

Evaluation of Textile and Clothing Sector with Regard to Sustainability

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Abstract

Humanity is acquainted with sustainability concept in 1987 for the first time by means of a report which is prepared by the World Commission on Environment and Development that exists within the structure of United Nations. Although sustainability concept can be defined from different points of view; it is commonly defined as a development model which meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability is a complicated concept which has economical, social, cultural, technological and ecological (environmental) dimensions. From this point of view, sustainability can be defined as a concept which constitutes the basis of environment and human centered policies. Protection of natural resources, development of renewable energy resources and energy conservation, waste reduction and improvement and activation of recycling systems can be used in order to provide sustainability.

Textile and clothing sector, which approximately constitutes 6% of world trade, possesses a great significance in sustainable development in terms of used raw material, production processes and technologies, utilization areas and outputs. Textile and clothing sector constitutes a significant corner stone at the development in regard to developed countries and especially developing countries. The sector has to make progress in terms of sustainable development. Some sub-sectors of textile and clothing sector are criticized due to their adverse structures and they are abandoned by many developed countries.

In this study; the current situation of textile and clothing sector, with regard to sustainable development, is evaluated and our enterprises' significant projects and their effects are analyzed.

Key words: Sustainability, development, ecology, environment, textile and clothing sector

1. Sustainability Concept

Sustainable development is a complex multi-dimensional concept concerning the environment, economy, human health and social impact. According to the well-known report Our Common Future or in other names the Brundtland Report (World Commission on Environment and Development, 1987), it is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It requires the unification of economics and ecology as well as social and cultural development [1,2,3,4,5].

As it can be seen, sustainability is multidisciplinary concept which is used broadly and has been the trending topic for researchers from different fields. It can be considered as a process that

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provides society to use social, cultural, scientific, natural and human resources providently. While importance of the sustainability has been increased rapidly, companies become more willing to adopt this concept not only for environmental concerns but also using the resources efficiently to survive in competitive market and succeed in business financially [6].

In this context, environmental sustainability has become one of the key issues for strategy, marketing and innovation. In particular, significant attention is being paid by companies, customers, media and regulators to development and consumption of green products. It is argued that through the efficient use of resources, low carbon impacts and risks to the environment, green products can be essential to help society toward the environmental sustainability targets. The number of green product introductions is rapidly increasing, as demonstrated by the growing number of companies obtaining eco-labels or third party certifications for their environmentally friendly products [7].

2. Sustainability in Textile and Clothing Sector

Historically, textile production used local resources that were sustainably harvested and processed. In the past, textile workers generally used locally available materials because these were affordable and accessible. Exceptions were luxury materials, such as silk or gold, but these usually were reserved for the elite and were not employed in daily use by the general population. The basic materials of textiles were plant and animal fibers and they biodegraded or broke down into small particles that become part of the soil without damaging the environment. In addition, most textiles were reused until they could no longer be used. As a result, most of the textiles created in earlier ages are not littering today's landscape [8].

The Industrial Revolution destroyed the role of textiles as craft and the deliberate strategy of planned obsolescence after World War II put an end to the thrift and saving ethos of our grandparents. The post-war fashion industry portrayed the practice of refashioning or wearing used garments as something shameful and a sign of poverty. Today, we are disconnected from the origins and ultimate destinations of our industrial and consumer products, including textiles. Modern technology shields us from these sources and processes so that we are spared unpleasant knowledge of the environmental and social damage caused by the textile industry. The accumulation of consumer goods has become the primary goal of many people, leading to tremendous economic disparities between haves and have-nots, as well as environmentally unsustainable use of non-renewable resources and exorbitant waste and pollution [8].

Therefore, clothing production and consumption has been on the increase since the industrial revolution and at present there is a strong negative perception of the textile and clothing industry, which is considered amongst the most unsustainable of modern industries, generating significant environmental and social impacts throughout every stage of the product lifecycle [9].

The major environmental burden caused by textile and clothing sector is associated with; energy consumption in the production of man-made fibers, in yarn manufacturing, in finishing processes and in the use phase for washing and drying clothes; water and chemicals consumption associated with fiber growth, wet pre-treatment, dyeing and finishing activities and laundry; solid waste

arising from textile and clothing manufacturing and mostly from the disposal of products at the end of their life and direct CO₂ emissions, particularly related to transportation processes within globally-dispersed supply chains [10].

From the necessary raw materials to the end-of-life impacts, the production and consumption of clothing and textile products damage the environment. The clothing and textile supply chain carries a high environmental load in terms of energy use. For example, a t-shirt made from 100% cotton requires 109 mega joules of energy to grow and process the fibers, manufacture the yarns, knit the textile, construct the shirt, home launder it 25 times and incinerate it after disposal. Clothing and textile production and consumption also require large water inputs. Dye processes can require eight separate dye baths before color saturation occurs, with each bath dictating additional volumes of fresh water and some dye processes consume upwards of 132,5 liters of water per pound of textile. The industry's use of synthetic, often toxic, chemicals is also extensive. Cotton is one of the most chemically intensive crops, consuming 24% of the world's insecticides and 11% of pesticides. Manufactured fibers such as polyester and nylon are produced from petrochemicals and many of the chemicals used during dyeing, printing and finishing of textiles are confirmed carcinogens and endocrine disruptors and are persistent in wastewater. Finally, clothing and textile production and consumption contribute to the earth's solid waste load [11].

The post-consumer textile waste issue is not a new problem but is growing in importance in the global fashion industry as increases in purchase frequency, availability of lower quality clothes and a real reduction in price levels has changed our relation to clothes and led to an increasing trend of throw-away fashion and growth in textile waste [12]. Because such discarding behavior adversely affects the environment, consumers are encouraged to get rid of no-longer-needed clothing in a responsible way, such as recycling through drop-off, donation, resale or reuse. Consumers may get rid of unwanted clothing through donating to thrift shops, reselling to second-hand stores, trading or swapping with other consumers, passing on to family and friends and dropping in recycle bins [13].

As it can be seen, the modern textile and clothing industry is facing a great number of challenges related to sustainability [1]. These challenges include environmental disasters and hazards to human health caused by toxic materials, the use, release and disposal of chemical pollutants and other solid wastes, the biodegradability of fibers, resource exhaustion (water, energy, and raw materials) and social impacts caused by delocalization, counterfeiting and other elements [1,14].

In order to develop the industry in a sustainable and optimal way, industrial companies need to optimize their production organization by minimizing risks not only at levels of materials and processes but also in the whole international textile supply chain [1]. Sustainable supply chain management is defined as integration of environmental, social and economic criteria that allows an organization to achieve long-term economic viability [15]. In other words; sustainable supply chain management is the management of material, information and capital flows as well as cooperation among companies along the supply chain while integrating goals from all three dimensions of sustainable development (economic, environmental and social), which are derived from customer and stakeholder requirements [16,17].

The clothing and textile industry has recently taken steps to decrease environmental impacts. For example, the industry has replaced some harmful chemicals with environmentally benign ones; implemented cold batch dyeing techniques that consume less water and energy and designed closed-loop manufacturing that permit material recycling. Additional strategies include the use of eco-conscious textiles like organic cotton and hemp, designing apparel for recycling and integrating concepts of slow design into product lines [11].

Moreover, many different responses to the sustainability challenges in the clothing industry exist, both social and environmental and they have led to a plethora of standards, certification systems and labels covering different parts of the value chain [18]. In addition to these, popular strategies include; replacement with eco-friendly materials, replacement with eco-friendly processes, increment in the efficiency of the process, extension of the life span of a product and/or material, opening up of new resources and reduction of consumption [19].

In the fashion industry, sustainability has been rephrased as a long-lasting environmental establishment and the achievement of social responsibility [19]. Sustainable fashion or sustainability in the fashion industry are associated with fashion brands' endeavors to improve their social and ecological footprints along their global supply chains, a trend that will continue in the future due to the industry's increasing use of resources, as well as social and environmental impacts. For decades the industry has focused on improving upstream supply chain practices, mainly related to social and environmental issues of production, such as human rights, waste management, toxic-free production processes and sustainable materials, while downstream supply chain issues, such as use, reuse and end-of-use management issues are only recently gaining more attention [12]. Because, in the past, eco-friendly fashion used to be thought as eco-ugly, bringing up the associations such as low quality, high prices and outdated design. Now people associate it with eco-chic, actively displaying their eco-loving practices. They see being eco-friendly is trendy and sophisticated. Using eco-friendly products, they want to be seen as mature and proud citizen who care about our environment, all of which has coined a new word, eco-chic [20].

To sum up, the term environmentally sustainable textiles and clothing refers to items produced and consumed through processes in which resources are not depleted or permanently damaged. Such processes greatly minimize the impact on the environment using sustainable raw materials, reducing the use of chemicals and fossil fuels and decreasing the level of water use and waste [21].

3. The Purpose and the Method of the Research

The research aims to analyze the sustainability activities of successful Turkish textile and clothing enterprises and their effects on enterprises' competitiveness. In accordance with the aim of the research; successful, big sized textile and clothing enterprises, which export and perform sustainability activities, have been determined as target group. Interviews have been made with the managers of textile and clothing enterprises, who are responsible for sustainability activities, within the target group and a questionnaire form consisting of 5 main questions (30 inferior

questions) have been sent to them. During the limited period of time assigned for this research, 7 enterprises (Şık Makas, Söktaş, Üniteks, Sun Textile, Yünsa, Yeşim Textile and Martur) have been included in the research. After the conduction of the survey, the collected data have been evaluated and analyzed.

4. Findings of the Research

The sustainability activities of the participating textile and clothing enterprises are usually performed by the administration or production department (Table 1). Approximately 43% of the accomplished projects are related to sustainability whereas 44% of ongoing projects are associated with sustainability (Table 2). As it can be seen, nearly half of the participating Turkish textile and clothing enterprises' projects includes sustainability concept. Our enterprises give great importance to sustainability projects and endeavor for sustainable products and activities.

Table 1. Distribution of participating textile and clothing enterprises according to the departments where sustainability activities are performed

	Şık Makas	Söktaş	Üniteks	Sun Textile	Yünsa	Yeşim Textile	Martur
Research & Development		+	+		+		+
Marketing		+	+		+		
The Administration	+	+	+	+	+	+	
Production		+	+		+	+	+

Table 2. Distribution of participating textile and clothing enterprises' projects according to the sustainability concept

	Şık Makas	Söktaş	Üniteks	Sun Textile	Yünsa	Yeşim Textile	Martur
The accomplished projects which are related to sustainability	%20	%40	%30	%75	%90	%40	%5
The ongoing projects which are associated with sustainability	%20	%50	%40	%80	%90	%20	%10

If the sustainability activities of participating textile and clothing enterprises are analyzed, it can be seen that all of the enterprises use and/or produce natural fibers (Table 3). Besides, most of the enterprises use and/or produce organic cotton and recycled fibers. In addition to these, three enterprises use and/or produce biodegradable fibers. As it can be seen, our enterprises head for natural, eco-friendly and sustainable raw material usage. Therefore, they preserve natural resources and minimally harm the environment and human health.

Almost all of the participating textile and clothing enterprises perform recycling activities. Four enterprises reduce raw material/semi-finished product/product usage within the enterprise whereas all enterprises endeavor for reducing other wastes. Similarly, all enterprises endeavor for reducing water and energy consumption. On the other hand, most of the participating enterprises don't use environmentally hazardous chemicals and dyes and benefit from treatment plants. Besides, four enterprises perform reuse activities (assessment and usage of waste fabric pieces, yarns and fibers in design and production processes). According to the obtained results, textile

and clothing enterprises pay attention to sustainability factors in most of their activities. Participating enterprises endeavor for minimal environmental harm during their activities and pay attention to sustainable resource usage.

Table 3. Distribution of textile and clothing enterprises according to the sustainability activities

	Şık Makas	Söktaş	Üniteks	Sun Textile	Yünsa	Yeşim Textile	Martur
Natural fiber production/usage	+	+	+	+	+	+	+
Organic cotton production/usage		+	+	+		+	
Recycled fiber production/usage		+	+	+	+		+
Biodegradable fiber production/usage		+	+				+
Recycling		+	+	+	+	+	
Reuse		+	+		+		+
Ecological labels		+	+				
Ecological certificates	+	+	+	+	+	+	+
Green marketing and promotion activities		+	+				+
Green distribution network and green logistics			+				
Ecological design activities		+	+		+		
Ecological footprint measurement activities		+	+				
Non-use of environmentally hazardous chemicals and dyes	+	+	+	+	+	+	
Reduction of water consumption	+	+	+	+	+	+	+
Reduction of energy consumption	+	+	+	+	+	+	+
Treatment plants	+	+	+	+		+	+
Increment of process productivities	+	+	+	+	+		
Extension of manufactured product lives							
Reduction of raw material/semi-finished product/product usage within the enterprise	+	+	+		+		
Reduction of other wastes	+	+	+	+	+	+	+

On the other hand, participating textile and clothing enterprises benefit from ecological labels and certificates in order to certify their sustainability activities. Two enterprises possess ecological labels whereas all of them own ecological certificates. The enterprises own ecological labels and certifications such as; ISO 14001, SWAN, OEKO-TEX, OCS (Organic Content Standard 100), GRS (Global Recycled Standard). Textile and clothing enterprises enrich their customer portfolios and increase their recognition and corporate image by certifying their sustainability and environmental preservation.

According to another result of the research, only one enterprise performs green logistics and distribution activity. Three enterprises perform ecological design activities whereas two enterprises measure ecological footprints (water, carbon footprint etc.). Besides, three enterprises engage in green marketing and promotion activities. On the other hand, almost all of the participating textile and clothing enterprises work for process productivity increment whereas

none of the enterprises endeavor for manufactured product life extension. As it can be seen, the enterprises perform sustainability activities within the context of production and main facility implementations (raw material production/supply, water and energy consumption, usage of chemicals, semi-finished product and product usage/production, reduction of wastes within the enterprise) instead of engaging in sustainability activities within design, distribution, logistics and marketing fields.

Table 4. Distribution of participating textile and clothing enterprises according to the gained advantages with sustainability activities

	N	Mean	Std. Deviation
Corporate image is improved.	7	4,57	0,53
Customer relations are improved.	7	4,14	0,38
Productivity is increased.	7	4,00	0,82
Enterprise awareness is increased.	7	3,86	0,90
Profitability is increased.	7	3,29	1,50
Costs are reduced.	7	3,29	1,38
Turnover is increased.	7	2,86	1,35

The survey offers 7 statements, which analyze the gained advantages via sustainability activities. The managers of the participating Turkish textile and clothing enterprises are required to choose their agreement levels for each of these statements. In quinary likert scale never is coded as 1, rarely is coded as 2, occasionally is coded as 3, frequently is coded as 4 and always is coded as 5. The findings are given in Table 4.

According to the participating textile and clothing enterprises, the most important advantage they gained by performing sustainability activities is the increment in corporate image (Table 4). This advantage is followed by customer relations improvement, productivity increment, enterprise awareness increment, profitability increment, cost reduction and turnover increment respectively. As it can be seen, sustainability activities seriously contribute to competitiveness increment and enterprise survival in long-term.

5. Results and General Evaluation

Sustainability, which aims to preserve the nature, use the global resources effectively and productively and protect the rights of posterity, has increased its importance and effectiveness progressively. If textile and clothing sector's input variety and usage, production processes and consumption of textile and clothing products are taken into consideration; it can be seen that it is one of the sectors, where the effectiveness of sustainability is mostly felt. Many developed countries have stopped finishing and dying investments and textile raw material production due to their hazardous effects over environment and have left these investments to developing and backward countries. However, sector has seriously improved during the last decade due to the developing technology, social influence and increasing entrepreneur awareness.

The participating Turkish textile and clothing enterprises show serious awareness about sustainability. Besides, they fulfill significant projects and research about consumption and

recycling of inputs and finished products. As a consequence of these activities, natural resources are used effectively and projects (these projects are eco-friendly, do not give any harm to human health and utilize wastes) are actualized.

According to the research results, participating textile and clothing enterprises perform successful activities in terms of sustainability. These activities centre on natural and organic raw material usage, recycling, reducing water and energy consumption and decreasing carbon emission. These activities provide brand image, customer satisfaction, productivity increment and cost and profitability advantages to enterprises in long-term.

To sum up, a sustainable development and success will be gained both in domestic and international markets due to the increasing awareness. Also, the financial and managerial incentives will create a positive discrimination and will positively contribute to enterprises' sustainability activities.

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