCC: Their open eco-system or platform, NCC allows any asset-heavy industry to become more resource-efficient. Their app makes waste from over 600 sites available to other companies at a reasonable price and handles waste in a more environmentally conscious manner. – Apps like these can be used effectively in the fashion industry.

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. Trends such as the circular economy, fair trade, low-consumerism, and the sharing economy are some of the many emerging entrepreneurial approaches that address this issue, but there is still a gap between what theory argues, and the levels of environmental and social sustainability realized when the theory gets applied into practice (Ingebrigtsen & Jakobsen, 2006). Most research on the topic of sustainable business models is still exploratory and does not fully acknowledge these emerging approaches, whose definitions, boundaries, and defining characteristics are still somewhat vague (Ha-Brookshire, 2017).

### **Expected Outcome Model**

Our expected outcome model focuses on improving operational efficiency in the fashion industry by incorporating a circular business model in the industry. It intends to do so, by considering five components of a circular economy — these components derived from the previous literature on the subject. The 4R model of Ellen MacArthur Foundation lies at the heart of this newly developed model of the circular economy. A specific addition of the V-factor that is Verbund makes the model more comprehensive to vet businesses in the fashion industry and assess their inclusion of circular economy aspects.

**Redesign:** Reimagining /changing the current business or product design leads to an increase in the value proposition to customers and to unlock higher profits for the concerned business. All this while increasing the efficiency and improving the positive impact on the environment and society, designing for effectiveness in products, and increasing efficiency by reducing the negative impacts of commerce. CE get linked to other concepts such as Industrial Ecology (Lifset & Graedel, 2002), regenerative design (Cole, 2012).

The redesign can be accomplished by changing the existing business model or completely switching to a new business model to incorporate aspects of the circular economy to make the industry/business more sustainable. It can also happen by changing the product mix to be more sustainable.

**Redistribute:** Establishing the various point of sales for the products, to better serve the target markets. To come up with the best ownership transfer mechanism with the clients to achieve the waste management goals of the business. Moreover, finding newer markets for newer, more sustainable recycled products (Giri & Shankar, 2013). It can be accomplished either through changing the ownership, i.e., changing the business model based on the ownership of the product. For instance, clothes can be leased out instead of transferring ownership to the buyer. Other ways can be by changing the point of sale, i.e., Modes through which the businesses can sell their products or entering new potential markets created through the adoption of a circular business model.

**Reuse:** Relates to finding mechanisms of elongating the resource usage life by finding new ways of using the same materials for the same or different purposes. Till now, little consideration given to the environment during the life-cycle of the chemical, including production, use, disposal, and reuse (Hauschild, 2015). It can be achieved by the adoption of new technology to improve operational efficiency or sustainability. Also, to identify ways to optimize the product life and also how the discarded products can get utilized.

**Recycle:** Taking something old and finding ways of making it into something entirely new in the process of finding a way to maximize the usage and value generation from the raw materials that went into the building of the "old" item. A garment with as little modifications as possible to create greater value by the reuse sub-products from discarded clothes to recycle and obtain products with the same or higher value (Sustainable Report Inditex, 2015). Use of materials to produce synthetic fabrics that get recycled easily, secondly exploiting the fashion trends of different regions to optimize the use of excess stock and also recycling accessories used in the industry rather producing it from new raw materials for every product.

**Verbund:** A new addition to the existing 4-R model developed by the Ellen MacArthur Foundation of Circular Economy. Verbund pertains to finding uses for the by-products of the apparel-making process, unlocking newer revenue sources using subsidiary business opportunities. Another advantage comes with

building synergies with other players in the same or different business verticals, who might find better uses for the by-products of one's business, and others who might have by-products that find use in one's business.

**Opportunity:** Creation of opportunities to enter new markets based on the by-products produced by the industry or entering a business whose by-products can be used by the current business.

**Synergy & reduction of risk:** It creates a synergy wherein different businesses work together to optimize the use of materials by sharing by-products. Diversification of business interests leads to a reduction in market risk.

## RESEARCH METHODOLOGY

The five variables identified as Redesign, Redistribute, Reuse, Recycle, and Verbund were used for further quantitative analysis.

### Data Collection

To validate the construct of the circular economy practices, a questionnaire consisting of 20 questions got developed. A five-point Likert Scale was used to measure responses, where one is Strongly disagreed and five strongly agreeing. The questionnaire got pretested with 30 professionals in the fashion industry necessary modification was made on the feedback received and subsequently floated via personalized e-mails to middle level managers from textile and retail sector. In all, 243 usable survey responses got received from 260 respondents. (response rate of 35.27% percent) Over four months (from January to April 2018). The geographic distribution and characteristics of the survey group are listed in the table below.

**TABLE 1**  
**RESPONDENTS ACROSS REGION, PROFESSIONAL LEVEL, AND**  
**SIZE ORGANIZATION (n = 243)**

Item	Measure	Frequency	Percentage
Region	India	92	37.86%
	Dubai	143	58.8%
	America	8	0.03%
The profession of respondents working in this sector	Industry Experts	47	19.34%
	Fashion Designers	68	27.98%
	Retailers	128	52.6%
Educational Qualifications of respondents	Fashion Designers	148	60.9%
	Graduates	84	34.56%
	Other well versed in the fashion industry	11	0.04%
Total			100% (243 Respondents)

### Data Analysis

In the first step, the principal component analysis was applied to study the interrelationships between the variables based on the data reduction to explain their relationship, i.e., the way the indicators are combined to form the constructs of circular economy practices. Thus, the principal component analysis divides the indicators (questions) into groups (factors), summarizing their relationship pattern.

The principal component analysis resulted in a framework with three factors.

Questions	Component	Construct
How comfortable are you with the idea of changing your business model	Var-1	Redesign
How comfortable are you to change your product mix, to be more sustainable	Var-2	Reuse
Are your suppliers aligned with you, when it comes to the sustainable business model?	Var-3	Redesign
Would you spend more on an efficient supply chain?	Var-4	Redesign
Are you aware of the carbon footprint of your supply chain	Var-5	Redesign
Would you be willing to lease your products instead of selling?	Var-6	Redistribute
How likely are you to choose online platforms as a source for customer contact?	Var-7	Redistribute
How likely are you to choose “Retailing” as a source for customer contact?	Var-8	Redistribute
Would you discover new markets, even if there is an initial cost involved?	Var-9	Verbund
Would you enter new markets, if it meant more sustainability to your products?	Var-10	Verbund
Would you invest in new technologies to improve operational efficiency?	Var-11	Redesign
Are you open to partner with enterprises which would reduce the size of your supply chain?	Var-12	Verbund
How strongly do you feel that product life is essential to changing fashion trends?	Var-13	Recycle
Do you think your customers would be willing to recycle their products?	Var-14	Recycle
Do you think you will get an edge over other brands, by offering sustainable products?	Var-15	Redesign
How dependent is your business on changing fashion trends?	Var-16	Redesign
Are you aware of any industries that would be willing to use your by-products?	Var-17	Verbund
How willing are you to use other industry’s by-products?	Var-18	Reuse
Are you willing to venture into another business that would supplement using your by-products?	Var-19	Reuse
How favorable is the idea of moving to sustainability for your union/guild?	Var-20	Verbund

Then each of these three factors was analyzed for quality measures. These quality measures were obtained using the SPSS software package.

## RESULTS AND DISCUSSION

The first step to data analysis was to calculate the global Cronbach's alpha of the indicators of circular economy practices. The general value of 0.868 was obtained, which was considered excellent.

The data reduction of all variables (V1-V20) was performed using the principal component analysis method with varimax. This procedure resulted in a framework with three factors that can explain the variance value of 72.765 percent. The global KMO test that verifies the adequacy of the sample was 0.832 and is considered adequate. To substantiate the result principal component analysis only shows variable loadings higher than 0.5 and factors with eigenvalues higher than one and coefficients of the diagonal of the matrix anti-image higher than 0.6 (Hair et al., 2005).

Good quality indicators for the proposed framework were obtained, giving due consideration to average variance extracted, composite reliability, and commonality. The loadings of all indicators on their corresponding constructs reached acceptable levels (over than 0.6). For the reliability and validity test, the composite reliability value should be higher than 0.7, while the average variance extracted value should be higher than 0.5. Construct reliability was assessed using composite reliability. Convergent validity examined the average variance extracted measure. The table shows that all the values of composite reliability are higher than 0.7, and all the values of the average variance extracted are higher than 0.5 (Foltz, 2008).

**TABLE 2**  
**PRINCIPAL COMPONENT ANALYSIS PROPOSED FRAMEWORK**

Factors	Fac-1	Fac-2	Fac-3
Label Indicators	Knowledge and interest of the supplier	Market competitiveness and innovation	Sustainable operational efficiency
Variables	(Var 3)	(Var 5)	(Var 1)
	(Var 4)	(Var 6)	(Var 2)
	(Var 14)	(Var 8)	(Var 7)
	(Var 15)	(Var 9)	(Var 12)
	(Var 17)	(Var 10)	
	(Var 19)	(Var 11)	
		(Var 13)	
		(Var 16)	
		(Var 18)	
		(Var 20)	
Average Variance	0.543	0.054	0.129
Cronbach's Alpha	0.924	0.647	0.825
KMO Test	0.825	0.791	0.706
Eigenvalue	8.276	3.828	2.449
Accumulated Explained Variance (%)	41.379	60.518	72.765



While five factors got developed initially, but after the principal component analysis 3 factors found suitable which can be explained through clearly outlining the research variables where some variables can be combined.

The five pillars developed during the literature review got condensed into three factors:

- Factor 1 Knowledge and interest of the supplier: combined indicators include indicators that focus on the supplier's point of view, which covers aspects such as the supplier's available knowledge of sustainable products and circular economy, which can be classified and their "*Knowledge and interest of suppliers.*"
- Factor 2 Market competitiveness and innovation: touches all the variables that include market competition concerning being sustainable. It also touches the possible action and initiative that can be made by the supplier to be competitive in the market, which is either opening to new market entrants or bringing new value into the market. This group of indicators can be called "*Market competitiveness and innovation.*"
- Factor 3 Sustainable operational efficiency: being the group with the least indicators brings valuable information regarding operational efficiency, such a re-designing business model, supply chain, and point of sale. This group of indicators can then be called "*Sustainable operational efficiency.*"

### **Suggested Business Model**

This research gave multiple inputs as to the possibilities of business models, which give a foundation for circular economic aspects to be applied and included in the fashion industry operations. The refinement of these inputs through quantitative and qualitative data culminated in the formation of two business model constructs.

### **Circular Framework Model #1**

This business model lays the framework of a supply chain that enhances the product life of a single product using a single product through multiple usage cycles. The supply chain starts with an apparel manufacturer, which starts operations by supplying to a retailer into a developed country. The retailer markets and sells the product to customers in this country on a "leasing" or "discount-on-return" policy. Later return of these products to the manufacturer from the customers after a stipulated product life gets achieved. The procured clothing gets refurbished, and worn and torn articles get discarded, if beyond repair. This batch of products is now sent by the manufacturer to a retailer in a developing country and sold at a lower price point. These products are re-procured by the afore-mentioned techniques; they get refurbished before being shipped as the third batch to a smaller developing country. Using such a supply chain model, the product life of a product which was invariably 1-2 years at most may get stretched to 3-4 years.

The discussion with industry professionals reveals that customers would be receptive to such a product and value offering if they convinced that the model would be good for the environment at large and is a part of the manufacturer's attempts to considerably reduce its waste and carbon footprint.

### **Circular Framework Model #2**

The global economy depends highly on continuous material consumption and production to keep societies and the markets accelerating, instead, decreasing the production and consumption of goods. Thus, the focus shall be on finding the innovations that can limit the damage to the environment while we can still have economic growth and job creation.

For accelerating the transition to circular fashion, there's a dire need to focus on these four quick points of action:

1. Carrying out design strategies for cyclability: To make it easier for fashion brands and retailers to collect and recirculation of valuable used textiles, rules on the legal ownership of discarded textiles should get reviewed.

2. Encourage an increase in the volume of used garments collected: Collection points should get initiated by the companies where their end users return all products and after that gets transported for sorting and recycling to more extensive facilities. Reviewing rules of legal ownership for discarded textiles and making it easier for fashion brands and retailers to collect and recirculation of valuable used textiles.
3. Encourage an increase in the volume of used garments resold: Leasing, repair, and resale of used clothes can be encouraged by VAT reductions for these services, funding for sustainable business models.
4. Hike in the share of garments made from recycled textile fibers: Improvement in the classification of discarded textiles as waste to reduce unnecessary disposal of valuable textiles

There is a need to increase investment in infrastructure for sustainable management of used textiles. Designing products in a way that will help dismantle individual components to ease the process of repair and substitution of broken parts and possible redesign. Motivating services such as second hand, rent, and repair, which in turn improve the sustainability of the waste textile products. Such services will help the fashion industry by providing them with valuable information regarding the ideas of the customers, their suggestions, and experiences benefitting them in the long run.

Prolonged neglected health and safety measures can get addressed using a circular model, leading to a more sustainable environment. Biomimicry is one of the most trustable routes, nature's designs to human-made products. There has been a development of textiles that mimic the stain-resistant properties found in the lotus leaves. Research in this area has also contributed to mimicking the antimicrobial properties of crab and lobster shells.

Usage of fibers which already exist that have both performance and sustainability attributes includes solution-dyed nylon, used in carpet, and various other varieties of apparel. Solution dyeing is a process of freezing color into the fiber itself, which helps in producing a very high-performance fabric. In applications of garments, it produces clothing that does not fade after repeated laundering. Solution-dyed nylon furnishings, including carpet and upholstery, can resist strong system without fading or worsening. It reduces the water used in production aggressively, which is one of the most bothering issues in the sustainability of textile garments. One of the oldest sustainable and high-performance options is Wool, which has several economic features: it is easily renewable, readily biodegradable, recyclable, and produced organically.

A few of the newest innovation which has emerged in the textile industry focussing on sustainability like CRAiLAR is a flax fiber that helps in drastically reducing chemical and water usage. Qmilch is fiber derived from a protein in sour milk. "Recyclon" is recycled nylon from Unifi's Repreve that uses pre-consumer and post-industrial nylon waste. S. Cafe is a new fiber coming out of Taiwan that uses recycled coffee grinds. EcoCircle Plant Fibre is a plant-based PET (polyester). Evrnu is an innovative new technology that recycles cotton garment waste to create a premium, renewable fiber.

### **Managerial Implications**

The framework gives a robust platform for future research to apply and measure the effects of a circular economy on other industries. It entails the suggested business model solutions developed and modified in the course of this research. With minor changes, these ideas and inputs can be made viable for other industries and other businesses. This research not only weighs the pros of switching to a circular business model from a linear model but also provides a few ways in which it can get achieved. The suggested business model frameworks provide ideas and steps that can be used by new and budding entrepreneurs as well as the already established players in the market to set up businesses in the fashion industry sector that follow a circular business model.

The benefits of the circular economy lead to a significant reduction in cost in the long run, but its primary objective is to improve sustainability and reduce the negative impact of industries on the environment (Chen, 2009). The central construct of this research, "Verbund" emphasizes the importance of optimum utilization of by-products created by various industries. Thus, this research encourages the

market players in the fashion industry to formulate partnerships and synergies within the industry and with various industries that can utilize the by-products produced by the fashion industry and with businesses that produce by-products which can be used by the fashion industry for optimum utilization of all the available resources.

This research emphasizes making the fashion industry more sustainable by incorporating a circular business model in the operations of the industry. Moreover, the consumer survey shows that majority of respondents hold a preference for products that more sustainable, this gives the market players in the fashion industry a direct incentive to adopt this circular model since this will give them an edge over their competitors and prove to be selling point for their products.

The scope of this research focuses on the implementation of the circular economy in the fashion industry, but it has not only confined to that. This research can also be used for a better understanding of what is a circular economy and what are benefits of switching a circular business model, and for this reason this research can also be used for understanding the importance of circular economy for other industries as well. The research process used for this research can also help in the implementation of the circular economy in industries other than the fashion industry. Therefore, the scope of this research is not only restricted to the fashion industry but revolves around the circular economy and the reasons why industries should adopt it.

### **Limitations & Future Scope**

The research though robust on the fronts of customer understanding and variable identification of the factors affecting operations in the fashion industry has some blind spots which hold future scope for research. This research missed the opportunity of looking into the financial merits of establishing a circular business model. It could have done so by doing a cost-benefit analysis. A risk-return analysis would have turned up important insights on whether such a switch is economically and financially viable for companies.

The demographics of the Customer Survey was limited in diversity and could have shown different and even mellowed down results if targeted to a different and more diverse respondent base and a larger population. The interviews with industry professionals, however, complemented the findings of the survey and suggested that the survey findings not be without merit.

### **Future Scope**

Enrico Brivio, a spokesperson for the European Commission, believes that by the year 2050, the world may need three times more resources than we are currently using, due to growth in world population and general consumer demand. The circular economy seems like a logical and sustainable situation for the problem that resources are finite as in the circular economy, and almost nothing gets wasted. The idea is to keep resources running in the economy as when products are exhausted, the useful materials they have been harvested for reuse and creates new additional further value.

Sustainability in the fashion industry is not just a temporary trend, and it is the contemporary future. The next generation is slowly inclining towards transparency, ethics, and sustainability and then investigate the brand's name and identity. Sustainable and ethical fashion in the future would not be a niche market anymore, and the fight for sustainability is robust.

Research model opens new platforms for new collaborations between different companies and industries to adopt and could accelerate towards changing the system to a level needed for the circular economy.

## **CONCLUSION**

The circular economy is a gateway to repair the problems and issues of the global system. The objective and the pillars of the circular economy prove a clear way forward without wasting time – for a better sustainable future converting resource from nature into a product or a service with an intrinsic

economic value which can be used time and again. It is a promising concept, attracting the business community towards a sustainable future.

The empirical results presented and summarized in this research suggest a circular economy as a recommended economy for the future and for businesses to adapt with time for better functioning and efficiency, crucially the fashion industry. It shows the possibilities of sustainable production for a more sustainable production-consumption culture.

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