

Sustainability in the Textile Industry: Things Cannot Stay the Way They Are



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Short Communication

The textile industry's severe environmental impact is well documented. Whether it is the high exposure of pesticides or excessive water usage for harvesting cotton crops, the increased carbon footprint of man-made fibers or the uncertain handling of hazardous chemicals during the further manufacturing process and the associated water contamination due to the discharge of poorly treated effluent. Also, workers in the textile industry must face violations of international human and labor rights. These include insufficient labor conditions like wages below the subsistence level, inadequate occupational health and safety provisions [1, 2], but also documented cases of physical and sexual abuse [3]. Given the increased pressure from NGOs like Greenpeace and their Detox campaign [4], legislators and ultimately consumers it is no surprise that sustainability is nowadays one of the most discussed concepts within the textile sector. Brands actions towards a more sustainable production are closely monitored by the greater public. The times when sustainability was a 'nice to have' are gone. These days it is a 'must have', an inevitable trend and subsequently a competitive advantage. But what does this extensively used and thereby slowly diluted concept mean and how should it be applied to the textile sector?

Most notions of sustainability include the same three dimensions, namely the environmental, social, and economic dimension, but link or weight them differently. One of the most popular and widespread models is the Triple Bottom Line where all dimensions are seen as rather equally important and they can be measured in terms of the corporate's performance. Several authors expressed substantial criticism of this concept: its vague definition and semblance of measurability give companies the opportunity to appear committed to social and environmental concerns when they actually continue to harm the planet and people [5]. Furthermore, it can be argued that through its focus on reducing environmental and social harm it inhibits innovations that would contribute to the well-being of nature and humankind. The idea of the Triple Top Line meets this criticism on a conceptual level and offers a design

approach to industrial and organizational problems which is in return closely linked to the cradle-to-cradle design principles [6, 7]. This general design framework transforms the linear production process by promoting closed material cycles and has been successfully been applied to textiles and fosters the emergence of new business models.

The discussion about closed material loops is related to newer developments in the field of textile recycling, research on novel fiber sources and innovations that lead to better traceability in the textile supply chain. Only when all these fields are analyzed in combined fashion can the best approaches for a holistically sustainable textile value chain be identified and integrated. Fast fashion means heavily shortened fashion cycles on order to provide the market with the newest styles. Before 1990 there were only two seasons: spring/summer and fall/winter. Some of nowadays fast fashion leaders produce up to 100 micro seasons a year. The constant marketing of new styles at very low prices successfully tempts consumers to make more purchases. However, since each part is only used for half as long on average, there is a massive waste problem. This problem is exacerbated by the prospectively higher demand for textiles of all kinds, as the global middle class continues to grow. Especially in Asia, more precisely China and India, more and more people are becoming part of the middle class [8]. All in all, these trends tend to intensify the problems that already exist, particularly the increased consumption of resources and the creation of waste.

Besides the complete elimination of the waste problem by the cradle-to-cradle principle, there are various approaches to raise recycling processes and products to a new avenue of quality. One of the biggest problems is the sorting of blended fabrics and the extraction of high quality recycled fibers, especially in the case of cotton, which can enter new production cycles. Projects like the Fiber sort technology and Recover's approach to up cycling cotton fibers and mixing of fibers of different colours to avoid conventional dyeing processes are promising and visionary [9,10]. Nevertheless, further research and a profound restructuring of the industry are

needed to make such technologies suitable for large-scale use. Decisive for the quality of recycling output is what happens at the very beginning of the textile value chain: The choice of fibers. Some fibers or fiber blends can be transferred more easily into a closed material cycle. In addition, many innovations with regard to fiber raw materials must currently be taken into account. The handling of unusual raw materials such as wheat and rice straw, pineapple leaves and corn stover is assessed [11]. Although the big three, polyester, cotton and man-made cellulose, will continue to dominate the market, current developments should be followed so that relevant trends and opportunities for new business models are not overlooked. The evaluation of these new raw materials and fiber blends should be based on the potential for a circular economy.

The moment we talk about fibers and take a holistic view of the textile supply chain, we are also talking about traceability and transparency. It is these two keywords that allow reliable assessment of the sustainability and quality of textiles and make the supply chain comprehensible to consumers. Current research is investigating the various possibilities for straightforward and reliable traceability. For the implementation of these procedures, consideration must already be given to how the wealth of information from the supply chain, some of which is difficult to classify, can be well prepared and communicated to laypersons, i.e. customers. In order to meet the challenges of today's textile production, a close networking and cooperation of global players as well as the training and further education of current and future textile generations is necessary. Many of the developments mentioned above call for an analysis from different standpoints. This can be accomplished with the help of experts from the different areas of the textile sector, from the design to the recycling of the end products, but also from the area of legislation and NGOs. International forums are required for a structured and open exchange of knowledge - always involving tomorrow's decision-makers. Initiatives like the Sustainable Textile School try to contribute to this.

The Sustainable Textile School is described as an "independent scientific platform" and brings together practitioners and scientists from very different fields to promote the exchange on textile sustainability in the social, ecological and economic dimension and already existing solutions [12]. A special program enables

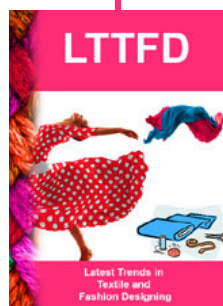
international students to participate in the annual conference in Germany. The conference culminates in digital training and advisory services that ensure exchange throughout the year. The first successes of this substantial work are a constantly growing network of universities with the aim of improving teaching regarding sustainable textile process chains. Cooperation with a university in Bangladesh and visits by delegations of Ethiopian ministers and Croatian university representatives can help to gradually reduce historical differences between continents in order to move closer to the ideal state of a socially and environmentally compatible textile industry that does not deprive the future generations of any viable basis.

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