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A Case Study Comparing Textile Recycling Systems of Korea and the UK to Promote Sustainability

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ABSTRACT

The aim of this study is to review the current textile recycling system of Korea in order to promote and build a sustainable textile recycling system. As fast fashion has changed the climate of the fashion and textile industry across the world, excess consumption is profoundly encouraged and the volume of textile waste has been notably increased. In recent years, Korea has also faced a large volume of textile waste and its related environmental and economic impacts. As a result, recycling practices have become critically important, yet its systems in Korea have not been fully settled as many interconnected problems are raised through the current process. Therefore, case studies are made between the UK and Korea systems, especially waste collection and distribution channels, to review and address the current problems in Korea with the aim of improvement.

Keywords: Textile recycling system, Textile waste collection method, waste distribution channels, Korea, UK

1. Introduction

As current fashion retailers create an extreme demand for quick and low-priced clothes, consumers need to be aware of the significant changes in their consumption and its consequent social, economic and environmental impacts. The fast fashion industry has been a significant contributor to global environmental issues with the rise of the global supply chain system as the industry has developed their price competitiveness by involving developing nations. The fast fashion phenomenon has grown over the past decade leading to significant change in the fashion market (Birtwistle et al., 2003). A quick response strategy is the key to success in the retailing system by satisfying consumers' high needs and wants for every upcoming trend. Fast fashion retailers such as ZARA, H&M and Uniqlo launch new lines every two to three weeks and many fashion-hungry consumers are willing to purchase the newest fashions at very low prices (Birtwistle & Bianchi, 2010). Today's fashion styles are no longer new styles after a few weeks. This pushes fashion companies to thrive by making a rapid turnover to meet their customer needs. This trend also influences research of fast

fashion and sustainability or eco-related issues (Joy et al., 2012). As lower quality products are offered with cheap synthetic fabrics, fast fashion items are frequently replaced and discarded to follow the newest fashion trends and thereby, the disposed volume of textile wastes is higher than ever before (Birtwiastle, 2007). Therefore, the significance of textile waste minimization has arisen globally over the past several decades in which recycling and reusing textile products have become much more important. Consumers have been aware of the connection between low fashion prices and unethical working conditions (e.g., overseas' factories), but its negative environmental impacts are still less appreciated (Morgan & Birtwistle, 2009).

In the UK, one million tonnes of textiles, estimated £238million-worth, is annually discarded in landfill sites which, given finite landfill capacity, would fill current space in ten years' time if these amounts continue (Defra, 2008). In addition, the environmental issues are also addressed in connection with soil and air pollution as the synthetic fabrics do not decompose, and the garments made of wool and synthetics produce the greenhouse gas methane when biodegrading (Waste Online, 2006). In Korea, the textile waste volume has progressively increased as the 'throwaway culture' has emerged with the fast fashion phenomenon. According to the Ministry of Environment of Korea, textile waste volume was verified as 54,677 tonnes in 2008, but in 2010, it increased to 64,075 tonnes, a 17 percent escalation. The amount signifies a monthly average that corresponds to 300kg per 300 household, estimated at over £6million-worth (MK Business News, 2013). Both the UK and Korea enforce textile recycling, but their systems have shown differences regarding waste collection and distribution channels. UK textile waste management is recognised as a more systemised process than Korea's and is achieved through the collaboration of government, recycling firms, charities and consumers. In contrast, Korea is reported to have many interconnected problems in its current system as addressed by media and civil reports. As the textile recycling system and its waste management policy directly influence the effectiveness of textile recycling and waste minimization, the recycling systems of Korea and the UK are reviewed and compared with a focus on the collection method and distribution channels (Figure 1) for building a sustainable textile recycling system in Korea.

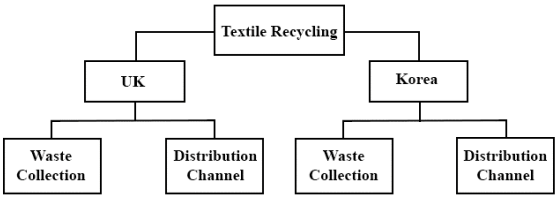


Figure 1. Research frame for the comparison of the textile recycling operation systems between the two countries

2. Method

In our investigation, case studies are undertaken to promote sustainability in the textile recycling system in Korea. There is a need to research a good model for recycling fashion and textile products to improve sustainability. We found major differences in the textile waste collection methods and distribution channels in Korea and the UK. In the UK, charities and individual recycling firms are required to register at a local council for their legal operation, while the Korea case shows a fairly small number of charities and recycling firms with the permission of the government, although separate waste collection is well accepted and implemented in both countries. Each

country also primarily takes clothing banks, door-to-door collection and donations to charities for recycling, yet many problems are featured in Korea as the recycling has been left to illegal business. Therefore, this review focuses on the charity and recycling firms of the two countries to address and define the current problems of the waste collection and distribution method in the Korea system. The data sources are obtained from secondary sources, provided by Static Korea Information Service, including: 1) a number of recycling companies in Korea; 2) sales of Korea textile waste in 2008 and 2014; and 3) disposed volume of Korea textiles in 2008 and 2014.

3. Results and Discussion

3.1 Textile Waste Collection and Distribution by Charities in the UK

Textile recycling in the UK started about 200 years ago in the West Riding of Yorkshire. It was commenced by the 'rag and bone' men who collected recyclable materials from households through door-to-door visits (Waste Online, 2006; Birtwistle, 2007). The waste management of the UK is driven by firm legislations and policies with varied government projects for the minimization of textile waste volume. In the UK, there are several different schemes for waste collection such as clothing banks, door-to-door collection and private and public donation in which both charity organisations and waste management companies are engaged and collaborate. In case of charities, clothing banks and direct donations from customers are the main collection scheme (Morgan & Birtwistle, 2009) and their clothing banks are marked with details of an organiser and placed in various sites around the UK such as supermarkets, Waste Management sites, council premises, etc.

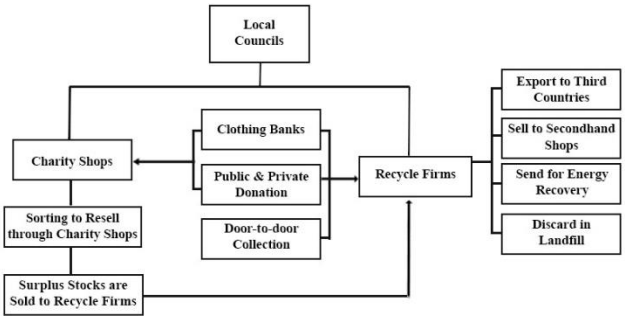


Figure 2. General textile recycle process in the UK. ***(Birtwistle, 2007).***

There have been 380 members of charity organisations that run over 7,800 outlet shops to resell donated second-hand fashion products. Once the stocks are collected by charities, the items are sorted for resale through their shops, and the surplus stocks are sold to recycling firms. Good quality items are normally on two weeks of window display and general sell-through rates are between 50 and 75 per cent. After several weeks of display, unsold stocks are moved to discount stores, either to liquidate for recycling or to dispatch for emergency relief board (Birtwistle, 2007). Additionally, the UK government applies a firm regulation to charity members (e.g., SATCOL, SCOPE, Oxfam, BHF and others) (Figure. 2) to register their business with the Charity Commission to gain public confidence and trust through contract transparency with anecdotal documents or solid figures (CRA, 2015). On the other hand, the contents of clothing banks belonging to charities are directly collected by the recycle firms in which the firm compensates the associated charity based on the weight of the collection (Figure. 3) (Bianchi & Birtwistle, 2010). The profit earned from the sale of donated

goods is closely tied with internal and external activities and projects to help people and communities where cares and supports are needed.

Figure 3. Examples of charities run with clothing banks in the UK

3.2 Charity organisations and operation in Korea

The scale of charity organisations and activities in Korea is comparatively smaller than in the UK, yet there are such establishments: 'Otcan' and 'beautiful store' are run based on consumer donations (Figure 4). 'Otcan' was established in 2009 as a non-profit organisation belonging to the Ministry of Environment. It receives people's donations by parcel service after an online application for donation; packages of clothing are sent by self-payment. These projects and activities are associated with helping children in developing countries where the clothing donation can provide support for people's living.

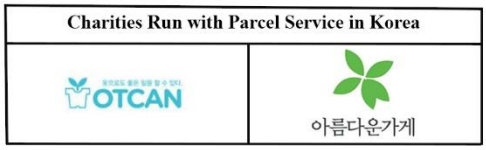


Figure 4. Charities run by parcel service in Korea

On the other hand, 'beautiful store' collects a wide range of second-hand items by direct donations from people, including not only apparel but also baby goods and household products. They run around 100 charity shops across the nation and their activities are engaged with both international and national activities. Moreover, they organise such events to encourage reuse and recycling practices through social events (e.g., fair trade and flea market campaign) (Otcan, 2014; Park 2013; Beautiful Store, 2015).

3.3 Textile waste collection and distribution channels by recycle firms in the UK

Most textile recycling firms in the UK need government permission and are registered if proper infrastructure to handle textile recycling process exists. In addition, many of them operate their businesses as a member of a waste management association such as the Textile Recycle Association (TRA), to promote recycling practices nationally and internationally (TRA, 2014). For instance, 'Nathans Wastesavers', a member of TRA, is the largest textile firm in the UK. The company was established in 1903 and collects more than 600 tonnes of textile material each week. The immense majority of textiles (85%) are received from charity shops, and besides they collect materials through more than 3,000 textile banks, which are installed in permitted sides of private businesses or local authorities. By sorting and processing the collected items, 98 per cent of the total volume is reused or recycled, of which hundreds of tonnes of clothing are exported each week to developing countries in Africa, Asia, Eastern Europe and the Middle East where the affordable and quality clothing are needed (Nathans Wastesavers, 2014).

The Salvation Army Trading Company Ltd (SATCOL), another form of textile recycling company, has relations with over 250 local authorities to collect textile waste and it also runs 380 charity shops. The company receives 10–15% of all sorts of fashion items (e.g., clothing, shoes, textiles and accessories) donated in the UK. Currently, it is estimated that each bank collects between 6-7 tonnes per annum across the UK, while SATCOL – with 2000 banks, door-to-door collections, and group donations –handles some 17,000 tonnes per week (Waste Online, 2006; SATCOL,

2014). The firm recycles clothing and textiles by providing a collection and distribution infrastructure, as well as the facility to transport the items to the countries where there is a high demand for low- cost clothing. As the key process activities in SATCOL are presented in Figure. 5 (Woolridge et al., 2006), the textile waste collection is achieved by door-to-door collection, clothing banks and charity shops which interconnect from donation to sales and renews the waste values to full-spectrum of the recycling process.

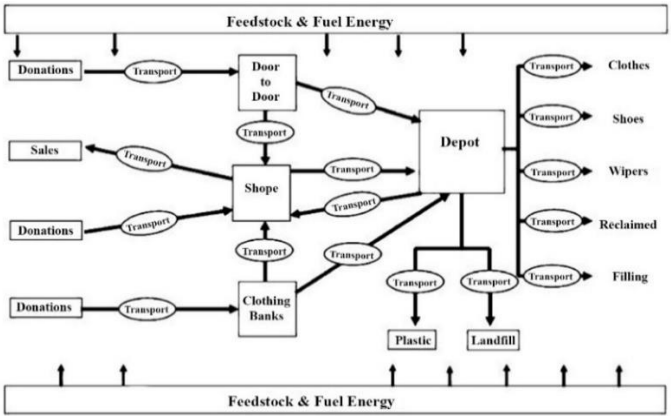


Figure 5. Key process activities in SATCOL *(Woolridge et al., 2006)*

According to the Salvation Army Trading Company Ltd (SATCOL), when clothing is disposed of, it still has at least 70% of its useful life left (SATCOL, 2014) and therefore, the environmental benefits of textile recovery would be enormously achieved by reusing and recycling discarded textiles. Therefore, the firm addressed and emphasised the important parts when running a textile recycle operation with 1) clothes banks, 2) household collection schemes, 3) charity shops, 4) collection logistics and 5) distribution of clothing (Figure. 6) (Woolridge et al., 2006).

Figure 6. The proposed fields related to textile recycling firms *(Woolridge et al., 2006)*.

The textile waste management system of the UK has presented a good relation involved with environmental, social, and ethical commitment. As the recyclable materials of textiles and fashion items are collected based on the peoples' donation, the profits generated through sales are returned to societies locally, nationally and internationally. Furthermore, the massive majority of discarded textiles are found to be reused and recycled by the recycling firms with proper infrastructure for textile waste volume minimization. It might be addressed that the UK government is in aggressive support with solid legislation and regulation and therefore, the recycling system is socially and ethically governed and controlled to deliver such effectiveness in environmental and economic aspects.

3.4 Textile waste collection and distribution channels in Korea

The present textile recycle system in Korea including installation of clothing banks, waste collection, distribution and sales is mostly implemented illegally according to an officer in the Seoul local Government

(MK Fashion, 2013). There have been two different ways to collect discarded clothing and textiles in Korea, which are categorised by the residential types: detached residential house areas and public housing areas (Figure 7) (Park, 2013). In detached residential areas, the clothing banks are installed in common properties in which the private recycling company takes a chance installing clothing banks more spontaneously and irresponsibly. On the other hand, when clothing banks are installed on private land, such as an apartment, each housing management office makes a contract with a large-sized recycling corporation in which they agree to a specific sum of payment for the waste collection (MK Fashion, 2013). However, there have not been many cases where the details of the contract are open with anecdotal documents or solid figures and thereby, residences do not have much information about where the clothing ends up or where the profits are contributed.

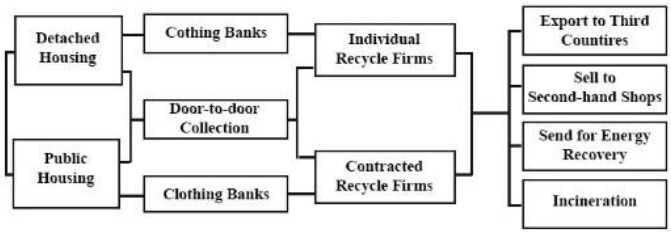
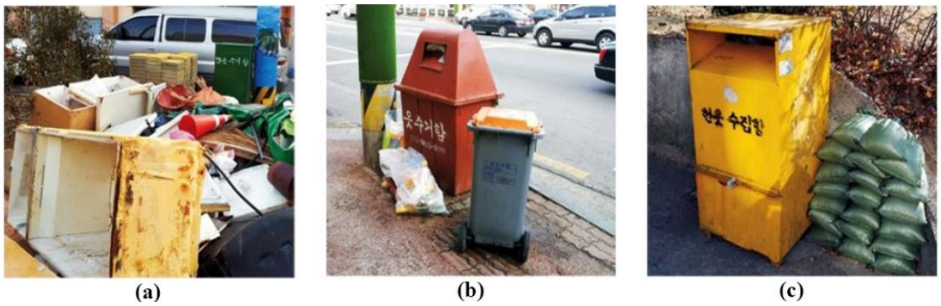


Figure 7. General textile recycling process of Korea *(Park, 2013)*

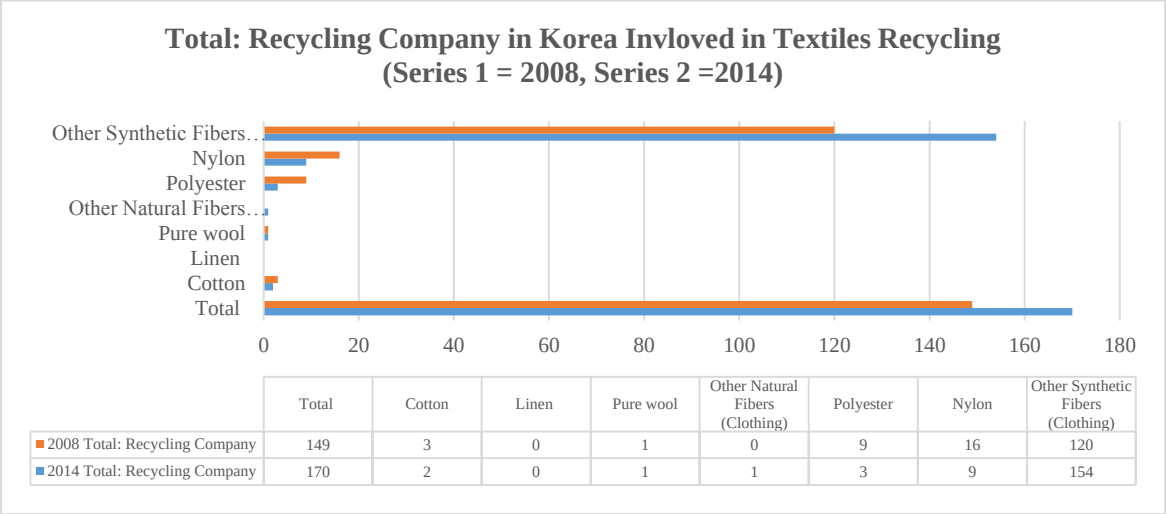
The Korean Ministry of Environment specifies that second-hand garments and used textiles belong to recyclable materials and therefore, the competent authorities should be either directly engaged with the recycling process or entrusted to the registered recycle companies according the environmental law in Korea. However, unauthorised companies indiscriminately install clothing banks on the kerbside of roads and make personal profits out of people's donations (Joongboo, 2014). The major concern and problem raised by an illegal clothing bank installation on streets is the great inconvenience caused by the obstruction of pedestrian passages and roads. In addition to that, the clothing banks are often left rusted, and trash dumping occurs nearby the clothing banks (Figure. 8).



(a) (b) (c)

Figure 8. Problems caused by illegal installation of clothing banks in Korea; (a) illegal trash dumping, (b) indiscriminate installation and (c) non-management authority *(Dongbu Maeil, 2012)*

As a result, problems have emerged such as 1) indiscriminate installation of clothing banks, 2) corroded clothing banks from negligence, and 3) illegal trash dumping. Many local governments and competent authorities are aware of the presence of illegal implementation of individual textile collectors and distributors, yet the unlawful business acts are rarely controlled and restricted by regulation or legislation.



	Total	Cotton	Linen	Pure wool	Other Natural Fibers (Clothing)	Polyester	Nylon	Other Synthetic Fibers (Clothing)
2008 Total: Recycling Company	149	3	0	1	0	9	16	120
2014 Total: Recycling Company	170	2	0	1	1	3	9	154

Figure 9. The number of recycling companies in Korea involved in textiles recycling. ***(Sources: Korean Statistical Information Service, 2016)***

As a recycling firm is required to equip infrastructure to take part in the textile recycling process, many private agents avoid the investment, but operate their business illegally and irresponsibly. According to Statistic Korea, the number of recycling companies in 2008 and 2014 either registered or permitted in the recycling business grew slightly from 149, in 2008, to 170, in 2014 (Figure 9). The number of the companies in cotton, nylon and polyester recycling has decreased in four years while the number in collecting natural and synthetic fibres of clothing has grown as fashion items are valued the highest among recyclable materials, according to the party involved with the clothing management. Once the materials are gathered, a recycle firm sorts the collection by garment type, fabric and quality at their storerooms or sorting plants. Some of those clothing is intended for a new life in the second-hand clothing export market, while poor-quality garments are managed to be fibres or wiping pieces for industrial use (Korea JoongAng Daily).

	Total	Cotton	Linen	Pure wool	Other Natural Fibers (Clothing)	Polyester	Nylon	Other Synthetic Fibers (Clothing)
2014 Total: Sales of Textile Waste	109,681	1,236	0	9	48	2,815	4,251	101,323
2008 Total: Sales of Textile Waste	143,710	87	0	10	0	4,650	7,348	131,615

Figure 10. Total sales of textile waste 2008 & 2014. ***(Sources: Korean Statistical Information Service, 2016)***

Table 1 shows total disposed volume of textile and sales of textile waste in 2008 and 2014 which was based on a secondary analysis of published data from the Korean Statistical Information Service (2016). Comparing the sales of textile waste between 2008 and 2014, the amount diminished by 23% from 2008, although there was a small growth in the number of companies. By aligning the two data, the number of companies involved in polyester and nylon recycling declined, while the sales of textile waste amount also reduced notably (e.g., polyester (39%) and nylon (42%). In contrast, the sales of cotton and other natural fibre (clothing) increased by 13 and 48 times respectively with a small growth in the number of companies.

Table 1. Total disposed volume of textile and sales of textile waste in 2008 and 2014 (based on secondary analysis of published data from Korean Statistical Information Service (2016) (Unit: tons)

Waste Category	2014		2008	
	Disposed Volume of Textile Waste	Sales of Textile Waste	Disposed Volume of Textile Waste	Sales of Textile Waste
Total	98,899	109,681	159,793	143,710
Cotton	1,268	1,236	587	87
Linen	0	0	0	0
Pure wool	9	9	10	10
Other Natural Fibers (Clothing)	48	48	0	0
Polyester	2,607	2,815	5,737	4,650
Nylon	3,227	4,251	6,825	7,348
Other Synthetic Fibers (Clothing)	91,740	101,323	146,634	131,615

Figure 11. Comparison between disposed volume of textile waste and sales of textile waste in 2008 and 2014 *(Sources: Korean Statistical Information Service, 2016)*

The disposed volume of the textile waste which is neither sold nor recycled decreased by 62% from the total amount of 2008 in 2014. The contribution was achieved by a reduction in the synthetic fibres of clothing, nylon, and polyester, while the natural fibres disposal rate mostly increased. On the other hand, considering the disposed volume and sales in each year, the disposed amount is figured to be high as the amount nearly equals the sales volume. It may suggest that a substantial amount might have lost their renewable values as a small number of companies handle the recycling and not

much with infrastructure. In addition, the data may be connected to the involvement of unregistered and unpermitted recycling companies. As their business numbers and scale appear to be unconfirmed and uncertain, a considerable amount of recyclable textiles and clothing may have floated to illegal collection and distribution.

4. Conclusion

The disposable fashion culture has been gradually diffused worldwide while the negative social, economic and environmental effects have risen with the considerable textile waste volume. As the environmental issues of textile waste volume have become much more critical, consumer education needs to be encouraged for the awareness of the environmental concerns and responsibilities. As a result, the significance of textile waste reduction has been arisen globally to save money, energy and natural resources in which textile recycling system and its management policy takes a critical role to improve the effectiveness of recycling and reusing thrown-away textile products.

In review of the UK case for the textile recycling process, management present strength in management of charity and recycling firms for waste collection and distribution. As the charities and recycling firms operate their business in such collaboration under government control and monitoring, the process from waste collection and distribution channels are built in an efficient and effective process regarding the high recycling rates of the waste and social contribution from its sales and profit.

In the Korean case, however, the textile waste management policy is found to be weak; the government and its related competent authorities rarely control and monitor illegal textile recycling businesses. As there are not many restrictions in the installation of clothing banks, many unauthorized firms have been illegally installing clothing banks that have had negative social impacts. In review of the number of textile recycling companies for the sales amount and disposed volume of textiles in 2008 and 2014, the data shows a sharp decline in the amount of disposed textiles, although the growth in the number of recycling companies and sales does not support the result. It may signify the scale of unauthorised and illegal firms in textile recycling and signal that firm and effective regulations are needed. This study signifies the importance of building a systemized recycling process under government control and the cognitive comprehension of public attitudes. The social dimension of waste management through collaboration is vital in maintaining and building a sustainable textile waste recycling system for which recognition and understanding of the environmental and economy impacts of disposed textiles are required.

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