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Slow Fashion Accompanies Digital Towards a Sustainable Future: From Quantity to Quality. Reflections on the New Paradigm of Sustainable Fashion

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Abstract

The negative social and environmental impacts of the fashion industry refer to a global industry, with its ubiquitous supply chains driven by big brands that determine what to produce, where to produce, and at what prices to sell. Do we want to continue to keep fashion as a beautiful artifact? If so, we need to consider how resources are deployed. Accelerating climate change is looming, portending an uncertain and damaging future. Can fashion be sustainable? Why is sustainability in fashion seen as an oxymoron? Can a return to slow fashion accompany digital towards a sustainable future?

Keywords: sustainable design, innovation, industry 4.0, fashion design, slow fashion consumers

1. From industrial revolution to fast fashion: slow fashion accompanies digital towards a sustainable future

With the birth of the industrial age came the beginning of that phase of decline that characterizes the proper use of natural resources. The industrial revolution drastically changed how modern society functioned: with the invention of the steam-powered machinery and the mechanical loom, the textile industry was the first to use today's production methods. The rise of the factory-system implied faster production characterized by large quantities of materials. That growing need for industrialization began to spread across the globe, forming a globalized interconnected network of the fashion system that gave rise to global supply chains. The textile explosion, which formed the very basis of the industrial revolution, was rooted in the cotton boom, and it was with cotton that the decline of the craftsman began, particularly the woolen craftsman, who relied on home-based work and lost the magic of working with their own hands using proper methods and natural resources.

Today, cotton represents the foundation that underlies the design of a garment. Beginning with its production, the world's cotton producers use approximately $2.6 billion in pesticides each year and over 25% of the world's pesticides are used on only 2.5% of farmland (Gwilt, A., and Rissanen, T. 2011).

With the fashion system being composed as one of the most extensive and complex industries in the world, the environmental problem is complicated by the issue of transportation and semi-finished products, adding to the release of various chemicals into streams and rivers creates serious health problems and accounts for human deconstruction, as well as soil infertility, deforestation, and environmental deconstruction. All of this is amplified by an unprecedented rush boosted by a business model: "fast fashion", which has been evolving since the 1980s, offering new fashion collections every year based on rapid trend change at very low costs. This encouraged excessive consumption

generating an overabundance of waste. (Moderator, M., 2019) The advent of fast fashion with the consequent possibility of being able to buy garments reminiscent of luxury ones, but at a much lower price has led to a democratization of fashion, allowing anyone to approach a hitherto utopian and unattainable world, overcoming the conception that some clothes were only a prerogative of those who had a certain budget at their disposal. So if on the one hand this change can be interpreted as a phenomenon of social inclusion, on the other hand it has resulted in an increase in the consumption of goods made with highly polluting materials that are difficult to recycle and very often have a high social cost.

In contrast to fast fashion, the term "slow fashion" (Fletcher, K. 2007), fits into the global panorama not only with reference to the theme of environmental sustainability of production and the reduction of waste, but also to the individual well-being of the worker, often a highly skilled craftsman. Slowness is therefore not a limitation but becomes an added value that makes it possible to dedicate oneself to understanding a need and creating a product that is not only beautiful to wear, but encompasses a much broader concept. In addition to representing a model of design and production to consumption, slow fashion approaches a type of disposable purchase, the person is placed at the center combined with the concept of sustainability. The theme of sustainable transition is one of the great challenges of our time and involves different sectors, one of all fashion that has long been confronted with a stratified problem that involves production processes, distribution and the same dynamics of consumption. Therefore, the research aims to investigate the role that slow fashion currently plays in contrast to the fast fashion system, focusing on the responsibility that design can offer for the development of future solutions in the sustainable sphere.

2. The mirage of a symbolic sustainability in the fashion system

The whole fashion system is an industry governed by a strong drive for change, where each individual turns out to be emotionally and culturally attached to clothes. This industry lies within two halves that together form a perfect fit: the first includes status, desire and identity. It flaunts the historical presentation of status that connects an individual to fashion according to a cultural and emotional approach. The second half of the fashion industry encompasses the entire production process and natural resources, going to show the practical concepts of the fashion system.

Fashion is to be understood both as a material culture and, as a symbolic system (Kawamura, Y. 2005). It is a sociocultural force related to the dynamics of modernity and postmodernity, a commercial industry that produces and sells material goods, but that within it contains an immaterial system of meanings made of individual and collective signs, which are merged through practices of production, consumption, distribution and representation. (Smelik, A., and Rocamora, A. 2019). The fashion industry is a nearly $3 trillion global industry that employs nearly 60 million people (Lavergne, M. 2015); and the fashion system is often marked by processes that are significantly environmentally impactful, especially in terms of consumption of natural resources (primarily water), use of chemicals, and consumption of electricity. Often, production locations move in search of cheaper labour, resulting in a loss of worker rights (Nayak, R. 2019). The concept of sustainability is gaining increasing global attention and it is pertinent to talk about sustainability when it is implemented in the fashion industry as well as one of the most polluting industries in the world, with a huge environmental, social and economic impact. (Garcia-Torres, S., 2017; Legere, A. 2020). This new perceived sustainability as a trend has triggered in fashion companies, the desire to try their hand at innovative strategies related to sustainable development. In recent years, many companies operating in the fashion field have gone green by redesigning their business processes (Caniato, F.; Caridi, M.; Crippa, L.; Moretto, A. 2012) and establishing their formal sustainability in the implementation of the 5Rs (reduce, reuse, recycle, redesign, re-imagine) (Ho, H.P.Y., Choi, T.M., 2012; Li, W.Y.; Choi, T.M., Chow, P.S. 2014).

The first controversies on the topic date back to the mid-1990s, when the problem of child exploitation by some Nike suppliers exposed to attention. (Khurana, K.; Ricchetti, M. 2014).

Since then, non-governmental organizations such as Greenpeace and Clean Clothes have urged fashion and luxury brands to move towards greater sustainability. However, sustainability in fashion is difficult to achieve due to the complexity of the textile supply chain: from growing fibres, to

weaving, to tailoring, to retail practices, each step is exposed to significant risks, whether it be harm to the environment or to the health and safety of employees in the workplace.

Standardised mass processes are the main obstacle to the spread of sustainable production and consumption, implying a reduction in the diversity of materials, forms of knowledge and skills (raw materials, production processes, fibre cultivation methods, cultural patterns, etc.) that would inevitably be involved in the creation of a sustainable product. Consequently this also causes an impoverishment of clothing cultures as a whole (Blackburn, R.S. 2009).

It is evident in fast fashion, which has emerged as a global trend, with brands such as Zara from Spain and H&M from Sweden actively entering the international market to successfully reach the global market. (Wahba, P and Skariachan, D. 2013). The success of the fast fashion business stems from its ability to respond promptly to rapidly changing trends in fashion and consumer tastes while maintaining low prices (Ghemawat, P. and Nueno, J. L. 2003; Sull, D. and Turconi, S. 2008). However, the rise of fast fashion has led to a disposable culture where fashion is bought, worn and discarded quickly. The lead times for these garments are very short and items are constantly being replaced to keep up with each frantically changing trends (Legere, A.; Kang, J. 2020); this results in increased fashion waste and resource consumption (Fletcher, K. 2007).

80 billion "fast fashion" garments are produced every year, and the problem of waste and overconsumption are becoming major issues for the fashion industry system: according to recent estimates, from 1975 to 2018, production increased from 6 to 13 kg per person and the demand for clothes grows every year by 2%. In 2019 alone, approximately 95 million tons of waste from clothes worn only once were produced in the United States. According to current estimates compiled by Waste & Resources Action Program, 30% of purchased clothing remains hanging in closets and is never worn, and consumers are discarding higher volumes of clothing than ever before (Morgan, L.R. and Birtwistle, G. 2009). An equivalent percentage ends up in landfill after being used, on average, less than five times, but often after only one use. A total of 14 million tonnes of used clothing and textiles are thrown away each year worldwide, of which only 16% are recycled (EPA - Environmental Protection Agency). What remains unsold is incinerated causing 1.35 tons of carbon dioxide emissions per megawatt hour, more than the burning of carbon and natural gas.

The life cycle perspective has also been adopted in studies conducted within the fields of technology and management research (BSR, 2009), confirming that a body of knowledge and shared attitudes towards the issue of sustainability in the fashion system is growing.

As a result, consumer awareness of the complexity of the apparel supply chain has increased significantly over the past decade (New, S. 2010; Sisco, C. 2012). Consumers are aware that in addition to workers' rights and common environmental problems, the sustainability of a garment depends on several factors, such as fibres, yarns, dyeing processes, and transport. Deprived of direct access to the necessary knowledge, consumers expect sustainability monitoring of the production chain, retailers and brands they rely on. The personal value of the consumer plays a fundamental role in the formation of attitudes aimed at decision-making, which is why it is essential to understand them and identify a specific segment of the population, where appropriate marketing strategies can be employed accordingly (Huber, F. et al., 2001). In particular, in sustainability-related consumption, personal values have a significant impact on consumer behaviour (De Pelsmacker, P. et al., 2005).

The emergence of a 'responsible' consumer will irreversibly nurture demand for products with sustainable characteristics. Cooperation is essential and becomes a key element of ethical principle and sustainability. Sustainability requires innovations and needs a multidimensional approach, providing the opening of spaces in society for a change in values. It means more than anything else a new ethical-cultural orientation (Vogt, M.; Weber, C. 2019).

Consumers should not be forced into the purchase decision due to possible variations in their demands and tastes; but it is incumbent and necessary to educate consumers to recognize quality consumption and as well slow fashion brands should help consumers directly benefit from attributes such as authenticity, functionality and exclusivity, instead of emphasizing only sustainability. (Carrigan, M. and Attalla, A. 2001; Loureiro, M.L. and Bugbee, M. 2005).

3. Fashion as a superficial game of exteriority? Fashion sustainability: widespread awareness and responsible innovation

In relation to what has been expressed so far, it is evident that sustainability is a complex issue involving the environmental and social spheres and consequently the related production systems, design approaches, and consumer products themselves. Since the fashion industry is certainly an autonomous source of business and culture (Kawamura, Y. 2018), the economic dimension is not addressable to sustain the fashion industry. A layered problem requires action on multiple levels, and design takes on a key role (Fletcher, K. 2007) by implementing strategies and approaches that can help reduce or avoid the social, environmental, economic, and cultural impacts associated with the production and consumption of fashion apparel.

In his preface to a pamphlet by Zygmunt Bauman, Carlo Bordoni describes the years in which we live as an intermediate phase "between the end of the mass society - grey, uniform, totalizing - and the passage to a conscious diversification". According to the journalist and sociologist Francesco Morace, "today sustainability can represent an element of differentiation and advantage for a product, but over the next 20 years being 'sustainable' will be a necessary characteristic that every product will have to incorporate to access the market" (Marra, F. 2021).

Sustainability cannot relate to the fast fashion system, which is quantity oriented, leaving aside an increasingly bulky quality on the global scene. There is a growing interest in slow fashion that emphasizes quality through a slower production cycle, with small numbers of high quality products; promoting a higher price than fast fashion products packaged by mass production systems. The high quality and high price strategy would lead to a higher value consumer's perception of a particular product, justifying its price and encouraging them to keep the item longer rather than discarding it in a short time after purchase (Fletcher, K. 2007). Equally, slow fashion urges people to buy less while maintaining high quality, this underpins a shift in thinking from quantitative to qualitative, reducing levels of resource consumption. A return to slow fashion will therefore provide an alternative to achieve sustainability in the fashion industry by raising consumer awareness to change the consumption patterns used so far.

In terms of sustainable consumption practices, an interesting trend involves a move away from the idea of owning goods to that of privileging their use through sharing, bartering, renting, but also the business of used and vintage clothing that in the United States alone is worth $24 billion, with the prospect of reaching $64 billion in the next 10 years.

Practices of reuse, exchange or barter, whether carried out in local contexts, or facilitated by dedicated digital platforms, will imply a real possibility to give new life to garments and accessories, relocated in the wardrobes of new owners (Airaghi, G. 2013). Similarly, a "Cradle to Cradle" approach, will be halfway between extending the life cycle of a product and reducing waste, using industrial processes that have a positive impact on humans and the environment, as well as recycling and upcycling into new products those products that have reached the end of their life cycle but are not destined for waste. (Braungart, M., McDonough, W. and Bollinger, A. 2007)

Slowing down the clothing production cycle allows the environment and people to coexist in a healthier way and allows time for the ecosystem to regenerate (Cataldi, C. et al., 2010). Items are thus consequently produced slowly in small batches, which reduces resource consumption and the amount of waste (Cline, E.L. 2012). Slow fashion artisans can spend more time on each item, thus improving the quality of the products. In addition, designers can invite consumers into the design process in order to meet consumers' needs for creativity and identity. Stimulated by a richer connection between producers and consumers, co-creation processes encourage consumers to act more responsibly for a greater awareness of how a garment is made (Cataldi, C. et al., 2010).

A recent approach to sustainability in fashion insists on the possibility for fashion production to foster social sustainability by leveraging the special link between creativity and social inclusion (Santagata, W. 2010). In craft work the pace is slow and the development of skills follows a trend, a circular movement. Starting again to be craftsmen means recovering that connection between head and hand, doing a job well done for oneself and not for the result, not for the effect or its instrumental use. Going back to producing not the maximum possible, but only in the right way. Every craftsman cares about a

job well done and this concept of unity and dedication is what modernity has exploded (Sennet, R. 2008). It becomes essential to protect and relaunch on the market this fundamental value, which distinguishes the Made in Italy that Italy, unlike many other countries, still possesses.

Craftsmanship is associated with creativity and the latter is seen as a collective process (Bordieu, P. 2013). A fashion collection does not simply arise within an isolated mind removed from the collective world but is the product of various cultural, social and economic forces. It is assumed to contain an identity. Our identities function within a material culture, justified by our emotional relationships with objects and people's relationship with objects is socially and culturally dependent, which in turn implies that the objects themselves have a social life (Appadurai, A. 2013).

The object intended as a dress, expresses our identity, relates to the body within a social environment. It represents a way of being by modulating the relationship between ourselves and the surrounding world. The world and the body are thought of as the clothes we are made of. Fashion turns out to be a medium because it changes into an embodied experience by covering us with a second skin, from which we interact with the world. Man doesn't dress only to keep warm, but clothing turns out to be a means of social identity. (D'Alolia, A. 2021) The dress as worn is inextricably linked to the body and fashion is not only the creation of a specific 'look', but it is also the behavior of the body in space; it is not only a superficial game of externality, but it is also located within a bodily sphere that covers a 'deep' self hidden in the inner folds of the soul. In conclusion, fashion is not simply seen as an aesthetic or symbolic phenomenon, but as a real tactile experience. (Smelik, A.; Rocamora, A. 2019)

4. Utopia of a sustainable future

During the first Industrial Revolution, the steam engine rapidly transformed the entire society and the production sector. Today, digital innovation has fostered the birth of Industry 4.0. ready to welcome the new challenges of the super smart society 5.0, which sees the advancement of the digital craftsman (Micelli, S. 2016) and which constitutes a real cultural movement with enormous potential in terms of social and economic development; thanks to its capacity for technological experimentation, placed in relation to the desire to explore new paths or simply retrace existing ones in a modern way (M. Bentivogli, 2018).

The contribution that digital technologies can make to the sustainable transition becomes fundamental.

1. digital device innovation
2. communication
3. traceability
4. transparency

The innovation given by artificial intelligence tools, big data analysis, fifth generation mobile internet networks, 3D printed for manufacturing, sensor technology, driver nanotechnology, algorithms, Internet of Things, AR, VR, will bring a new production process, which will generate a new paradigm. There is a need to communicate to industry companies, governmental organisations and consumers about the role of transparency and traceability regarding the sustainable value chain in the textile system. There is a need for education and training for designers and senior managers working in the fashion industry, directing them towards responsible production approaches. Producers with greater openness to new resources create trust within companies which in turn builds a solid bond with the public. This produces positive associations in the mind of the consumer, who will tend to buy more from the transparent company rather than a closed competitor. The use of computer applications on smart devices can help better engage consumers and provide insights into the origins of fabrics and garments. From a business perspective, when considering the transition from a large company to a small grower, smart, simple and effective technologies are essential. Big data and predictive analytics can be used to start designing better solutions in the sustainable arena. Data mining can be useful in providing results, excluding assets that come from unknown sources. Blockchain technology, on the other hand, can help better track the origins of products and provide operational efficiencies; it is a networked distributed transaction ledger. (Nakamoto, S. 2008). The use of cryptography provides a secure system and the information that is stored is tamper proof. Blockchain can help in creating a shared common ground through information nodes where every contribution plays an important role.

Loomia is a start-up company that has developed a smart fabric and flexible circuitry, The LOOMIA Electronic Layer that responds to senses, especially touch, and environmental changes (LOOMIA, 2017). The use of their Loomia tile leverages blockchain technology to ensure the secure exchange of data and authenticity of products (Lederer, S., Maxey, M., Ucar, E., Liriana, J., and Paúl, M. 2017).

We envision a future where customers may not own their garments but, rather, subscribe to the opportunity to wear them, returning the items for remanufacturing once they are done with their use. Consumers become temporary caretakers of new clothing that can be remanufactured into a new design, reshaped to fit changing trends and weather seasons. Companies are working to prioritize material recycling, aspiring to a future where "re-loved clothes and shoes would circulate in closed cycles of products and materials and be used continuously in the generation of new products.

The future of clothing lies in its sustainability. Fashion must become an active part of an integrated system that helps society itself to be more sustainable. Beyond the psychosocial aspect that clothing plays, clothing will have to be smart and adaptable and, in a wearable technology perspective, perform some fundamental functions such as reducing the impact on the environment and protecting against the environment (Huang et al., 2019; Cerati, 2019).

Mud Jeans is a certified sustainable and fair trade denim brand based in the Netherlands. It has started a new strategy "Lease a Jeans", inspired by recycling old paper and creating a new one. Customers have to bring in their old jeans and in return they will receive a new pair. Lease a Jeans works as a kind of subscription: customers can rent a pair of jeans for €7.50 a month for 12 months. The company recycles both denim and cotton with the help of mechanical recycling. They have started using 40% recycled cotton and the goal is to create denim that has good properties with 100% recycled cotton. Keeping the system transparent will help the consumer to become aware of sustainability.

Renting the Runway in the U.S. and Air closet in Japan were born as "clothing libraries," or platforms where we can choose a certain number of garments per week by paying a membership fee. When the customer returns the clothes they get a new set of clothes, and the cycle continues. In this way the consumer can get a new set of clothes per week without buying them. These new start-ups need the system of washing, dry cleaning, delivery and handling of clothes and are a viable response to the various social and environmental challenges the world is facing.

The future of sustainability must be inclusive: fashion must give priority not only to the planet, but also to people. The digital revolution flanked by a production towards the no size, no gender and no season market will bring a substantial change in the fashion system, allowing to buy only the garments that will actually be ordered, thus limiting the production choices. The future is heading towards adaptive clothing that, lasting over time, adapts to the changes of the body in the different phases of life.

The responsibility of design will involve the design of products with a strong technological innovation, characterized by an expressive, formal and aesthetic charge: recyclable, reusable, easily disassembled and disposable products. Focusing on design, the new technologies will be shaped by adapting them to the company's needs throughout the project cycle, from concept to post-sale. It will be essential to have more awareness of the products, the materials used and their origin, in order to design garments that can really be recycled in a circular economy. To arrive at the creation of sustainable products that are also trendy: durable, desirable and at the same time able to create profit.

The digital manufacturing that works is the one that prototypes, as taught by Design Thinking, and the approach to digital prototyping will bring new skills, fundamental to the role of the designer. Behind the garments we wear there are the people who made them, with their stories; so says Gaia Segattini, art director, founder and administrator of Gaia Segattini Knotwear, which has been talking about sustainable manufacturing and made in Italy for years. The consumer is interested in the story of the object he buys and the garment acquires an added value by taking care of the body itself.

Antonio Gramsci said that: "He has culture who is aware of himself and of the whole, who feels the relationship with all other Beings", and in some way, with this reflection, he had anticipated the concept of sustainability, understood as awareness of one's role in a world where resources are finite and the negative effects generated by the activities of human beings risk being irreversible. Sustainability is culture, and the culture of the third millennium can only be sustainable. Culture is what makes us human, rational beings endowed with critical judgment and a sense of moral

compromise. Culture allows us to discern values and make choices. It is through culture that man expresses himself.

Radical visions of the future are needed to help launch change, and progressive utopian ideas must embrace diverse social futures that will result in a revolutionary transformation of the relationships between fashion, consumption, technology and the environment.

References

Airaghi, G. (2013) 'The political dimension of everyday life: The case of barter practice', in I. Tomanić Trivundža, N.

Appadurai, A. (ed.) (2013 [1986]) The Social Life of Things: Commodities in Cultural Perspective ,11th edn,

Bentivogli, M. (2018) Blockchain, technology "humanizes" work, on ilsole24ore.com, Il Sole 24 ore.

Blackburn, R. S. (2009), Sustainable Textiles: Life Cycle and Environmental Impact, Cambridge: Woodhead.

Bourdieu, P. (2013) Things said. Towards a reflexive sociology. Cerulo, M. Cur.) published by Orthotes, 2013

Braungart, M., McDonough, W. and Bollinger, A. (2007), 'Cradle-to-cradle design: creating healthy emissions - a strategy for eco-effective product and system design', Journal of Cleaner Production, 15: 13, pp. 1337-1348.

BSR (2009), Apparel Industry Life Cycle Carbon Mapping, http://www.bsr.org/en/our-insights/report-view/apparel-industry-life-cycle-carbon-mapping. Cambridge: Cambridge University Press.

Caniato, F.; Caridi, M.; Crippa, L.; Moretto, A. (2012) Environmental sustainability in fashion supply chains: Exploratory case-based research. Int. J. Prod. Econ. 135, 659–670.

Carrigan, M. & Attalla, A. (2001) The myth of the ethical consumer - do ethics matter in purchase behaviour? Journal of Consumer Marketing, 18, 560-578.

Cataldi, C., Dickson, M. & Grover, C. (2010) Slow fashion: tailoring astrategic approach towards sustainability. (Master's thesis, Blekinge Institute of Technology, Sweden). [WWW document]. URL http://www.bth.se/fou/cuppsats.nsf/all/a97ef79c5d4af3cec125774c004d6240/ $file/slowfashion.pdf. (Accessed on 10 October 2012).

Cerati, F. (2019), The clothes of the future automatically adapt to the environment while maintaining the right temperature, Il Sole 24 Ore, at https://www.ilsole24ore. com/art/the-future-clothes-adapt-automatically-to-the-environment-while-maintaining-the-right-temperature-ABOtXNTB (accessed January 2020). Clean. Prod. 225, 291-303.

Cline, E.L. (2012) Overdressed: The Shockingly High Cost of Cheap Fashion. The Penguin Group, New York, NY, USA.

D' Aloia, A. (2021) Artificial intelligence and law. How to regulate a new world. Published by Franco Angeli

De Pelsmacker, P., Driesen, L. & Rayp, G. (2005) Do consumers care about ethics? willingness to pay for fair trade coffee. Journal of Consumer Affairs, 39, 363-385.

EPA - Environmental Protection Agency https://www.epa.gov/

Fletcher, K. (2007) Slow fashion. Ecologist, 37, 61.

From sustainability reporting to action. Sustainability 9(12), 2256.

Garcia-Torres, S.; Rey-Garcia, M.; Albareda-Vivo, L. (2017) Effective disclosure in the fast-fashion industry:

Ghemawat, P. & Nueno, J.L. (2003) ZARA: fast fashion. Harvard Business School, Boston, MA, USA.

Gwilt, A., & Rissanen, T. (2011). Shaping Sustainable Fashion Changing the Way We Make and Use Clothes (1st ed.). Routledge.

Ho, H.P.Y.; Choi, T.M. (2012) A five-R analysis for sustainable fashion supply chain management in Hong https://digilander.libero.it/moses/rivindu1.html

Huang, P. C., Lin, C. C., Wang, Y. H., & Hsieh, H. J. (2019), Development of Health Care System Based on

Huber, F., Herrmann, A. & Morgan, R.E. (2001) Gaining competitive advantage through customer value-oriented management. Journal of Consumer Marketing, 18, 41-53.

Kawamura, Y. (20 18) Fashion-ology: An Introduction to Fashion Studies, New York: Berg.

Khurana, K. and Ricchetti, M. (2014), Incorporating Sustainable SCM in Fashion & Textile Companies - An Analytical Study on Existing Sustainable Tools and Models, unpublished paper, accessed thanks to the courtesy of the authors.

Kong: A case analysis. J. Fash. Market. Manag. 16, 161–175.

Lavergne, M. (2015). Fixing Fashion Rethinking the Way We Make, Market and Buy Our Clothes. New Society Publishers.

Lederer, S., Maxey, M., Ucar, E., Liriana, J., & Paúl, M. (2017). LOOMIA Tile. A Decentralized Platform. For Identity and Personal Data. Retrieved from: https://github.com/LOOMIA/loomia/blob/master/LOOMIA_whitepaper.pdf

Legere, A.; Kang, J. (2020) The role of self-concept in shaping sustainable consumption: A model of slow fashion. J. Clean. Prod. 258, 120699.

Li, W.Y.; Choi, T.M.; Chow, P.S. (2014) Risk and benefits brought by formal sustainability programs on fashion enterprises under market disruption. Resour. Conserv. Recycl. doi: 10.1016/j.resconrec.2014.08.005.

LOOMIA. (2017). Our Technology. Retrieved from: https://www.loomia.co/token https://github.com/LOOMIA/loomia/blob/master/LOOMIA_whitepaper.pdf

Loureiro, M.L. & Bugbee, M. (2005) Enhanced GM foods: are consumers ready to pay for the potential benefits of biotechnology? Journal of Consumer Affairs, 39, 52-70.

Marra, F. (2021) Sustainability: fashion and the three R's in professionaldatagest.it Available in: https://www.professionaldatagest.it/news/sostenibilita_il_fashion_e_le_tre_r/

Micelli, S. (2016) Making is innovating. The new artisan work and the mill.

Moderator, M. (2019, October 8). Fashion - Let us talk Fashion - Witan World. Witan World. https//witanworld.com/article/2019/10/08/fashion/.

Morgan, L.R. & Birtwistle, G. (2009) An investigation of young fashion consumers' disposal habits. International Journal of Consumer Studies, 33, 190-198.

Nakamoto, S. (2008), Bitcoin: A peer-to-peer electronic cash system.

Nayak, R.; Akbari, M.; Maleki Far, S. (2019) Recent sustainable trends in Vietnam's fashion supply chain. J.

New, S. (2010), 'The Transparent Supply Chain', Harvard Business Review, 88: 10, pp.1-5.

Santagata, W. (2010), The Culture Factory: Creativity and the Production of Culture, Heidelberg: Springer.

Sennet, R. (2013) L'uomo artigiano, Feltrinelli, pp. 315

Sisco, C. (2012), Supply Chain Sustainability: Four Lessons From the Past and Four Ideas for the Future, http://www.bsr.org/en/our-insights/bsr-insightarticle/supply-chain-sustainability-four-lessons-from-the-past-and-fourideas- for-t. Accessed 24 August 2014

Smelik, A.; Rocamora, A. (2019) Thinking through Fashion. A Guide to Key T heorists/ book review by Edith Lázár.

Sull, D. & Turconi, S. (2008) Fast fashion lessons. Business Strategy Review, 19, 4-11

Vogt, M.; Weber, C. (2019) Current challenges to the concept of sustainability. Glob. Sustain.

Wahba, P. & Skariachan, D. (2013) How fast fashion brands are beating the '3As' in US. ABS-CBN News. [WWW document]. URL http:// www.abs-cbnnews.com/business/08/25/13/how-fast-fashion-brandsare-beating-3as-us (accessed on 17 December 2013).

Wearable Devices, in 2019 Prognostics and System Health Management Conference (PHM-Paris) (pp. 249-252). IEEE.