

REVIEW:  
**The impact of climate change on the fashion industry in  
Korea**

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**Abstract**

Korea's four distinct seasons have become less distinctive due to climate change; new weather patterns have affected the kind of clothes people wear, and the production and sales activities of fashion companies. This study has used the fashion system as the basic framework to examine the changes in Korean cultural symbols and values following climate change, and how these symbols and values have influenced fashion consumption behaviour and the activities of fashion companies. Climate change has introduced new cultural values and symbols, such as "season-less," "multi-function," and "sustainable/green" which have resulted in new fashion products and dressing methods, such as the layered look, season-less items, multi-functional items, and sustainable designs. Fashion product planning under the influence of these symbols and values has gone through a transition toward quick response planning and production, which has greatly cut down the time spent on planning and production. Information regarding short- and long-term weather forecasts and climate change has become increasingly important in the planning, production and sale stages of fashion products. Lastly, a growing awareness of extreme weather events, such as ensuing natural calamities, has led the fashion industry to apply the concept of sustainable development to the overall industry; fashion has somehow turned into a green/sustainability movement. Efforts toward sustainable development are being pursued in the design, production, distribution, consumption and disposal stages of fashion as well as in the management of fashion companies.

**Keywords:** Climate change, Fashion system, Green, Multi-functional, Season-less, Sustainable design

**Introduction**

Nowadays, media reports on extreme weather events are made daily. In 2006, Al Gore released a documentary film called "An Inconvenient Truth" to inform the world about the dangers of climate change and the need for immediate action. It warned the public that the earth would face irreparable damages if greenhouse gas emissions were not cut back immediately and argued that today's generation is obligated to protect the environment for the future generations (Park 2010: 2). The argument that the earth's average temperature is rising has caused a lot of controversy. A highly disputed argument is that climate change might be a natural phenomenon and not due to greenhouse gas emissions from human activities. However, the Intergovernmental Panel on Climate Change (IPCC), made up of 3,000 meteorologists and oceanographers from across the globe, estimated with about 90 percent probability that climate change was caused by human activities (Park 2010: 2).

According to the IPCC Fourth Assessment Report, global warming has been the main culprit of climate change since the beginning of the twenty-first century; this report explained that global warming leads to climate change and extreme weather, such as rising sea levels, cold/heat waves, changes in the precipitation level, flood/draught, typhoons, and dust storms (Shin 2011: 88). Global warming has gained speed with the growing use of fossil fuels, such as coal and oil, since the 20th century, and abnormal weather activities became more frequent with increasing deforestation of tropical rain forests in the 21st century (Lee and Park 2009: 124-125). Global warming continues to affect the ecosystem through increasing occurrences of flood or draught, acceleration of deforestation and desertification as well as increase of infectious diseases (Kim and Lee 2006: 226).

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Temperature or precipitation levels that are beyond normal weather conditions can be meteorologically defined as abnormal weather patterns (Jeong 2010: 6). In other words, if big changes in the temperature or precipitation level continue for a certain period of time, such instances can be deemed as abnormal weather. Therefore, weather conditions that were never observed in the past thirty years are identified as abnormal weather (Shim 2008: 34). Recent cold waves and heavy snowstorms observed in Asia, North America and Europe, as well as heavy rainfall in the Southern Pacific and Africa can be deemed as abnormal weather patterns. Abnormal weather activities can be caused by natural causes, such as changes in the atmospheric general circulation, changes in solar radiation energy and declining quantity of solar radiation, or by man-made causes, such as the increasing greenhouse effect due to growing use of fossil fuels, deforestation due to human activities, and emission of pollutants.

Since industrialization began, the global average temperature has increased by 0.74°C. The IPCC's climate experts assume that the natural, social and economic systems would be able to adapt themselves to a global warming of up to 2°C. An increase of more than 2°C would exceed the adaptation capacity and would cause dramatic effects. Climate change and the accompanying process of global warming have diverse consequences for ecosystems and, of course, also for human beings (Michelsen and Riechmann 2008: 19). Climate change affects agricultural produce as well as the overall lives of people. Erratic weather patterns are causing damage in various ways, such as increasing travel cancellations in the tourism industry, lowering outdoor activities and decreasing the sales in the tourism, sports, art and fashion industries (Jeong 2010: 8).

This study aims to examine how external environmental factors, such as climate change and erratic weather, have affected the Korean fashion system which itself is under the influence of cultural symbols and values of the Korean culture. We shall examine how such symbols and values have influenced the behaviour of fashion consumption and affected the activities of fashion companies, and see how climate change or erratic weather patterns affect fashion companies and the way people dress in Korea.

Fashion companies have been struggling with the impact of abnormal weather patterns and erratic changes of climate since the 1990s. Companies that successfully adapted to such climate change recorded strong sales whereas companies that failed to adapt recorded otherwise. In particular, seasonal items that were customarily introduced to markets at certain points every year recorded sluggish sales due to warmer winters and prolonged summers. Many companies have experienced a sharp decline in sales due to their failure to introduce items suitable to shorter springs and autumns caused by erratic weather patterns (Jang and Lim 2003: 124).

On the other hand, fashion companies that actively responded to climate change by utilizing weather forecasts or by implementing weather marketing strategies have experienced an unexpected increase in sales. Large-scale retailers, such as department stores and discount stores, are more sensitive to climate change, so they carry out weather merchandising or management strategies that correspond to customer demands through weather sensitive marketing efforts (Shin 2011: 86-87). For example, fashion companies have utilized long-term weather forecasts to determine the needed items, the quantities, and the optimum timing of production and market release. Also, medium and short-term forecasts provide essential information for fashion stores in their daily inventory management, sales management and visual merchandising (VMD) management.

Nevertheless, uncertainty is growing in the consumers' purchasing behaviour because of weather changes. Some fashion companies have focused a great attention on changes in the consumers' purchasing behaviour and changes of abnormal weather to maintain a stable revenue (Jang and Lim 2003: 4-5, Shin 2011: 91).

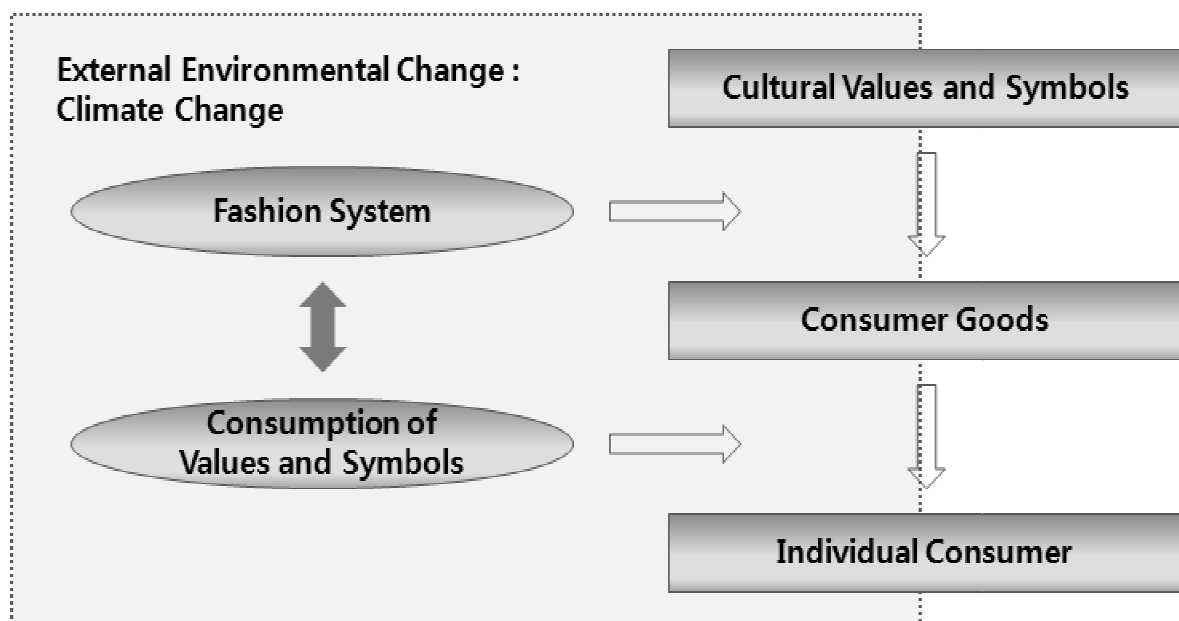
## Methodology

This paper is based on literature review and a qualitative study of the fashion system. The fashion system is an important conceptual framework through which the process of fashion can be integrated for explanation. Although clothing and textile scholars continue to discuss the level of social analysis, driving factors of change in the fashion market, continuity and transience, the fashion system is one of the best conceptual frameworks to use when explaining about the fashion process. The concept of the fashion system began with the work of McCracken (1986: 71):

“In the usual trajectory, cultural meaning moves first from the culturally constituted world to consumer goods and then from these goods to the individual consumer. Several instruments are responsible for this movement: advertising, the fashion system, and four consumption rituals.”

This study seeks to examine the process of how external environmental changes are accepted by the fashion system and fashion consumers. That is, this study will examine what kind of cultural values and symbols climate change has created and how climate change influenced the fashion system and consumers' clothing behaviour.

The framework of this study, as shown in Figure 1, is based on applying external environmental changes, i.e. climate change, to the fashion system and culture production system. In this study, environmental changes that affect an individual's consumption and the activities of the industry and companies within the fashion system are inserted as exogenous variables to the fashion and culture production system that was introduced by McCracken (1986) and Solomon (1988). In other words, new cultural values and symbols are formed due to external environmental changes, and new cultural values are actualized as fashion products through the fashion system; this is followed by the acceptance of new cultural values and symbols through the purchase and wearing of such fashion products by fashion consumers.



**Figure 1:** External environmental change and the delivery system of cultural symbols; source: the author

Solomon introduced the culture production system that emphasizes the connection between consumers and the macro culture based on McCracken's concept. Solomon explained the need for (1) a creative subsystem that generates new symbols and products, (2) a managerial subsystem that selects, makes tangible, mass-produces and distributes new symbols and products, and (3) a communications subsystem that gives meaning to the new products and provides a symbolic set of attributes. Solomon added that the fashion system, which creates symbolic meanings, is made up of all people and organizations that are involved in transforming the meanings created by the fashion system into cultural goods (Park and Kim 2004: 3-4).

Hamilton (1997: 164-165) explains that fashion designers in the fashion system create designs based on novelty, beauty and social reflection, which can be turned into fashion, whereas mass fashion producers and retail producers reproduce or recreate such designs into products that correspond to the markets to which they belong. In particular, such reproduction or recreation is based on novelty, cost effectiveness and product turnover rate, which shows that mass fashion producers and retail producers are pressured to follow different standards compared to the designers. As such, Hamilton stressed the importance of the macro-perspective, pointing out that an individual's micro-perspective on fashion is affected by the macro-perspective, i.e. the arbiters of the cultural and fashion systems.

## Findings

The designs created in the last 250 years have been culturally received as a form of an aesthetic language (Jeon 2011: 448). That is, design has the power and strength to suggest and actualize new notions, and a meme and medium that delivers culture, which in turn brings about new behaviour (Kwan 2011: 35-36). Let us examine what kind of values and symbols have been created by external environmental factors, such as climate change:

**1) "Season-less":** Climate change has rendered the concept of the four seasons somewhat vague. Springs and autumns have become shorter, whereas summers and winters have become longer and lost their seasonal attributes. The academia, industry and consumers are paying close attention to the changing concept of the four seasons (Lee and Park 2009: 125-126). Most fashion products are categorized by season. However, as seasons are becoming vague in their concept, the newly-coined term "season-less" has become the new consumer/cultural value and symbol, and is affecting fashion consumption behaviour. As a result, the fashion system proposes, produces and supplies more "season-less" products.

The introduction of the concept "season-less" has brought about change not only in the way people dress but also in the designs of fashion products. New items that were never seen in the past are increasingly worn all year round regardless of the season (Lee and Park 2009: 125). In addition, items have been designed, known as "double items" that can be worn for two consecutive seasons, such as spring-summer or fall-winter. There are season-less items, such as trench coats, jumpers, jackets and blouses that are adjustable to weather changes. These items were purchased and worn throughout all four seasons. Moreover, as the traditional meaning of the four seasons became more ambiguous, in-between fashion, such as "clothes for winter-like spring" or "clothes for summer-like spring," that can be worn for longer periods have become fashion trends. The spring and autumn periods have become very short in the last 20 years and the concept of clothes for spring or fall have disappeared (Fashion Channel 1 November 2008, The Suwon Ilbo 8 March 2012).

**2) "Multi-function":** Another new concept that was introduced in the fashion system to respond to climate change is "Multi-function"; it refers to a product that is changeable according to various purposes, uses and taste through

repeated change and recovery (Na, Kim and Lee 2011: 121). These items are also called “transformer items” as their forms are changeable according to weather changes. The adjustable sleeves of a jacket or blouse, detachable vest and lining of a jumper, and detachable hood of a jacket, are examples of multi-function items. New terms such as “two-way”, “changeable”, “transformable”, and “diversification” have been introduced in the fashion system with the rise of environmental issues; the concept “multi-function” is implied within all such terms.

Some items can protect the human body by actively responding to environmental changes through multi-functional changes (Lee and Park 2009: 133). Lee and Park (2009: 124) explained that multi-function fashion is transformable according to the various types of purposes, uses and functions, and utilizes complex designs. A single design may transform to satisfy a purpose other than the design’s main use and even multi-styling is possible by changing the form of the design according to the clothing method of the wearer. Other examples include reversible design functioning as two designs in one; designs with detachable sleeves, hoods or collars; long trousers that are changeable into shorts; and rain coats that are changeable into a bag.

Recently, a women’s clothing company in Korea increased the proportion of transformer/multi-weather products that can be worn from winter to spring (Fashion Journal 9 February 2012). Head, a fashion brand of Kolon Industries, introduced the successful “transformer jacket,” a down-filled windbreaker that can be changed into five different styles. This product can be worn in various forms, such as a vest (with the sleeves detached), windbreaker, down jacket and inner jacket (MK Business News 15 November 2010).

**3) “Sustainable” and “Green”:** One of the concepts that were introduced during the endeavours to resolve environmental issues such as climate change is the concept of “sustainability,” which is a new paradigm and value for the society in the 21<sup>st</sup> century (Jeon 2011: 449-445). “Sustainability” was first introduced in 1987, in Brundtland Commission’s report titled, “Our Common Future”. This concept is about the development and use of natural resources in a way that brings about the best result not only for the current generation but also to the future generations and the environment (Michelsen and Riechmann 2008: 43-44). Sustainable development, which seeks to improve the quality of life within the environmental limit of the ecosystem, is a development process as well as a goal that equally pursues economic development, societal development and environmental protection, all at the same time (Hwang 2011: 48).

For a long time, the fashion industry was considered as one of the main culprits of environmental pollution. In fact, the fashion industry has been defined as an industry that goes against sustainability due to causing water and air pollution from thread and fabric production, chemical dye treatment of materials and end products, fast changing trends, planned obsolescence, waste landfill and incineration, and dumping waste in third world countries (Khan, Son and Cho 2011: 294-297).

The fashion industry is starting to introduce the concept of sustainable design, but in a perspective that is more focused on its ecological nature rather than sustainability itself; it takes the relationship of natural resources and eco-friendliness into account rather than mainly focusing on environmental resource conservation. Sustainable design is to design for the environment and people; a general concept that takes sustainable relationships among the economy, society, ethics and ecology into consideration (Kim and Lee 2006: 232). The concept “sustainable” is muddled up into numerous terms in the process of actualizing designs. Examples of such terms are as follows: environmentally-friendly design, ecology design, green design, well-being design, eco design, slow design and ecological design.

With the rise of environmental awareness during the 1990s and the 2000s, eco fashion designs that started in the 1970s are going beyond just using natural materials and motives from nature. Since then, eco design has developed into sustainable fashions that seek to reduce carbon emissions during production, distribution and disposal process and

to pursue ethical fashion, such as fair trade (Shin and Hong 2010: 874). Furthermore, fashion companies are establishing an environmentally-friendly supply network based on eco-friendly systems that were introduced with their acceptance of the concept of sustainable management (ISO 24000). In other words, fashion companies are looking for ways to establish an environmentally-friendly supply network that features a sustainable process of product design, production, sale, use, recycling and disposal (Hong and Kim 2011: 1073).

Chang (2010: 154) suggested that designs would progress toward those open to recycling, seeking to use a minimum amount of materials, use innocuous materials, save energy resources, and could be used semi-permanently and produce a minimum amount of waste. Kwan (2011: 39-40) has suggested that fashion design should aim to minimize damage to the environment during the entire process from production to consumption and should move towards improving the functionality, economic feasibility and beauty of the product. Sustainable fashion design, which applies recycling and reusing methods of the existing eco designs, has made it ever more possible to create and develop a variety of styles and products with the development of science and technology. For example, fashion brands that took sustainable fashion design into consideration not only use design in creating products, but also reuse and recycle the same design so that a whole new product is created after the use of the initially created product (Kwan 2011: 39-40).

**4. “The Layered Look”:** As the four seasons started to lose each of their seasonal distinction, it stimulated many changes in clothing method, one of which is the layered look. With the seasons losing their seasonal distinction, consumers are starting to dress according to the weather, rather than the season. As an active response to abnormal weather patterns, Bean Pole, a fashion brand of Cheil Industries, created a task force team in 2010 as an effort to actively deal with erratic weather patterns. The team continues to endeavour in weather management and in developing new designs, such as the layered look and special fabrics, including heat-storing fabric, cooling fabric and ultra light fabric (Fashion Journal, 9 February 2012). Jackets, trench coats, jumpers have become trendy items with the layered look, which is about wearing layers of thin, light-weight clothing. In particular, cardigans, mufflers and boots have gained great popularity (The Dong-A Ilbo 12 December 2007).

## Discussion

Abnormal weather patterns are becoming more evident in Korea, in the form of the four seasons becoming less distinct, a rise in the average temperature, and frequent occurrences of abnormal weather activities. Springs and autumns have become shorter, summers have become longer and winters are not as cold as in the past. One newspaper article (The Dong-A Ilbo 12 December 2007) compared Seoul’s number of days of summer and winter in the 1920s and 1990s, and noticed that the number of days of summer in the 1990s were 16 days longer than that in the 1920s, whereas the number of days of winter in the 1990s were 19 days shorter than in the 1920s. Furthermore, the article predicted that the number of days of summer in the 2090s was expected to be 45 days longer than that in the 1920s, and the number of days of winter in the 2090s to be 63 days shorter than in the 1920s.

In their study of the relationship of the scope of behaviour in connection to the probability of weather forecasts, Lee and Lee (2007: 483) explained that certain decisions are made based on weather forecast data. Khan, Son and Cho (2011: 293-299) described that climate change and abnormal weather patterns have an influence on consumers’ clothing behaviour; that is, climate change and abnormal weather patterns affect how people dress and purchase clothing products. They also have an effect on fashion companies’ production and sale of fashion products, and cause the fashion industry overall to pay more attention to environmental issues. Lee and Park (2009: 124) observed that although the fashion industry was making efforts to develop designs for fashion items that could respond to climate

change, it still faced difficulties in understanding the unpredictable environmental factors and applying them in their business decisions.

Korea's fashion industry has experienced damages for several years due to climate change and erratic weather patterns. As a result, the industry has introduced various measures to respond to climate change. Such measures have brought about changes in fashion items and designs as well as various changes in the development, production and sale of fashion products.

Fashion companies in advanced countries such as the US and Japan have been using the Quick Response (QR) system since 1985 (Chang 1997: 420) as an effort to respond to fast fashion and consumer changes, so that they can produce and sell products following consumer response. Recently, as it became more difficult to predict climate change, "climate change predictions" have become an important variable in the QR system. Unlike the past, fashion companies today have a QR System or a Specialty retailer of Private label Apparel (SPA) system in place so that they can swiftly respond to climate change and consumer demand by completing the entire process from planning to production within one or two weeks (Khan, Son & Cho 2011: 298-299). Fashion companies operate systems that apply actual weather forecasts and utilize the QR system, which determines the production amount after analyzing sales information in real time, for their productions. Moreover, they can adjust the quantity of product orders through systematic weather forecasting system as well as by increasing the spot production rate (Maeil Business News 2007). Through the QR system, fashion companies can adjust the amount of product release as well as the type of items according to the weather (Fashion Journal 2012).

In the process of fashion merchandising, when the planning of a fashion product is completed, it is usually followed by the production stage. The process of planning, production and final consumption can be as short as two weeks or as long as six months. Park and Kim (2004: 5-6) have pointed out that competition in today's fashion industry is shaped by the use of advanced technology and alternative goods, the economy of scale, and the balance of power between suppliers and buyers.

A speedy and precise response toward climate change and unpredictable weather patterns for product planning was recognized as a competitive edge among fashion companies quite long ago; the Dong-A Ilbo (8 November 2001) reported that around 100 fashion companies among those that recorded more than 1 billion won in sales in 2001 were using weather information. The report went on to say that there was competition within the fashion industry in utilizing weather information services, including long-term weather forecast, ever since the heavy snowfall in January of that year. Majima (2008: 502) concluded that the effects of weather on fashion merchandise purchase in the fashion system should be assessed in future research.

Recently, fashion companies utilize the weather forecast in their planning and production to determine product categories, quantities, the period of production and the time of release. Many companies take temperature, precipitation level and the number of days of rainfall into account when adjusting the design, and also in selecting the material, production category and production amount (Jang and Lim 2003: 24, Fashion Journal 2008). K-Weather, a climate consulting firm, explains that "fashion companies adjust the period of product release based on long-term weather forecast and extensive weather information in order to minimize the inventory level", and added that "there are more requests for advice in the winter when companies prepare for the new season" (Fashion Journal 2012).

Climate factors are deemed important in sales management since their effect is significant. In particular, short- and mid-term weather forecasts are used as mandatory information in stock management, sales management and visual merchandising (VMD) management. In the case of VMD management, short-term weather forecasts are used in product display (Fashion Journal 9 February 2012).

## Conclusion

Greenhouse gas emissions and climate change due to global warming have been considered serious issues for a long time. They affect many parts of our society and have brought significant changes in the fashion industry. This study used a qualitative approach and literature review to examine how external environmental factors, such as climate change, affect the fashion system. In order to do so, this study first looked into specific examples in the Korean fashion business to observe how climate change affected the clothing behaviour of fashion consumers through the fashion system and what kind of an effect climate change had regarding the activities of fashion companies.

The fashion system is an important conceptual framework through which the process of fashion can be integrated for explanation. The fashion system consists of organizations and people who are involved in transforming the symbolic meanings that were created through it within certain cultural systems. The fashion system was used as the framework of this study to examine what kind of cultural symbols and values climate change has created in our cultural system, how such symbols and values have been transformed into fashion consuming behaviour, and what kind of changes climate change has brought to the activities of fashion companies.

Climate change has affected our overall lives. With regard to the fashion industry, Korea's four seasons have become less distinctive, and the unpredictable and rapid changes in climate have greatly affected the way people dress but also the production and sale of fashion companies. Growing awareness of climate change led the fashion industry to turn to green/sustainable movements, through which new cultural symbols and values, such as "season-less," "multi-function," and "sustainable/green," were introduced.

The above cultural values and symbols were transformed into fashion products, consumption of fashion products, and production and sale of fashion products. In other words, fashion products that reflect such new values and symbols and new clothing methods, have been introduced. Due to the effect of new symbols and values, fashion companies have transformed their exiting production planning process into a Quick Response (QR) system, which has significantly shortened the period of product planning to production. In the QR system, short- and long-term weather forecasts, information on change, and flexibility are considered as important factors.

Lastly, the growing awareness of environmental issues has led the overall fashion industry to expand its application of the concept of sustainable development. The fashion industry is trying to take sustainable development into account in the process of product design, production, distribution, consumption and disposal as well as in company management.

This study looked into the process of how external environmental factors, such as climate change, affect fashion consumers and the activities of fashion companies. However, as the scope of this study is limited to the Korean market, there are limits in generalizing the result of this study to the overall fashion system. Moreover, the discussion of the fashion system can differ according to the level of analysis, depending on whether the study looks at the macro-perspective or micro-perspective, plus the driving force of the fashion market which this study did not delve into. Therefore, further research can be recommended to examine the effects of external environmental changes, such as climate change, on the fashion system in a macro and micro perspective, as well as wider studies that are not limited to the domestic Korean market but are inclusive, applying cases from both the Korean and non-Korean markets.



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