Artistic studies on design development with fabric scraps in the context of sustainable fashion

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Abstract

The process of clothing production creates waste and scrap, which creates environmental, economic, and ethical issues. With this in mind the concept of ethical and sustainable fashion is discussed on many platforms as an important and timely topic. Many solutions have been presented on this subject. For the solution of this problem which has been increasing in the fashion and textile industry, the usage of sustainable materials and production methods is needed. There in a ‘recyclable material cycle’ should be adapted, instead of a ‘traditional material cycle’. New methods and techniques should be developed with multi-disciplinary design approaches to produce creative and high value-added products in the name of fashion and sustainability. This is seen as one of the more effective solutions. This study aims to show that production scraps can be transformed into timely clothing designs with samples. The fabric scraps from different brands were turned into unique clothing designs with up to date trends by designer. In the practices completed while following the design process, collage and patchwork techniques were applied depending on the characteristics of the scrap fabric, artistic figures were hand-stitched onto the design. With this study, the scraps that get thrown into dumping grounds and damage the ecosystem can turn into ethical and economic benefits for the manufacturer. How to choose new high value-added products and create an awareness of social responsibility is also shown with examples in this study.

Keywords: fashion, design, clothing, sustainability, recycling

I. Introduction

In today’s world, sustainable development has become a consistent part of economic and environmental policy not only in developed countries but also in many developing countries. All sectors make different efforts within their area of responsibility. There needs to be a sufficient use of natural resources for sustainable living conditions. Production and consumption must be appropriate for sustainability. With the existing production and consumption structure, it is not possible to produce or consume without using renewable or non-renewable resources. The consumption of these resources and the waste they produce seen as most important causes of environmental changes caused by humans in the regional and global scale.
The main purpose of sustainability is to provide maximum benefit from the products by extending the period of use before discarding products (Fletcher, 2008). Research conducted in this direction has revealed that it is important to prevent waste and increase recycling. Specifically, synthetic fibers are well associated with the ecological dangers and biodegradability; those are needed to be reduced/recycled. Considering its economic, social and environmental reflections; the textile and fashion sector which is known to play an important role in increasing environmental problems, has responsibility for sustainability that is increasing even more.

With the addition of the waste of resources in fashion production methods and technologies to the rise in of nonrenewable resources that fast fashion has created, fashion and textile industries come first when it comes to problems with sustainability. From the process of production from raw materials to consumer usage and expiration of the usage time to the disposal of clothing, the entire process creates problems that are important on ecological, economical and social levels. The waste created by the process of clothing production creates environmental, economical as well as ethical issues. With this in mind, the concept of ethical and sustainable fashion is discussed on many platforms as an important and timely topic, with many solutions presented on the subject. For this reason, the role of designers has increased more to reflect sustainability for the dynamic structure that requires constant innovation to fashion.

Fast fashion firms meet the demand of consumers with low prices and new weekly product offerings, which quickly fall apart or become out-of-dated, pushing quantity demand up while pulling prices down (Scamans, 2016). In addition to this, the superiority created by the design phenomenon in the global competition leads the designers to distinctive design features on clothing. The increase in the quantity of production and the tendency to design can be an obstacle to the reduction of fabric scraps in the manufacturing process. Khandual and Pradhan (2018) stated that, waste remains one of the biggest worries for sustainable design practitioners, as the clothing industry looks for ways to utilize the million tons of fabric are thrown away every year. Couture out of waste may sound like a hyperbole, but there are huge possibilities of reutilizing leftover and rejected fabrics to establish brands. At this stage, transforming fabric scraps into an economic value with new product developments methods is important for designers since it allows them to develop their creativity as well as social and environmental aspects.

Currently, the majority of textile waste is being disposed in landfills or sent for incineration. For the solution of this problem that has been increasing in the fashion and textile industry, the usage of sustainable materials and production methods is needed. For this, instead of traditional material cycle, recyclable material cycle should be adapted. New methods and techniques should be developed with multi-disciplinary design approaches to produce creative and value-added products in the name of fashion and sustainability. This is seen as one of the more effective solutions.

Producing mutual studies and obtaining a correct information streak is very important for determining and applying sustainable approaches (Robinson, 2004). Sustainable designs consist of products that are produced with the lowest possible cost on social, economical and environmental levels. So, stating that by recycling textile scraps into new products with high added-value and low costs, we would be creating designs that serve sustainability’s purpose, would be a correct approach on this issue. Designs that are produced by recycling, that have high added-value and low costs will help reduce the damage wastes cause to the environment.

This work was written with this thought in mind. In this study the aim is to show that production scraps can be transformed into timely clothing designs with samples. A number of designs for the evaluation of fabric scraps have been developed to aid de-
signers in the integration of sustainability into their design practices. With this study, the scraps that get thrown into dumping grounds and damage the ecosystem can turn into ethical and economic benefits for the manufacturer. How to choose new high value-added products and create an awareness of social responsibility is also shown with examples in this study. By lowering the production scraps’ damage to the environment and creating new job opportunities from this, the country’s economy will also benefit. This fact was also brought to attention in this work.

II. Background

1. Sustainability and fashion

Sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” by Brundtland (WCED, 1987). The core of mainstream sustainability thinking has become the idea of three dimensions, environmental, social and economic sustainability. These have been drawn in a variety of ways, as concentric circles or as interlocking circles (Adams, 2006).

Even though its future success depends on reducing its environmental and social imprint across the life cycle of garment production, fashion is a polluting and resource-intensive industry (Joy & Pena, 2017). Chemical pollution of textile production process has made the textile sector, the second largest sector to poison the world after chemical industry (Earley, 2007). ‘Sustainability’ in fashion has become the major focus for long-term growth and environmental impact. Being the second most ecologically harmful industry with 1.5 million tons of waste, the fashion industry puts into landfills every year (Mahajan, 2012). The textile industry is one of the main consumers of water. Sixty billion kilograms of fabric demand about 1074 billion kWh (Kilowatt hour) of electricity and between six to nine trillion litres of water. There are thousands of textile mills around the world, many operating around the clock, near full capacity, thus a major contributor to greenhouse gasses (Scamans, 2016). Textile wastes’ harmful effects to the nature have been determined by scientific research, not only during the production process but also after the consumption of products. The high ammonia emissions that the wool fibers release to the nature during the decomposition process cause toxic effects of pollution in the air and water (Fletcher, 2008). Therefore, there is widespread recognition that the fashion industry’s current practices have adverse environmental, economic and social impacts. Considering the whole textile chain, from spinning to finish, it can

<Fig. 1> Sustainability venn diagram from Adams. (2006)
not be ignored that the use of chemicals may have carcinogenic and neurological effects that may cause allergies and may affect fertility. During this process, large amounts of water and energy are used and in general non-biodegradable wastes take form. In the marketing and sales processes, subsidies and quotas with a great impact on developing countries arise. The lack of international regulation on these issues creates a ‘win-lose’ scenario. In addition, prices should allow a fair distribution of profit throughout the supply chain. These stages also involve the use of energy and lots of packaging as well as the generation of carbon emissions. Finally, major impacts that derive from transportation are carbon emissions and waste generations (Gardetti & Torres, 2013). Garment production involves chemicals at every step of the way. The paradox, in this case, is that for its survival, the workforce depends on a system that seems to be destroying the world’s capacity to withstand such a force. In both textile and fashion design, sustainability is, in general, perceived as an obstacle.

Sustainable fashion is an endeavour that draws together sustainable development and fashion. Until recent days, these two concepts together were an oxymoron. Today, it is vital to make this pair a promise for the future (Clark, 2008). Despite the fact that fashion and sustainability show development on mutual concepts on ecological, economic and social/ethical dimensions, fundamentally these two terms contradict each other. Fashion’s fast cyclical feature that constantly needs innovation and sustainability’s need for a long usage time create this contradiction. With the “fast fashion” practices in recent years, the contradiction between fashion and sustainability has gained even more importance; which has caused an effort to create different approaches to fashion in order to raise awareness.

The production levels of fast fashion challenge the ethics of the whole process, while the many levels of the production chain make it near impossible to know the origin of a garment (Scamans, 2016). Slow fashion, which can be considered as a reaction to the rapid consumption of fast fashion, aims to produce high quality products that will provide craftsmanship and long-term benefits. Therefore, “the slow approach offers more sustainable and ethical ways to be fashionable, foreseeing design, production, consumption and use” (Clark, 2008). Today, many fashion enterprises and designers are adopting sustainable practices. However, usually the challenge of extending slow fashion to a larger scale still remains since slow fashion practices come from small-scale production.

2. Recycling

There are various sustainable design production methods such as reconstruction, upcycling, zero-waste and recycling. Suitable methods are determined according to the purpose and approach of the designer. Recycling is often defined as re-lives of consumer products. Recycling is considered a central idea to prevent textile disposal (Nyfeler, 2013). It is the method of reusing or reprocessing used clothing, fibrous material and cloth scraps from the manufacturing process. According to Fletcher (2008), recycling is a transition strategy, which is useful while society is transformed into something more socially aware and less energy intensive.
Textile wastes can be the raw materials for the development of new value-added products through a proper recycling methodology because recycling programs cost less than waste disposal programs. It can reduce the amount of energy used and decrease environmental pollution while the producers profit economically. In addition, the environmental problem-oriented community make new jobs and employment opportunities by creating the social dimension of the subject (Cuc & Vidovic, 2011).

Textile waste management systems are currently undergoing a crucial phase, which aims to produce the value-added products through various recycling concepts and methods (Vadicherla & Saravanan, 2014). Nowadays, known as the 3R target model that firstly focuses on “reducing”, then on “re-using” and lastly on “recycling”, has been expanded to a Five-R model (Fletcher, 2008).

The Five-R model is formed by the five-R’s: recycle, reuse, reduce, re-design and re-imagine. This model allows designers to improve their approaches on sustainability and causes them to incline towards multidisciplinary studies. Inclination towards creating designs using less amounts and types of materials, reducing, recycling, re-designing, re-using that lower the environmental impact of the design. Some designers such as Eileen Fisher, Katie Jones and Bethany Williams choose to use recycled materials and/or create products in which their materials can be recycled at the end of their life cycle. These fashion designers are also committed to continue and expand their recycling program, taking a step forward towards circular fashion. Therefore, designers are seen as key agents in the transformation to a sustainable fashion industry.

III. Material and Method

The aim of the study is to show that production scraps can be transformed into timely clothing designs with samples. The fabric scraps which are formed in the garment manufacturing processes of different brands were turned into unique clothing designs with current fashion trends and artistic approaches.

A total of four jacket designs were prepared: three from the woolen fabric scraps and one from the velvet fabric scraps and one blouse design was prepared from the silk fabric residues. The figures and cuts that were depicted on the design were inspired by art-deco and cubism movements and contoured with hand-sewing techniques. The steps that were followed during this process are shown in (Fig. 4).

Firstly, the fabric scraps are grouped according to their types (wool, silk, cotton), color, texture, pattern and dimension. In the practices completed while following the design process, collage and patchwork techniques were applied depending on the characteristics of the scrap fabric, artistic figures were hand-stitched onto the design. It has been pointed out that sustainable fashion can be looked at from different perspectives by giving examples of how the fabric scraps can be transformed into creative clothing designs with high value and quality handwork. Five-R recycling model that embraces reuse, reduction, redesign and re-imagining was adopted in all designs. Fabric scraps have been transformed into artistic figures with creative thought process and redesigned into recycled fashionable clothes. Creation of these artistic figures was inspired by art deco and cubism.
It is known that the fabric scraps cause a significant economic loss on material and storage costs in the fashion industry. Even though with today’s advanced technology, computer aided pattern preparation methods, pattern placing/cutting programs and zero waste applications are used, fabric wastage rate still cannot be dropped under a certain number. This number is too high to be overlooked and unfortunately these kinds of unpreventable scraps always take form in the textile industry. If designers want to support sustainable fashion, they should search for different approaches to turn scraps into economic benefits.

There are many models and techniques for fashion designers to adapt in their quest for sustainability. The important part is for designers to apply their knowledge, creativity and experience on the study to a suitable model with up-to-date trends and show examples of sustainability in fashion. With this work, fabric scraps are seen as an opportunity to create unique designs with artistic approaches that will set examples for sustainable fashion.

With woolen fabric scraps from a firm that cuts collectively with different colored fabrics, 3 jackets were designed. Scraps were carefully chosen so that all of them would have the same type of texture, volume and cloth handle. Since all designs were created with methods that include high quality sewing techniques as well as good hand work, they are all high-quality haute couture designs.

The jacket design in (Fig. 5) was inspired by the art-deco movement also called style moderne. The jacket named “Lady” was created by putting red, black, ecru, dark green, blue and yellow colored scraps to-

<Fig. 4> Process of transformation of fabric scraps into creative designs

<Fig. 5> The jacket designed with woolen fabric scraps “Lady”
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gether by following a composition. All fabric pieces are supported by fusible interlining appropriate for them. Cutting scraps were used in the small parts on the body, scraps from the beginning and the end of the fabric were used on the sleeve. On the right side of front body, a stylized female head figure was adorned with collage technique. Hand-winding technique was used on the figure’s nose and mouth lines. All fabric parts that make up the body are combined with patchwork technique. The assembly seams’ surroundings were contoured by colored cotton yarns woven with “oyulgama” hand seam method.

A collage is a visual representation made from an assembly of different forms, materials and sources creating a new whole. Abstract and figurative collages are two different types of collage. The designer determines the collage technique according to its composition. For this reason, figurative collage technique was used to visualize fabric scraps of different colors as an artistic figure. When the “Lady” jacket image is examined, it can be said that collage is one of the most suitable techniques for visualizing ideas in clothing design and increases the aesthetic value of the jacket.

This raglan sleeved, stand-up collared jacket with an applique pocket on its left side, has a hidden button placket on the front closure. The jacket’s visuality is increased by applying the “oyulgama” seam that was used as an adornment to the buttons. The lining gives the inside of the jacket a cleaner look.

“Galaxy” jacket design in <Fig. 7> that consists of cubist forms, was created with woolen fabric scraps. It has the same properties as “Lady” on fusing and seaming techniques. The stand-up collared jacket’s front closure was cleaned with “enkürüste” placket (by adding strip). Model combination was achieved
by paying attention to the dimensions of fabric scraps and the color harmony. Many Cubists reduced objects into cylinders, spheres, and cones and painted them in a single plane as if all faces of an object are visible simultaneously or successively. Inspired by this approach, the surface composition was created with rounded square and rectangular forms. The whole surface of the jacket was created with patchwork and collage technique.

In “Galaxy” jacket design, day and night, the planets and the light way were stylized on the body. All seam lines were surrounded by “oyulgama” hand seam. Buttonholes that open up to the frontal placket were hand-seamed and fabric covered buttons were adorned with “oyulgama” hand seam. All this creates a modern design with intensive hand work.

The symmetrical composition was formed on both sides of the body by placing black, ecru, dark green and burgundy colored fabric scraps. Cubist style is emphasized by creating fabric scraps geometrically in jacket design. The broken and split shapes of cubism not only facilitate the integration of fabric scraps, but also give the jacket an artistic and aesthetic appearance.

Enkürüste placket and assembly seam edges are contoured by “oyulgama” hand seam, such is the case of jacket designs made of other woolen fabric scraps. Turning small woolen fabric scraps that would otherwise go to trash into new and unique clothing designs is thought to be one of the best examples of sustainability in fashion.

“Nostalgia” jacket design is made of cotton velvet scraps, the jacket’s surface is adorned with floral figures. Body form is obtained by placing bands of
green “çuha” fabric between square and rectangular pieces with puzzle patchwork technique. “Çuha” is one of the Ottoman woolen and pile fabrics. There is also a type produced from cotton. Sleeve of the jacket is designed with inspiration from “Entari” an important part of traditional Turkish clothing. The sleeve form expands by opening towards the wrist. The sleeve has a slit up to the elbow on the middle seam.

Patchwork is often used to combine pieces of cloth in a specific order, so that a larger surface is created. This technique is found throughout the world and has been used for hundreds of years. It probably originated from the need to re-use (expensive) textiles. Therefore, it is a technique that contributes both to the purpose of sustainability and the visual value of the jacket.

The green “Çuha” strips between the velvet pieces are embroidered with metal spangles. The front closure of the jacket is held together with a single hook on the waistline.

The sleeveless blouse, in which pure silk fabric scraps create contrast in both color and shape, is called “contrast”, because of these characteristics. Cubist artwork creates a feeling of movement and shape that can differ from what an object represents. Also, cubist surfaces are suitable for the use of fabric scraps because they have the appearance separated into geometric components. The fabric scraps have been transformed into economic value while geometric forms shaped according to the size of the fabric scraps give the blouse a moving appearance.

All sides of the silk fabric pieces; sleeve hole, slit and neck rounding are adorned by hand with a blanket needle. The handcrafted ornaments on the edges
of the geometric parts increases the added value of the blouse. The added value of the blouse has increased with ornaments made by handcrafted on the edges of the geometric parts.

V. Conclusions

Fashion industry is currently based on extremely fast cycles of production and fast-changing trends. This also means there is an increase in fabric scraps generated during the production process. The gradual shift from fast fashion to a sustainable and socially responsible fashion is clearly visible around the globe. Therefore, the need for designers to consider all phases throughout the design process in making sustainable fashion is very important. Designers must find different ways to create a win-win situation for both consumers, manufacturers and for sustainable fashion. Recycling of fabric scraps as clothing designs is just one of these ways. Designers can start by evaluating the fabric scraps to create a sustainable transformation process in the fashion industry that leads to sustainable design practices. They also need to develop foresight and new a new, inspired way of thinking on how more valuable designs can be produced with production scraps.

Today, due to the increasing global warming effects and insufficient water and fuel resources, there is an urgent need to reduce the generation of all types of textile waste. In this study, it is presented with sample applications that production leftovers in the fashion sector can be transformed into timely clothing designs with high artistic value. The scraps that get thrown into dumping grounds and damage the ecosys-

<Fig. 12> Details of adornment and sleeve slit of jacket design “Nostalgia”

<Fig. 13> The blouse design prepared with silk fabric scraps “Contrast”
tem can turn into ethical and economic benefits for the manufacturer. Methods of choosing new high value added products and creating an awareness of social responsibility is also shown with examples in this study. Designs are high quality, timeless pieces because of their intensive craftsmanship and long-lasting values. Due to these properties, each of the designs created with fabric scraps are examples of slow approach. On the other hand, fashion designers’ approach towards ecofriendly and slow fashion products emphasizes that it is necessary to spread ideas of slow fashion on a wide scale and teach users about ecologically friendly clothing.

Design outputs have shown that collage and patchwork techniques are important visualization techniques in the design process. These techniques are very suitable to present a situation such as an atmosphere or a context, new product ideas and concepts. In addition, it is evident that the visual and added value of the design increases when the designer is inspired by art movements. Design can largely affect sustainability in fashion. It is possible to add ideological value to garment designs created with a sustainable approach. This will allow the designer to communicate a message to the world, to be perceived in a certain way and to be creative; while making the wearer feel like a part of his or her social group and at the same time being original and free.

Sustainable fashion and textile provide a solid foundation for understanding the state of the art for these industries as well as spurring on the much-needed research, product and process innovation. As a result, despite the lack of attention on turning production scraps into new designs from clothing firms, it should be known that this will make an important contribution not only to the economy but also to cultural areas and norms. For this purpose, not only designers but also producers and consumers need to be informed and aware of sustainability. Designers should investigate and try different techniques in designs with the goal of increasing the environmental and sustainable value of the product. They should be inspired from different art movements. This means that, through environmental values, we can utilize not only fabric scraps but also other textile waste in a completely new product. It believes that social and environmental issues are interrelated and through exploring the connection between these issues designers may find innovative design solutions to sustainability. Firms can create brand value by recycling fabric scraps. By lowering the production scraps’ damage to the environment and creating new job opportunities from this, the country’s economy will also benefit. It is thought that awareness can be gained from a different perspective to sustainable fashion by transforming the cutting residue fabrics into creative designs.

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