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Re-Birth Design Analysis for Developing Sustainable Fashion Products

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Abstract

Sustainability in fashion cannot ignore fashion attributes required for the design of rapidly changing and innovative products. This study examines "Re-Birth Design" development and provides a means to apply academic and industry perspectives to the investigation of Re-Birth fashion product development. This study defines "Re-Birth Design" as stock that has been designed and launched through distribution channels, subsequently returned unused, then improved and reborn into a new product for redistribution. This study analyzed specific cases. We selected 100 designs for Re-Birth from 11 brands of "K" fashion company in Korea, to be successfully sold in 2014. These cases are used in the analysis and are categorized into design types. As a result of the analysis, "Re-Birth Design" had five levels: Level 1. Changes in supplementary materials such as adding or removing decoration, Level 2. Changes in patterns or materials (changes within the product), Level 3. Partial changes in design (leading to a new design), Level 4. Complete deconstruction and rebirth of the design, and Level 5. Complete deconstruction followed by the use of the design source for a new product that is not a garment. This study analyzed products owned by brands, as well as successful cases of Re-Birth designs that reused existing resources, reduced energy consumption, and increased environmental and economic efficiency by recreating new products that could be resold.

Key words: Re-Birth, Sustainability, Fashion, Stock, Industry

I. Introduction

The world is increasingly placing substantial value on the issue of its future survival due to issues such as production affecting nature, the destruction of ecosystems due to environmental pollution, sudden changes in the earth's climate, the depletion of resources, and a long-term economic downturn. We are at a point where the consideration of alternatives in terms of resources and ways of life are of the utmost urgency. Korea is no different from the rest of the world with regard to this global eco-friendly inclination. Following the EU's CO emissions regulations in 2007, Korea implemented a carbon tax on the manufacturing industry in 2015 and created the CO emissions regulation bill. Korea is growing increasingly aware of the importance of sustainability in social categories (Oh, 2009). Furthermore, Koreans, who initially experienced a mental void concerning the blind consumption that has overtaken modern society, have made their concerns known, and the procurement of more substantial resources in terms of "Good Economics" (Lee, 2015) and "ethical consumption" has begun.

Amidst this global movement, it is only natural for "sustainability" to have become a megatrend throughout all industrial fields around the world. Sustainability was a major topic of discussion at the United Nations General Assembly regarding social development in 2005 (UN General Assembly 60th Session, 2015).

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Sustainability is a concept that integrates all systems related to the environment, economy, and society, and incorporates efficient usage strategies in the systems of countries. Sustainability is no longer a choice, but an obligatory task for all industries of the future. There has been not only increased interest in establishing sustainable policies suitable for each field of the manufacturing industry, but the scope of interest has also expanded to include the establishment of measures that can actually be enforced. Industries that go against this global trend toward sustainability may find it difficult to survive in the future.

The fashion and apparel industry, which is fast-paced and continuously updated, is not at all exempt from this social demand for sustainability. The apparel production system, which previously relied solely on new resources, has reached a point where further consideration is needed. When considering sustainability in the fashion and apparel industry, the characteristics of fashion, with its fast pace and adherence to the latest trends, cannot be overlooked. In other words, the fashion industry must find a direction by which it might maintain command in a sustainable manner, by carefully studying the characteristics of fashion from an industrial and systematic point of view.

Design connects with social innovation through a relationship with a continuous and fluid culture (Manzini, 2015). Sustainable fashion design may be successfully achieved through a better understanding of culture. Progressive domestic businesses have also shown a surge of interest in sustainable fashion design. At a point in which effort and social responsibility are being demanded for sustainable fashion design, issues regarding the environment, ethics, and society have a direct correlation with the sustainability of fashion (Black, 2013). In this context, the efforts and active participation of fashion companies are sure to create a positive synergistic effect on the sustainability of the Korean fashion industry.

The study reported here aims to identify a plan for sustainable fashion design within the context of the redesign of stocked fashion products. This research was based on case studies that achieved results through in-depth discussion of the use of stocked products, which impact on high clothing prices due to storage and handling difficulties in the fashion industry, and the actual use of these products. Stocked products are a cause of particularly high clothing prices. Because the use of stocked products often involves those from apparel businesses that already have production and distribution systems in place, this is a realistic approach that may solve the problem of stocked products by allowing them to reenter the market as new products. This study is significant in that it analyzes a "Re-Birth" design process by which resources can be reused, energy consumption reduced, and competitive efficiency increased by recreating stocked products from current brands long overshadowed by newer products into products that can once again be sold.

The research objectives are as follows: First, the term "Re-Birth" design is defined based on the concept of sustainability, and the need for Re-Birth design development is justified. Second, a number of Re-Birth design success stories are considered to illustrate the types of ideas that led to new designs, and analyzed step-by-step to describe a design approach by which stocked products may be recreated into new products. Third, a plan is proposed whereby the problems of stocked products may be addressed, and future Re-Birth designs expanded, by illustrating the advantages of developed Re-Birth fashion products.

II. Theoretical Foundations

1. Sustainable Apparel

We must understand the unique characteristics of sustainable design in order to identify a plan for sustainable fashion and apparel, which has quickly become a global megatrend. We must also present a plan acceptable from the perspective of future energy usage, considering increased domestic and foreign interest in this issue. Raising interest in eco-friendly fashion is a mainstream trend that has continued since 1970. Following this trend, sustainability has recently become a major paradigm from the perspective of future energy resources. In terms of research trends in sustainable fashion and apparel in developed countries, the focus has been on integrating political, economic, and design dimensions. Black (2008, 2013), DeLong et al. (2013a, 2013b),

Elizabeth (2010), Fletcher (2014), and others have proposed a range of guidelines for sustainable design, such as 10TED design. DeLong et al. (2013a) divided sustainable fashion design into five categories. Within one of these, namely "emotional design in sustainability", it is argued that when apparel communicates with emotions, sustainable use is possible. TED Design, performed in a design school in England, presented 10 types of sustainable design processes. Among the 10TED Designs, sustainable emotional design includes designs for which ethical practice is possible, those that dematerialize and enhance designs, systems, and services that can meet consumer demands, and those that can actually be carried out.

Chapman (2005) has explained appropriateness as a function of a product's emotional existence, evolution, and improvement, with regard to sustainable fashion product development. He stated that it is not sufficient for a product to simply trigger emotion in consumer desire, but instead to involve continuous and repetitive interaction (Chapman, 2005). A relationship must be established between the user and the product in order to extend the product's life. However, a problem with sustainable design in fashion and apparel thus far has been that the creative methodology used in accordance with the experience of designers was extended only to an abstract range that could not connect with business design practices and processes (Chapman, 2005). Furthermore, the trend in research on sustainable fashion in Korea is somewhat localized and focuses only on eco-friendly design, ethical design, and slow fashion. Domestic studies (Ha, 2009; Jung, 2013; Kim, 2012; Lee, 2013; Na, 2013; Park, 2014; Shin, 2011; Yoon, 2013) have pointed out that the concept of sustainability in the fashion industry remains limited to the concepts of eco-friendliness and recycling. This is similar to what Chapman (2005) pointed out, and is a result of temporary products created by designers with no connection to business, so that even though a product enters the market, it does not achieve practical usage in real life. A true instance of sustainability that can be applied to fashion and apparel is a much more comprehensive concept that goes beyond environmental issues and includes the society and economy. The person must be considered at its very core (Hethorn, 2015). Therefore, designers must focus their products more on the user in order to develop sustainable fashion products through Re-Birth design. This is how the design of recreated fashion products might speak more effectively to consumers, and increasing their user satisfaction.

2. Define of Re-Birth Design

In this study, the term "Re-Birth Design" refers to the redesign of stocked products, originally released through the distribution route to be sold to consumers but returned to headquarters due to lack of use, subsequently supplemented and redeveloped by designers as new products. Up-cycled products using current stocked products have been released with actual brand names (RE;CODE), but a range of issues arose in commercialization as the designs were too unconventional to be worn by general consumers in everyday life and prices were unreasonable. Thus, the purpose of Re-Birth design is to revive such products as practical goods with increased productivity. Re-Birth design can upgrade a product and allow it to rejoin the rotation of its life cycle.

The life cycle of a fashion product involves the stages of production, sales, usage, collection, and reproduction. However, this life cycle can vary according to the maintenance model, recycling model, and other concepts. From within the life cycle, the entire process from production to sales already includes the societal distribution route (Lee, 2014). Re-Birth design in the lifetime of such a product creates a shortcut from the production and sales stage to the collection stage once again <Fig. 1>. In other words, these are products that have already been through the sales process, but were recollected through a reverse distribution route as they were not chosen by consumers.

Among actual domestic brands, prices are determined on the assumption that only one out of three products will sell. Many brands pay high maintenance fees for warehouses and managers in order to maintain the value of stocked products (Korea Institute for Industrial Economics and Trade [KIET], 2012). But handling unsold and returned products are no easy matter because unselected products by consumers have

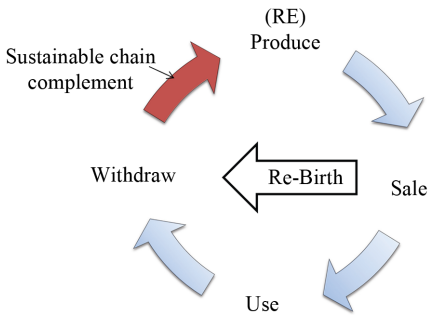

Fig. 1. Re-Birth in the life-cycle of fashion products.

solving problems in terms of delivery time or design, but rather by last minute sales agencies, by which the brand image may suffer.

When we examine the issues and conditions regarding wasted resources and waste disposal for stock owned by brands in Korea, the domestic apparel market is worth 40 trillion won (as of 2011). This comprises 13.5% of the home market and its proportion of the consumer price (54.6/1,000) is extremely high (KIET, 2012). According to an investigation by the National Statistics Office in 2012, the fashion industry has an accumulating stock increase rate that greatly exceeds the production and shipment increase rate, and is more than twice the average of the manufacturing industry. Furthermore, the waste disposal of stocked products is an issue that requires resolution. As shown in <Table 1>–<Table 2>, the domestic apparel stock volume increased exponentially between 2011 and 2012 due to an international recession, and this number has only been growing since then. Therefore, it is imperative that a plan be established to revive stocked products in the fashion and apparel industry. With such a plan, there may be a breakthrough in the apparel market through the creation of new jobs and revenue increases.

According to previous research (DeLong et al., 2013a) on sustainable clothing trends among college students in Korea and America from a perspective reflecting the culturally unique characteristics of Korean culture, Korean students rarely purchased clothes from recycled or used clothing stores, and expressed extreme aversion to purchasing clothes that others had already worn. Considering this cultural attribute, Korean consumers may regard Re-Birth design in a more positive light in comparison to recycled products that already went through the distribution process but were unused despite being chosen by the consumer.

III. Research Methods

In order to examine the ideas used to redesign existing products in Re-Birth design success stories, the subjects of this study were the 11 brands of the fashion company “K” which participated in the Re-Birth design project.

For purposes of this study, a Re-Birth product was regarded as successful if its sales rate exceeded 40.0%, and the recovery rate exceeded 200.0% due to this improved sales rate. The corresponding products were extracted from each of the 11 brands at random, and a total of 100 products were analyzed. The period of the

Table 1. Current status of the growth rate of key indicator for apparel (based on supply) (Unit: %)

	'05	'06	'07	'08	'09	'10	'11	'12 (1-5)
Stock	12.8	19.5	21.8	10.3	–27.3	1.2	15.3	29.7
Production	5.5	9.6	6.1	5.0	–2.9	5.1	1.2	–2.1
Shipment	6.3	10.2	8.4	3.3	–3.2	4.4	1.4	0.3

From KIET. (2012). p. 1.

Table 2. Current status of production compared to stock proportion (Unit: %)

	'05	'06	'07	'08	'09	'10	'11
Apparel	14.3	16.0	16.6	17.2	17.1	17.9	20.0
Manufacturing Industry	8.7	8.6	8.7	9.1	8.8	8.7	9.0

From KIET. (2012). p. 1.

study was from the point at which Re-Birth officially entered the market in 2013, until the point at which normal production and sales took place in 2014, and was limited to Re-Birth products available in the market for one year. The 100 products included 6 from H, 8 from S, 18 from HC, 4 from E, 14 from KS, 7 from LC, 3 from JN, 14 from CC, 9 from C, 8 from CM, and 9 from RE;CODE, with brand names represented by initials for the sake of anonymity.

Each brand's Re-Birth products were grouped into five levels depending on the difficulty of modifying the design for each similar category, according to the characteristics of similar categories in the design modification process.

IV. Results and Discussion

Analysis of the 100 successful Re-Birth products from the 11 brands, revealed the design categories for a five-level Re-Birth. According to the categorization with items grouped into five different levels according to modification difficulty, Re-Birth level 1 was the category involving changes in subsidiary materials or the addition or removal of embellishments. The main reason why products in level 1 showed poor sales may be due to a weak brand image or the absence of details to differentiate an existing product from other brands, which may increase attractiveness when the product is worn. As a means to combat this, the collar of the level 1 product shown in <Table 3> was changed from a denim material to an enhanced design using an adhesive ribbon in order to strengthen the LC brand image. The Re-Birth product achieved a sales rate that increased by 72.6%, displaying a 560.0% cost recovery rate. Another factor to which this kind of success may be attributed is the change in the product's sale season. Although the existing level 1 stocked products were released as F/W products, changing them and releasing them as S/S products, considering the product's design factors and general consumers, had a positive effect on sales rates.

Re-Birth level 2 is the category in which changes addressing pattern issues or material characteristics were applied to the stocked products. The focus of level 2 was a reverse design that enhanced practicality more than in level 1. The level 2 stocked product in <Table 3> was redesigned into outdoor apparel with a zipper forming a T design. In response to opinions expressing difficulty in putting on and taking off clothes with T-shaped designs, the shirt was modified into a light jacket, thereby increasing its practicality. The reverse product resulted in a 384.0% cost recovery rate and a 6.7% increase in sales rate. HC's wool pants that were released as a F/W product are another example in this category. By adding a soft texture, comfortable to the touch, a stocked product that barely achieved a sales rate of 8.0% increased to 87.0%.

Level 3 is the category in which a part of an existing design is combined with a different material to create a new design. Re-Birth level 3 thus changed a part of an existing design into a new design to simultaneously enhance practicality and brand image. In order to enhance JN's brand image and increase practicality, the level 3 product in <Table 3> was altered by removing the bottom hem, adding a color block to match the brand's concept, and increasing the length, which increased versatility and allowed more casual styling. Because product prices were set to be the same price as the original product, without including an additional reverse cost, these products held an advantage with regard to price, and the reverse product's sales rate improved by 32.0% compared to the existing product and displayed a 217.0% cost recovery rate.

Re-Birth level 4 is the category in which a product was completely taken apart and recreated into a new product. Re-Birth level 4 involved taking the product apart completely and recreating it with a new design. Re-Birth level 4 products, which recreated stocked products of different brands using recombined designs to fit the design concept, appear in the 2014 F/W product line from RE;CODE. RE;CODE is a brand launched in 2012, producing apparel using three year old stocked products. New clothes were created by taking products apart immediately before they were to be incinerated. For example, men's suits were made into long vests for women, jackets were made out of tent materials, and creative products were made using the back pockets of denim jeans. Designs remained up to date despite their origin as recycled clothes. In fact, they became one-of-a-kind items that could not be

Table 3. Re-Birth design in five levels (*N*=100)

Level		Stock1 (sale %)	Re-Birth design 1 (sale %)	Stock2 (sale %)	Re-Birth design 2 (sale %)	Production cost recovery (%)	%	
Low ↓ High	Level 1	 (22.0)	 (94.6)	 (85.0)	 (97.9)	560.0	6.0 (*n*=6)	High Re-Birth design Frequent (91.0)
		(Re-touch) details: to changes in supplementary materials such as adding or removing decorations						
	Level 2	 (52.0)	 (58.5)	 (7.0)	 (35.7)	328.0	62.0 (*n*=62)	
		Pattern or materials: changes in patterns or materials (changes within the product)						
	Level 3	 (15.0)	 (47.0)	 (38.0)	 (56.0)	217.0	23.0 (*n*=23)	
		Partial design: partial changes in design (leading to a new design)						
	Level 4	 (–)				-	4.0 (*n*=4)	RE;CODE (9.0)
		Other design: complete deconstruction and Re-Birth of the design						
	Level 5	 (–)				-	5.0 (*n*=5)	
		Fashion accessories: the complete deconstruction and use of the design source for a new product that is not a garment						

found anywhere else.

Lastly, Re-Birth level 5 is the category in which products were completely taken apart to become the raw material for fashion items aside from clothes. A jacket became a purse, a padded jacket became a bag, purses were made using back pockets, etc. As expected, this level was only applicable to RE;CODE products. When all five Re-Birth levels were analyzed, the reverse products of most brands, aside from RE;CODE products, ranged from levels 1 to level 3. Design types in Re-Birth level 2 were most frequent. Although the level did not significantly influence the success rate in terms of reverse design sales, the cost recovery rate increased as the product's reverse difficulty decreased. The design categories for each of the five levels are shown in <Table 3> and <Table 3> Our analysis showed that the key point in successful reverse designs was that they enhanced the brand's concept and image, and increased the practicality of products that fit the release period, product sales period, and consumer demands.

V. Conclusions

Sustainable design development can succeed by reflecting upon and addressing the cultural characteristics of each country. Because there are differences in sustainable clothing trends according to culture, positive effects can be achieved when cultural characteristics are considered. In order for sustainable fashion design to become applicable to actual consumers, there must be a gradual change in social awareness by using accessible methods. In other words, there is a need for both long-term research and social change. From this perspective, in order for sustainable fashion design to be applicable to the Korean culture, we must first understand the general characteristics of this culture. Because Korean society with weaker uncertainly avoidance tendencies for instance, Koreans avoid to purchase secondhand items (Hofstede, 2001). Thus, if we understand the connection between culture and product interaction can help to develop successful new product in the market place (Berk, 2013).

In an effort to establish a method for the practical use and diffusion of sustainable design in Korean culture, this study focused on stocked products that failed to sell and were left unused. Stocked products were collected and the reasons for their poor sales were identified. We found that Re-Birth products that were recreated could be divided into five levels. The design changes in 91.0% of the Re-Birth products from 11 brands, which were the subjects of this study, varied from level 1 to level 3, and the cost recovery rate increased as the Re-Birth product's difficulty level decreased. RE;CODE products were inclusive of all five Re-Birth levels, and 9.0% of their product line was included here. Considering that more design changes are added at higher levels, most brands seemed to prefer lower level Re-Birth designs, which resulted in practical effects that increased their cost recovery rate.

Re-Birth designs that use stocked products can revitalize the stock market of apparel brands, which have a high stocked product rate, at twice the average of other manufacturing businesses. Furthermore, we might anticipate price stability through a resulting decrease in the price of apparel. If sustainability plans can be developed within the apparel manufacturing and purchasing systems, new marketing plans can be applied and used for Re-Birth design products as sustainable fashion products in economic and marketing systems, and new jobs can, in turn, be created.

Despite the effects that can be expected from Re-Birth design, there is still much to do in the future. First, there are pricing issues. The price of Re-Birth products developed through stocked products is not based on new standards. The price is set by simply adding the production cost onto the price of the existing product according to the company's production and distribution systems. Therefore, a new system must be introduced between the distribution and production systems in order for consumers to purchase Re-Birth products at a reasonable price. Second, there are various design limitations that depend on resource limitations. If there are no materials or stock for the embellishment of products to be created through Re-Birth design, there may be limits to the design diversity that can be achieved. Therefore, because Re-Birth design breaks away from the existing method of designing new products, more creative thinking is required.

This study analyzed the products owned by brands, as well as successful cases of Re-Birth designs that re-

used existing resources, reduced energy consumption, and increased environmental and economic efficiency by recreating products into other that could be resold. This study holds significance in that it provides data that can expand the development of Re-Birth fashion products. In a follow-up study, we would like to develop creative ideas and design development models for sustainable design, and have students participate in the Re-Birth design process through actual design courses in order to understand consumer needs and the relevant brands' concepts and distribution process. This will play a role in enhancing the competence of future designers in the critical talent of creating sustainable designs.

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