



## Redevelop and create new value for second-hand clothing

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### Abstract

In a materially rich modern world, the diversity of clothing styles, the low cost, and the excessive consumption concept resulted in the reduced service life of clothing, loss of value, and eventually an endless loop of manufacturing, buying, and discarding, which is a waste of resources and materials and a burden of pollution to the living environment. Therefore, encouraging people to redefine second-hand clothes, to look at clothes from a new perspective, and to give them a new fashion value has become an urgent action to be done. For this reason, the author carried out this study. By reviewing relevant literature and in-depth data research on second-hand clothes, the author conducted a questionnaire survey on second-hand clothes, found the problems, obtained people's needs through the survey, and collected and analyzed the current recycling methods of used clothes. This study aims to use innovation theory and innovation transformation model to redevelop and design old clothes, realize reuse and value, and design effective solutions to solve the problem of second-hand clothes. This design helps people look at second-hand clothing from a new perspective, expand people's way of thinking, influence their way of life, and increase the attention to sustainable development.

**Keywords:** *Second-hand clothes, cyclic utilization, redesign, sustainable fashion, innovation transformation, circular fashion*

### 1. Introduction

The origin and concept of second-hand clothes took place in Europe in the Middle Ages. Because of the scarcity of materials in that era, the cost of producing new clothes was high, thus only a small number of people could buy new clothes at high prices. Besides, the process of making new clothes in that era was more complicated, and the service was customized according to the size of each person. The quality and service life of these clothes were very long, so in many cases, clothes could be used by multiple people and worn for many years. In this context, there were a lot of transactions about second-hand clothes in the market (Ethitude, 2017). After the 19<sup>th</sup> century, with the progress and development of the textile industry, the second-hand clothing market and trade gradually declined. Due to the update in technology, new clothes have become cheaper and easier to obtain, resulting in many clothes are left unused or discarded without being fully used. The fashion industry has been influenced by the concept of rapid consumption, with people buying and discarding clothes faster and faster, and an increasing number of second-hand clothes languishing in wardrobes.

With the development and progress of the textile industry, fashion has changed rapidly, and with time, people's understanding of second-hand clothes has also changed. Second-hand clothes are given different values and concepts, one is fashionable and personal while the other is cheap and unhygienic (Cengage, 2020). "The problem of what to do with clothes made from synthetic chemicals, and clothes that have been thrown away in your wardrobe, is tricky. Modern clothes are not only beautiful and fashionable but also bring unexpected harm to people..." (Shen, 2010). As for second-hand clothes, how should we solve the problem of disposal and recycling? Is there a better way to change the traditional way of doing it? Everyone has different ideas and ways of handling second-hand clothes, changing people's negative views and consumption ideas. Whether it is manufacturing, selling, using, or recycling, we all need better ways to solve the problem of second-hand clothes.

The book *From Cradle to Cradle: Remaking the Way, We Make Things* describes the key concept of design as eliminating waste, ensuring that all product components participate in the nutritional cycle of technology or biology. The complete elimination of waste is the core concept of this ecosystem-inspired



design approach, which is also the focus of sustainable clothing development today (Braungart & William, 2002).

However, not everyone likes second-hand clothes. Most people are biased. The recycling and reuse of second-hand clothes are generally considered to be environmentally friendly and green, but at present, there are very few people involved in the recycling and utilization of second-hand clothes, and the relevant platforms and industries are also few. For the author, rather than exploring the simple concept of second-hand clothes, it is about getting more people to accept the idea of sustainable fashion (Yau, 2018). Using second-hand clothes to develop new use-value and generate more influence is the focus of this study. Genuinely sustainable fashion design is not about recycling all second-hand clothes; using second-hand clothes to develop new exciting ideas and ways of transforming them. At the same time, it is essential to realize the functional value of second-hand clothes again.

This study focuses on the reuse of second-hand clothes, the analysis of its data and function, and through the second-hand clothing “sustainable fashion, recycling, redesign, innovation transformation, development of material research theory and concept,” to understand the historical background of second-hand clothes, treatment, reuse ways and the characteristics of materials. This approach is mainly through the design of the transformation of the way to influence people’s ideas and cognition of second-hand clothing; get more people involved in the reuse of second-hand clothes in a fun way. In this study, the author used design methods to show how to reuse and redesign second-hand clothes and make use of new transformation methods, show interesting modifications and ideas to continue the reuse value of second-hand clothes; Rational use of second-hand clothing resources, pass and advocate a more healthy attitude towards life, and guide the human society to adopt a more healthy and rational way of life. Simultaneously, it has important practical significance and long-term effect for a human to realize sustainable development.

## 1.1. Background

### 1.1.1 Second-hand clothes and contemporary trends

Second-hand clothes have been an essential way for people to get clothes since the beginning. With the gradual industrialization and large-scale production of the clothing industry, clothing has been continuously copied. Due to the development of economies of scale, the price of clothing has become low. Simultaneously, the improvement of material and products makes consumers pursue more trends and fashion, stimulating more consumers to buy more clothes, thus accelerating the frequency of wardrobe clothing updates. The clothing life cycle is getting shorter and shorter, and the underutilized clothes will soon become old clothes, long time unused in the closet or forgotten. Many old clothes are treated as rubbish, resulting in a waste of resources.

### 1.1.2 Recycling of used textiles and second-hand clothing

Recycling textiles and second-hand clothing is the recycling of old clothes and materials. The main way to recycle is through donation, collection, sorting, and processing to make new materials and objects; realizing the recycling value of textiles and old clothes again.

The primary way of second-hand clothing recycling:

#### 1. Form of voluntary donation

The waste clothes collected from the donation are mainly used to support the low and disaster-stricken areas. Most people accept and agree with the recycling model and are happy to participate. However, with the improvement of people’s living standards, there are fewer places to receive donations. Fewer and fewer clothes will be recycled from the donations.

#### 2. Buy recycled

Purchasing and recycling is a common form of clothing recycling. Generally, the purchase and recycling price is meager. The price is determined according to the colors and materials of the clothes, which is usually calculated by weighing. However, it is difficult for ordinary families to accumulate enough clothes in a short period, thus requiring businesses to recycle them at home. However, because the recycling price is so low for ordinary families and individuals, the income from recycling is not enough to motivate them, leading many families to throw away their clothes.



### 3. Recycle bin

In many cities, recycling companies have set up recycling bins in apartment buildings for recycling clothes. People can put their clothes in the bins at any time. Recycling companies come regularly. This way dramatically facilitates people's disposal of waste clothing, which is well received. Nevertheless, at the moment, neither penetration nor participation is high.

#### 1.1.3 Reuse of textiles and second-hand clothing

The reuse of second-hand clothes has become a new life fashion and trend. People buy or use second-hand clothes to protect the environment while maintaining a connection with the past. The realization of clothing reuse will effectively alleviate the pressure on the environment.

The main channel for realizing the reuse of second-hand clothing

##### 1. Donated for reuse

Donating and reusing is a popular way of reusing. The donated clothes can continue to give full play to their wearing value after finishing, disinfecting, and other procedures, which are the simplest way of reusing. However, only 80 percent of the new and above clothing can meet the necessary conditions for donation. The stain and damage degree of the clothing are also factors affecting whether the donation can be made. Thus, the amount of clothing that people can donate and reuse will be minimal.

##### 2. Second-hand transactions

Second-hand clothing trading is now mainly carried out through second-hand clothing trading market, second-hand trading website, or APP. Second-hand clothing is not affected by the added value of brands, and its price is relatively low, which caters to the consumption psychology of some consumers who value low prices. However, at present, the high acceptance of the second-hand clothing trade is concentrated in high-end brands. However, most consumers are reluctant to buy second-hand clothing due to hygiene and clothing sources. With the popularity of online sales platforms in recent years, some people choose to sell clothes that are not suitable for them but are still of high value online. Although the clothes are not sterilized according to strict procedures, since most of the clothes are sold by sellers, the source is relatively reliable and acceptable.

##### 3. Material treatment and reuse

For the clothes that have no value to wear, the primary method at present is to reuse them by processing them into materials. According to the material value of clothes, there are usually two ways to deal with them. The first is if the material has the value of recycling, can be recycled into textiles, complete waste textiles from the fabric-fiber-closed-circuit ring-type fabric recycling process, mainly for cotton, wool, and polyester; The other category is textiles that do not have the technology of recycling into recycled textiles, which can be reprocessed into roadbed cloth, non-woven cloth, mop, dishcloth and so on (Hong, Xiongying, & Xuemei, 2013). At present, the market price of the recycled fabric is slightly higher than raw fabric. The reason is that material recycling requires higher disposal costs. Material recycling is the main business of professional recycling companies, and it is also the most potent part of garment recycling.

##### 4. Second-hand clothing export

Some recycling enterprises in many developed countries export second-hand clothing to Africa, Southeast Asia, and other regions after finishing. The added value of the exported waste clothing is zero, so the price is low. The export of waste clothing can quickly relieve the environmental pressure brought by the waste clothing in developed countries. Still, in the long run, this is undoubtedly a loss of reusable resources. The export of oversized waste clothing is likely to cause the abnormal development of the garment foreign trade economy.

In general, the reuse of second-hand clothes is mainly in two forms; the first is to wear the value of second-hand clothes after the treatment of re-use and the second is to wear the value of clothing material reuse. Realizing the reuse of clothing is part of the circular economy.

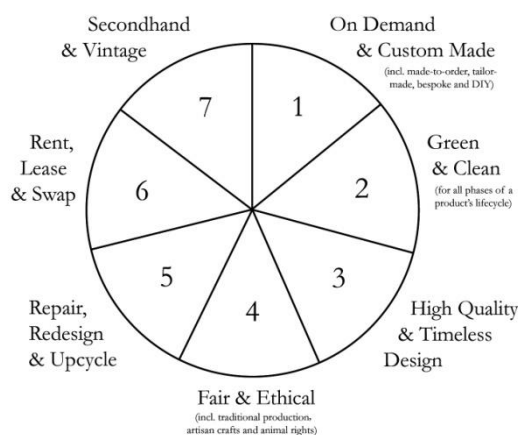


#### 1.1.4 Sustainable fashion

With the intensification of the earth's greenhouse effect, every industry is starting to pay attention to sustainability. The clothing and fashion industry is one of the most polluting, with more than 70% of second-hand clothing being discarded and ending up in landfills.

Sustainable fashion requires innovation and improvement at every stage of the product life cycle. The design, production, sales, recycling, and reuse of products are carried out with the concept of sustainability. The whole process follows the concept of environmental protection and green recycling, with no impact on the environment and ecology to the maximum extent (Green Strategy, 2019a). However, because the technology is immature, sustainable fashion is expensive. The concept of sustainable development is not well-publicized. Publicity is essential, and many people do not know what is sustainable fashion.

Sustainable fashion is a sustainable way to produce and manufacture the various products of the fashion industry, which also requires consumers to participate in the use and recycling of products sustainably. In 2019, Anna Brismar presented seven forms of sustainable fashion production and consumption, as in Figure 1 below (Green Strategy, 2019a).



**Figure 1** Seven forms of sustainable fashion production and consumption

**Source:** Green Strategy (Brismar, 2019)

For a sustainable fashion, each part of the picture above should be applied to the entire life cycle of each clothing product. Clothing products need to be produced and customized according to the needs of the market (Number 1). During the design process, the sustainability of the design and materials should be considered (Number 2). The manufacturers should choose green materials and methods (Number 3), pay attention to ethical and fair principles (Number 4), and provide post-maintenance and redesign of clothing products (Number 5). When the value of a garment product ends in the hands of the first consumer, it should realize the value of the garment product again through second-hand transactions or other ways to extend its use time (Numbers 6 and 7). After the clothing product is no longer of use-value, it should be recycled and become the material for making new clothes or other secondary textile products again through recycling. In many cases, consumers should consider purchasing sustainable clothing or second-hand clothing, rather than purchasing clothing products made entirely from new materials.

The seven forms of sustainable fashion require both producers and consumers of clothing products to carry out all stages in a sustainable manner. Of course, every producer and consumer can not participate in a fully sustainable concept, and people can participate in different parts of sustainable fashion in different ways. For example, the consumers go to second-hand clothing websites to participate in clothing exchange, purchase or participate in novel clothing rental forms. Clothing enterprises need to innovate production and sales with the sustainable concept and make innovations and values in material selection, production process, sales link, and after-sale recycling service in the whole life cycle of clothing products. Clothing enterprises



can also focus on a certain area of sustainable fashion. For instance, H&M has established a professional collection and recycling platform to sell sustainable product series or like the professional international recycling company I: CO who has a mature and sound recovery and reuse system.

Sustainable fashion is a very important link for the future development of clothing, which requires every producer and consumer to participate in sustainable development. Make the fashion industry better by establishing sustainable production, sales, use, and recycling models.

#### 1.1.5 Second-hand clothing for the recycling economy

Now everyone is talking about the circular economy. The concept of second-hand clothes recycling is to improve the recycling and recycling of textiles. It requires us to improve the current situation of second-hand clothes recycling and utilization in the following ways:

1) About recycling and reuse. For a variety of materials textile clothing, if the material is better, it can be processed into secondary products. However, if the material is poor, it can be eliminated. Not all old clothes are suitable for reuse, which requires the producers to consider the choice of clothing materials and the sustainability of the textile process, for example, choosing a single sustainable material and high-quality silk thread and accessories.

2) Reuse recycled secondary textile materials. In garment production and manufacturing, single material textile recycled raw materials are used for production and manufacturing and can carry on many trades exchange and cooperation, enhancing the secondary textile material recovery rate and the quality.

3) The extension of the value chain. The textile industry has a long value chain, which hinders the communication and cooperation of various links. Therefore, it is necessary to strengthen the communication and cooperation between the buyers, suppliers, and consumers.

4) The concept of innovation. The development of the textile industry requires more technological innovation and the development of sustainable materials to realize new business models and values.

5) Explore new models. For example, the design of the system suitable for rapid recycling and sorting, the new clothing use mode, and the efficient personalized customization service.

#### 1.1.6 Facts and figures on second-hand clothing recycling



**Figure 2** Recycled facts and data survey

Source: The Balance 2019 (Ellen Lindner, 2019)

According to statistics, an average person owns 127 pieces of clothing, but 40% of them are left unused and unused in the wardrobe, and the average life of clothing reaches 5.4 years, which leads to a waste of resources (PLATE, 2015).

On average, people buy more than 60% of clothes every year and only wear less than half of them for use. They are left idle for a long time and eventually discarded, which causes a lot of garbage pollution (Greenpeace, 2016).





Those who produce and discard second-hand clothes are mainly consumers of the clothes. Only 15% of old clothes are recycled and utilized, and 75% of unused clothes in the production and sales process are recycled and reused by manufacturers (CBI, 2020).

According to statistics, the damage and impact of a family on the environment in a year are equivalent to the water needed for 1,000 baths and the carbon emissions of a car traveling 6,000 kilometers. If you can prolong the service life of clothes by 3 months, you can reduce waste emissions by more than 10% (WRAP, 2012).

Besides, results from the survey reported that more than 30 million tons of waste clothing are produced in the United States every year, but the recycling rate is less than 10%. About 5% of the waste clothing is converted into energy through combustion, while the remaining 80% or more are buried in landfill sites (Environmental Protection Agency (EPA), 2016). The cost of landfill disposal is \$55.36/ton (Environmental Research & Education Foundation (EREF), 2019). It takes 20 to 200 years for these landfill waste clothes to be decomposed and disappears according to different materials (Close the Loop, 2019).

Recycling only about 10% of used clothes each year can reduce the waste emissions of 130 cars on the street (EPA, 2016).

Statistics from the Association of Used Materials and Recycling Textiles showed that more than 90% of used clothing and textiles can be recycled and reused, processed into a variety of secondary materials and products, while only about 5% can not be reused due to pollution and other problems. (SMART, 2020).

These data and facts show that the recycling and reuse of second-hand clothing have great value and significance. The recycling and reuse of old clothes can realize the economic value and reduce the waste of resources, which can enable the fashion industry to develop in a sustainable, recyclable, and healthy mode. Let unused clothes in people's wardrobes and discarded clothes in a new form to realize value and life.

## 2. Objectives

1. To study the reuse value of second-hand clothes further, make more idle clothes being realized the new value in new forms through redesign and transformation, make more people understand and participate in the reuse of old clothes interestingly, and find a home for people's unused old clothes and put unused old clothes to use in another form.

2. To design the clothing transformation that influences people's inherent impression of second-hand clothing to influence people's way of pursuing fashion and achieve sustainable clothing development.

## 3. Methods and Materials

The author investigated people's opinions towards recycling second-hand clothes using an online questionnaire. The data were analyzed based on the <https://www.wjx.cn/jq/99545083.aspx>. Then, the problem solving was analyzed to find the appropriate method for adding up the value of the second-hand clothes.

According to the investigation, information, and data through the development of the reuse value of second-hand clothes, the author reused and designed second-hand clothes in the next step. Combined with the common types of second-hand clothes, a new transformation scheme and value development for second-hand clothes were designed. Through new ways, old clothes are given new life and value from the conceptual design to the development and utilization of new products, which is a new way to solve the problem of second-hand clothes.

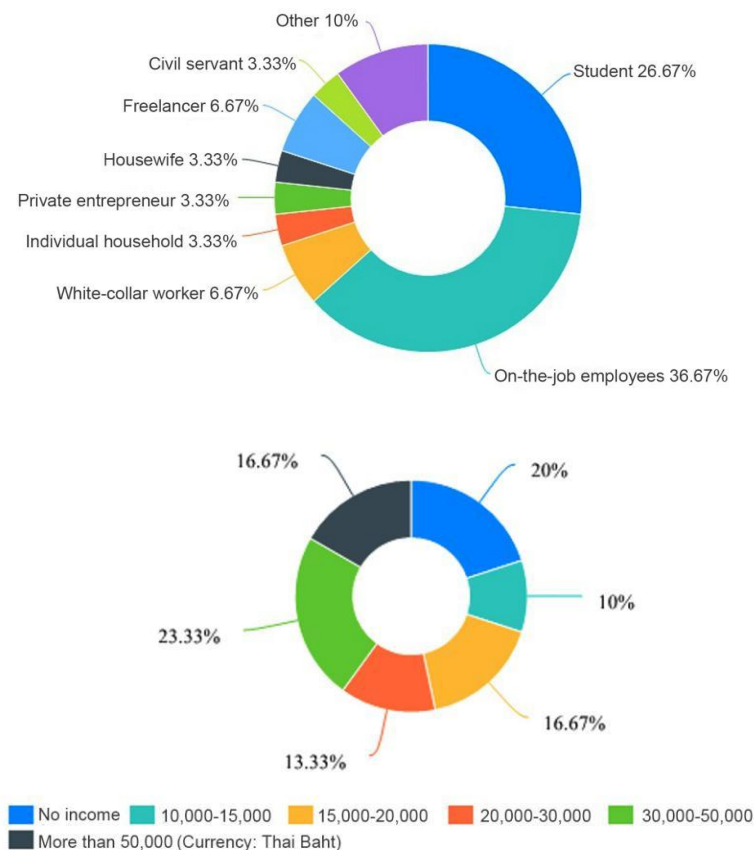
## 4. Results and Discussion

This research topic originated from people's disposal of idle clothes in daily life. It was found that people change and buy clothes more and more quickly, which leads to a large number of idle clothes. Most clothes are stored in the wardrobe for a long time or are discarded, resulting in a waste of resources. Therefore, through the investigation of the materials related to second-hand clothing, the author found that it is necessary to improve people's impression of second-hand clothing and re-create and design the new value of idle clothing. Through the relevant data investigation and the form of a questionnaire, it was found that the reuse of second-hand clothes needs to solve the problem of second-hand clothes through design and transformation.



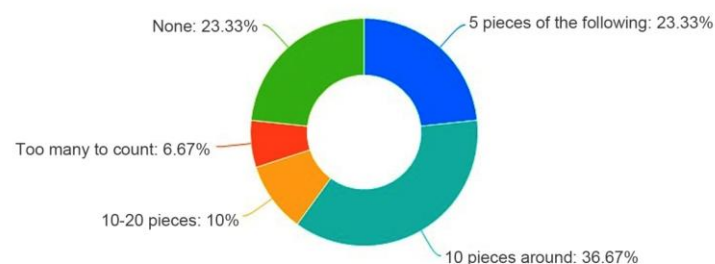
#### 4.1 Research and analysis of questionnaires

To observe and understand people's actual treatment of second-hand clothes and different opinions, the author published a second-hand clothing questionnaire on the Internet. Through the collection and analysis of the questionnaire method, 27 questions related to second-hand clothes were included. More than 200 responses from different populations were collected as the sample group. The questionnaire showed different occupational structures, age structure, income structure of the diversity of characteristics (Figure 3), indicating that the questionnaire can truly reflect different people treat the actual situation of second-hand clothes.



**Figure 3** The occupation distribution and income of the participants in the questionnaire

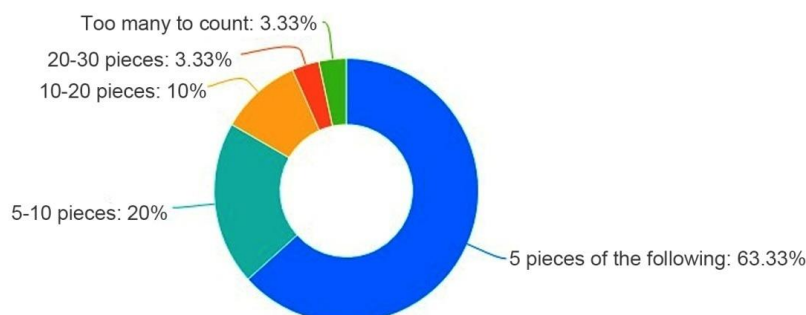
The questionnaire shows that, except for 23.33% of respondents with no idle clothes, other respondents have more or less unworn clothes (Figure 4). Thus, it can be seen that idle clothes have flooded people's closets, causing a waste of resources.



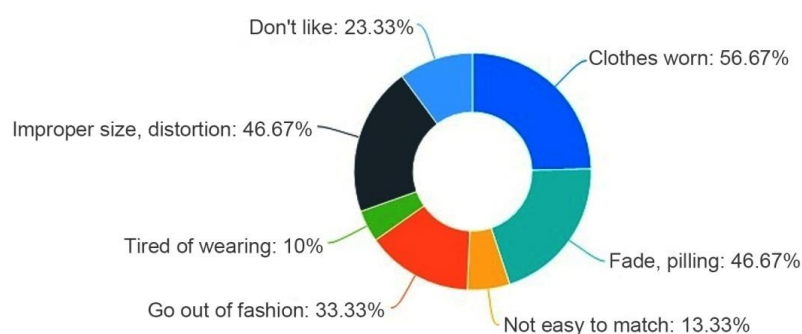
**Figure 4** A survey of the number of unused clothes in your closet



As for the number of clothes, people eliminate each year (Figure 5), the questionnaire shows that 63.33% of the respondents eliminate about five clothes whereas 20% eliminate about ten clothes. Eliminations are mainly because of the damage of clothes, fading, pilling, wrong size, deformation, and other reasons. Some surveyors also said it is out of date and does not like it (Figure 6).



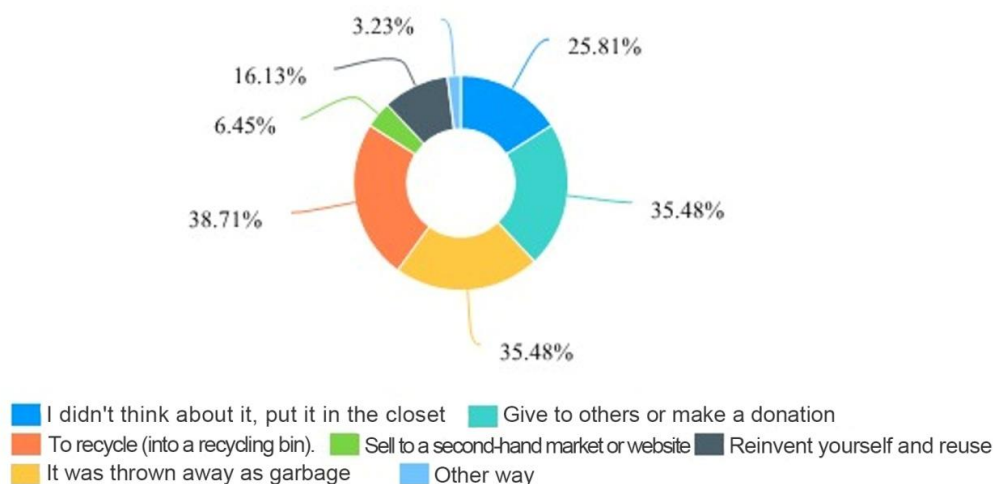
**Figure 5** A survey of how many clothes are eliminated each year



**Figure 6** For what reason do people discard clothes

So what do people do with their spare clothes (Figure 7)? 25.81% of the respondents put idle clothes in their wardrobes without disposing of them. 35.48% of the respondents directly throw the idle clothes away as garbage. Some of them donate and put them in the recycling box. Still, only 16.13% of the respondents reuse and transform the clothes. Knowing the environmental hazards caused by the increase of second-hand clothes has not been popularized on a large scale. Many old clothes are transported to the landfill site, releasing toxic substances and aggravating the burden on the environment. In particular, the chemical fiber in old clothes cannot be degraded even after several hundred years, causing great harm to the environment. What is worrying is that the level of clothing renewal has increased exponentially, and the number of old clothes is huge. Questionnaire results in Figure 7 show that only 6.45% of people put their spare clothing on sale at second-hand clothing markets or websites. Many visible respondents to the concept of second-hand clothing market are not very clear, almost only a few people modify their spare clothing, some merely as a linen cloth, mop and so on the reuse of low stage. In the past, the way of donation and charity was the primary way to solve second-hand clothing. However, it was the wrong concept of the reuse of second-hand clothing. According to international data, donations only account for 15% of second-hand clothing.





**Figure 7** A survey of how people dispose of unused clothing

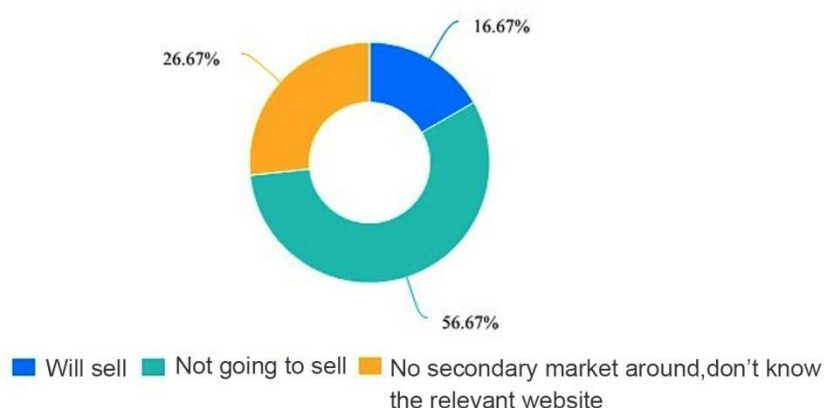
Many factors cause the environmental protection problem brought by clothing consumption.

1) Impulse consumption is an important cause of overbuying (Figure 8). According to the survey, most respondents will buy clothes on impulse, and the direct impact of impulse consumption is the unnecessary possession of clothing resources. 46.67% of the respondents made impulse purchases because clothes were fashionable and cheap. The improvement of the material standard of living provides the material basis for impulsive consumers. At the same time, fashion, fashion, and eye-catching become a great incentive, which on the other hand shows that the existence and change of human aesthetics is an inevitable factor for excessive clothing consumption. Sales promotion was another reason for impulse buying, with 40% saying they would be attracted to such activities.



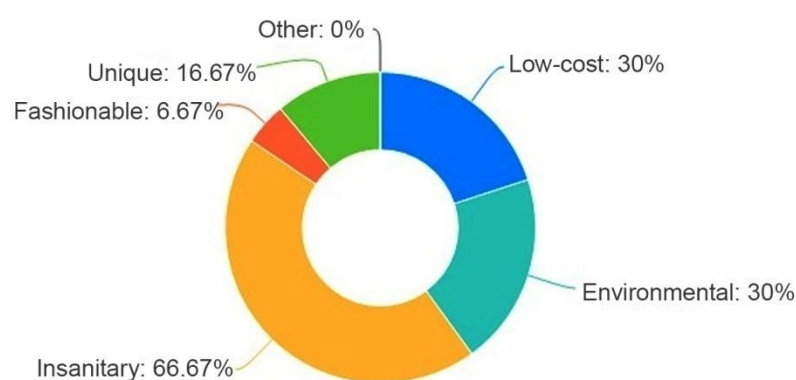
**Figure 8** A survey of how people dispose of unused clothing

2) People's unfriendly attitude towards second-hand clothes is another reason leading to excessive consumption of clothes (Figure 9). For example, according to the survey, 56.67% of the respondents would not choose to sell their idle clothes at the "second-hand markets"; 26.67% would choose to sell their idle clothes at the second-hand markets but they do not know where the second-hand market is; while only 16.67% would choose to sell their idle clothes at the second-hand markets.

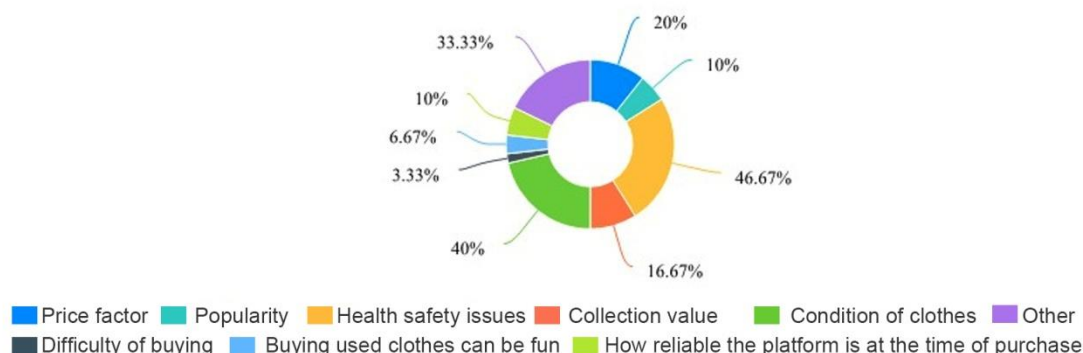


**Figure 9** Questionnaire survey on whether to put idle clothes in the second-hand market for sale

Most people do not trade their idle clothes at the second-hand markets. They are very unlikely to buy second-hand clothes because people perceive second-hand clothes as constrained. 30% of the respondents think second-hand clothes are a symbol of cheapness, and a whopping 66.67 % think second-hand clothes have a hygiene problem (Figure 10). Most people do not choose to buy second-hand clothes or second-hand clothes modified products because of the traditional concept of second-hand clothes. Therefore, the author conducted a survey on the factors to consider when buying second-hand clothes (Figure 11). 46.47% of the respondents focused on clothes' hygiene whereas 40% considered the degree of the clothes being old and new, while price and popularity were secondary factors. This finding shows that many people have not yet discovered the value and pleasure of second-hand clothes. Many countries and regions do not make fair use of second-hand clothing, resulting in the accumulation and waste of resources that demonstrate people's weak awareness of environmental protection and the concept of sustainable fashion, which also causes a series of environmental protection problems in the process of clothing consumption.



**Figure 10** Survey on the impression and understanding of second-hand once



**Figure 11** A survey of factors to consider when buying used clothing

3) Gender differences, regional differences, and occupational differences are also factors affecting consumption. The analysis showed that women buy new clothes more often than men. The development of different cities and the degree of fashion also affect people's consumption habits. Different occupations also determine people's different consumption concepts. Many people will buy clothes they like when they see them, leading to an increase in the frequency of purchase and a faster pace of change of clothes.

#### 4.1.1 Analysis and summary of the results

By studying second-hand clothes' relevant information, the author designed the questionnaire survey content about second-hand clothes. After issuing the questionnaire on the Internet, hundreds of questionnaires were collected over some time. Through the analysis and research of the questionnaire, recycling and reuse of second-hand clothes are generally considered to be environmentally friendly and green, but at present, very few people are involved in the recycling and reuse of second-hand clothes, and there are few relevant platforms and services. Most people's impression of second-hand clothes is still stuck in the traditional idea that second-hand clothes are a symbol of poverty and cheapness. The rejection of second-hand clothes is mainly due to concerns about the origin and hygiene of second-hand clothes. The improvement of living standards and the pursuit of fast fashion have led to consumers buying clothes more frequently, resulting in the under-utilized clothes quickly become old clothes, which are ignored or abandoned by consumers. Many idle clothes cause a waste of resources, and only a few people will consider the reuse and transformation of idle clothes.

Given the present study, the author found that people face with more and more old clothes. Many countries and companies are beginning to use old clothes for the development of a variety of ways and recycle. However, as a result of old clothes modification technology that is not yet mature, some difficulties in the process of clothing recycling have been found. So, the author used the SWOT analysis (Figure 12).



<b>Strength</b> 1. Reduce solid waste 2. Relieve environmental pressure 3. Realize resource recycling	<b>Weakness</b> 1. The enterprise of garment reuse has not formed the scale, and is characterized by low, small and scattered 2. The immaturity of technology limits the recycling use of old clothes 3. High technical cost and lack of financial support
<b>Opportunity</b> 1. Enterprises and the government begin to pay attention to the environmental protection of the garment industry 2. Famous designers have recycled and transformed the old clothes, attracting many fans' attention to the old clothes 3. Many fans are eager to imitate the transformation of old clothes made by fashionistas and bloggers	<b>Threat</b> 1. Cultural differences cause people to reject old clothes 2. People lack awareness of environmental protection 3. Some enterprises are profit-oriented and fail to fulfill their responsibilities to the society

**Figure 12** SWOT Analysis of Second Hand Clothing Reuse

#### 4.2 Conceptual design for second-hand clothes

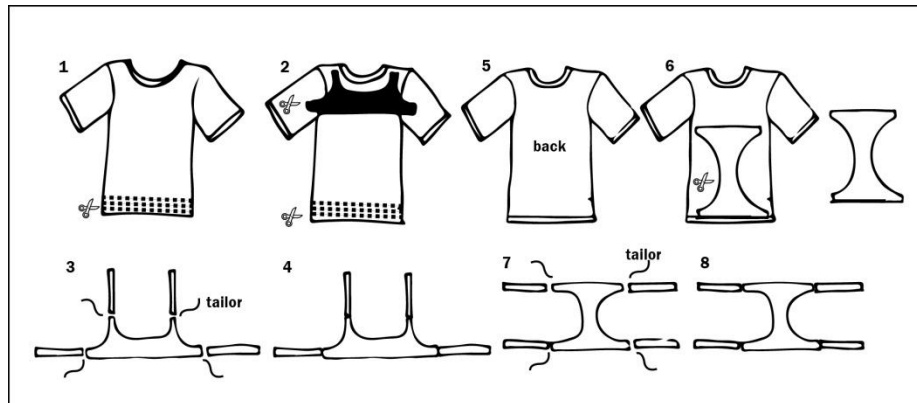
With the current situation, the author believes that the problems existing in second-hand clothing can be solved by redeveloping second-hand clothing and creating new values. We should advocate changing the inherent concept and cognition of second-hand clothes, transforming second-hand clothes in a new way, to reduce the waste of clothes. Assuming that old clothes can be reasonably reused and create value, it can bring good economic and social benefits and realize the reuse of resources and form a new fashion atmosphere of sustainable development.

For the problem of second-hand clothes, the author tried different ways. The first is to reuse the materials of old clothes, which are processed into some low-level materials. For example, some enterprises process old clothes into carpets, heat insulation materials, or building materials, which have low participation and limitations. Another way is to turn old clothes into new textiles and reprocess them into new clothes, but this way needs a lot of financial support and high technology. Therefore, the author focused on reusing idle clothes to create new values. The initial idea is to transform and redesign old clothes to realize the value of wearing them again so that old clothes can get a new life and waste can be reduced. Through some transformation methods, old clothes can also be transformed into new high-grade clothes.

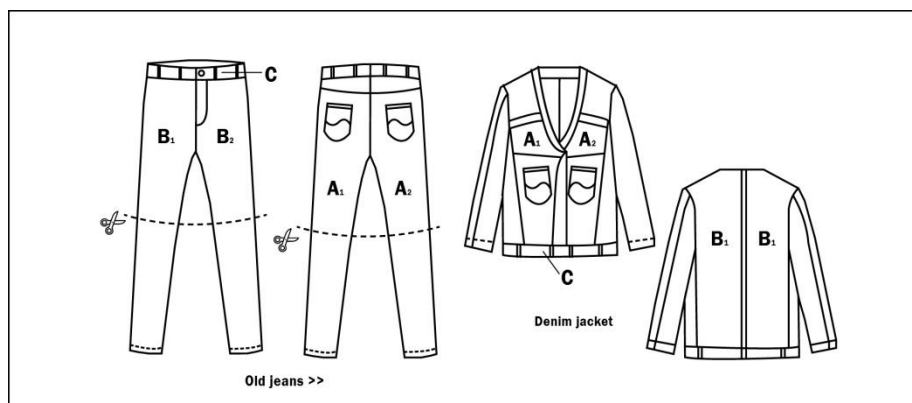
The author began the sketch design of the second-hand clothing transformation and tried different transformation design schemes for the characteristics and problems of the old clothes (Figures 13-22). The first concept design was to turn an old T-shirt into underwear, solving some of the problems of clothing size and style (Figure 13). The second concept design was to transform old jeans into denim jackets to add a new form to old clothes (Figure 14). The third concept design was to add more interest and possibility to the clothes (Figure 15). The fourth concept design was to add comfort and functionality to pants (Figure 16). The fifth concept design was to design new fashion clothes with multiple storage spaces and functions by transforming several unused clothes (Figure 17). The sixth concept design was to design a new fashion dress by cutting and re-collaging old trousers of different materials and colors (Figure 18). The seventh concept design was to transform old clothes into functional clothes (Figure 19). Concept 8 was a redesign and transformation of multiple pieces of clothing into new fashion styles (Figure 20). The ninth concept design was a multi-dimensional and multi-functional transformation of clothing by turning different clothes into a versatile clothing accessory (Figure 21). The tenth concept design was to make clothes more interesting and functional through a transformation; extra storage and a sense of style were added to your clothes (Figures



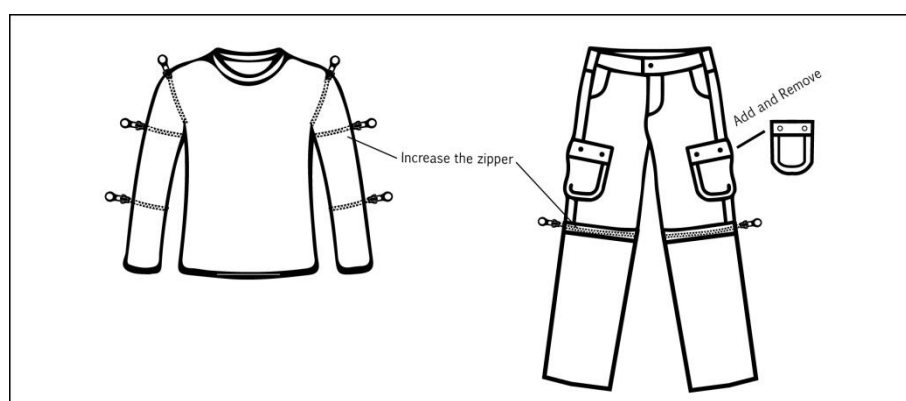
22). The overall concept design was to develop and design the new value of the old clothes and transform the old clothes into new fashion clothes through remolding and redesign.



**Figure 13** Old T-shirts turned into lingerie

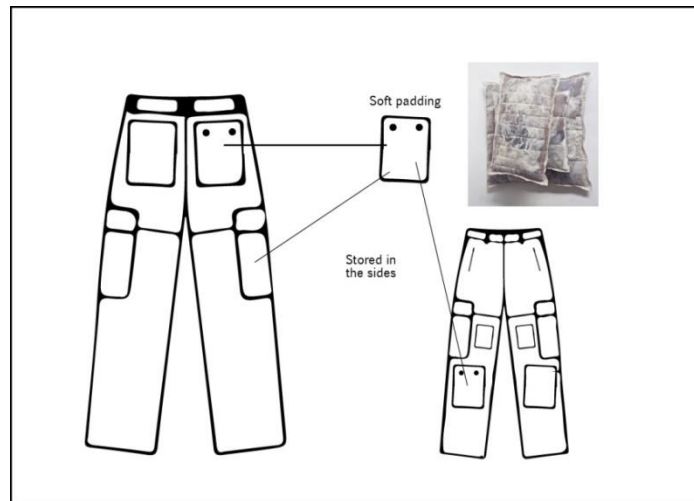


**Figure 14** Transform jeans into a new denim outfit

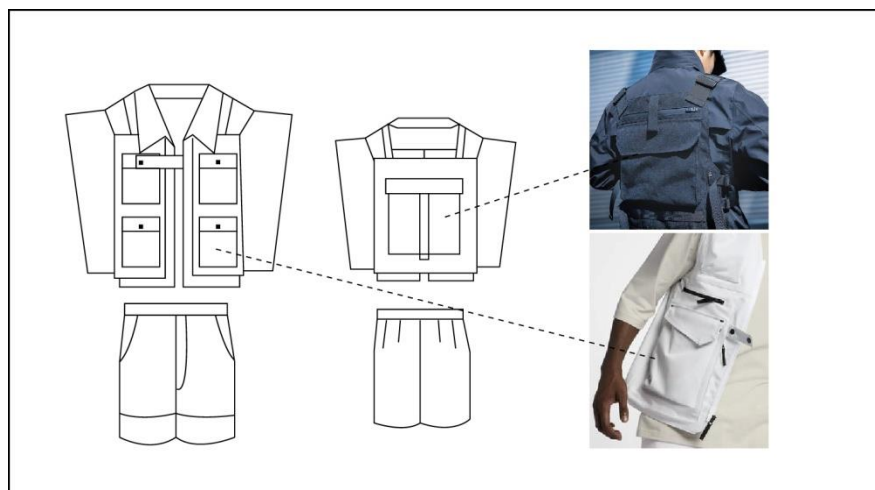


**Figure 15** Increase the possibility of clothes more, adapt to a variety of needs of transformation

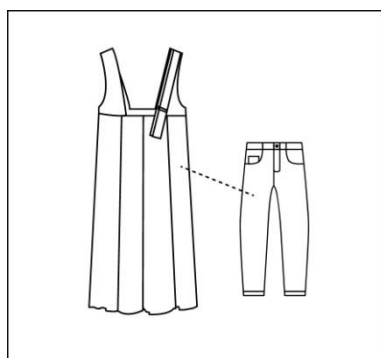




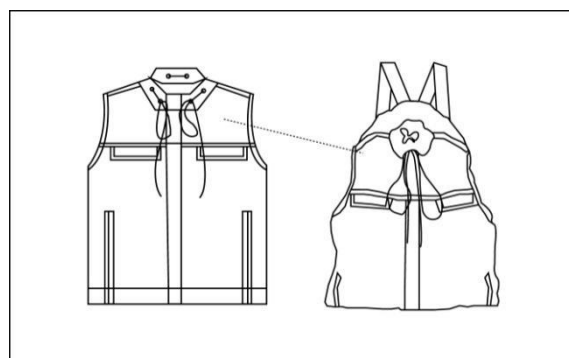
**Figure 16** Add function to clothes (Add a comfortable cushion to the pants to add interest and comfort)



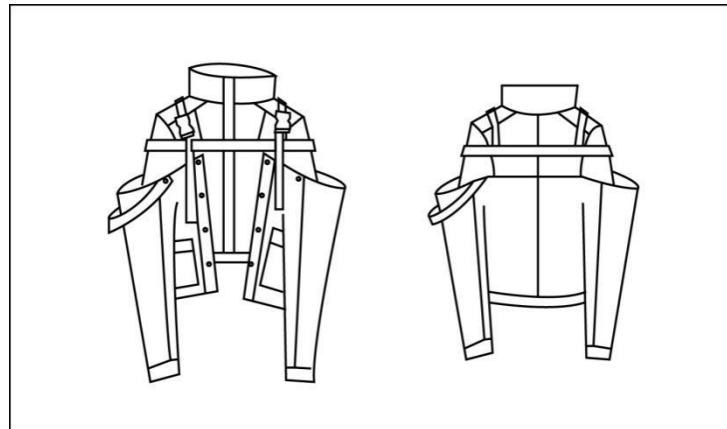
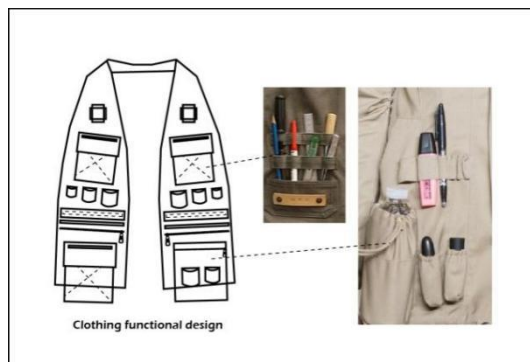
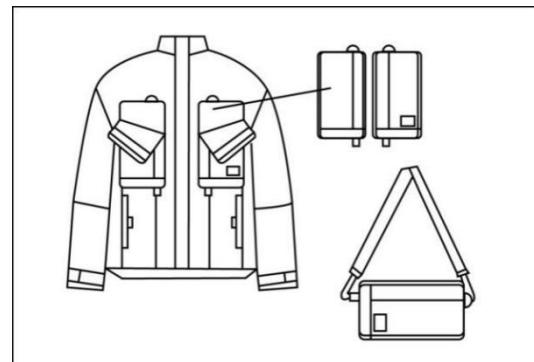
**Figure 17** Add more storage space and function to clothes



**Figure 18** Make a dress out of old trousers



**Figure 19** Function design of clothes and bags

**Figure 20** The transformation of fashionable clothes**Figure 21** Multiple storage spaces for clothing remodeling**Figure 22** Clothing functional design

#### 4.2.1 Concept development and designing scheme

The final solution was to establish a sustainable clothing brand, collect high-quality idle clothes or old clothes, redesign and transform these clothes after processing, and turn them into new fashion products for sale on the online platform to realize the wearing value of the clothes again and reduce waste. According to the different clothing characteristics (such as material, color, style, and function), through different methods and techniques for design and transformation, spare clothing was given new life and value, more sense of design, fashion sense, and functional. A new fashion style and interesting transformation make spare clothes interesting, and through the display sales platform and brand image, second-hand clothes can create a new circular fashion and trend economy. In this way, more people pay attention to the reuse of second-hand clothes, and as a result, they buy fewer new clothes and choose to buy recycled fashion clothes.

The design and transformation methods are as follows:

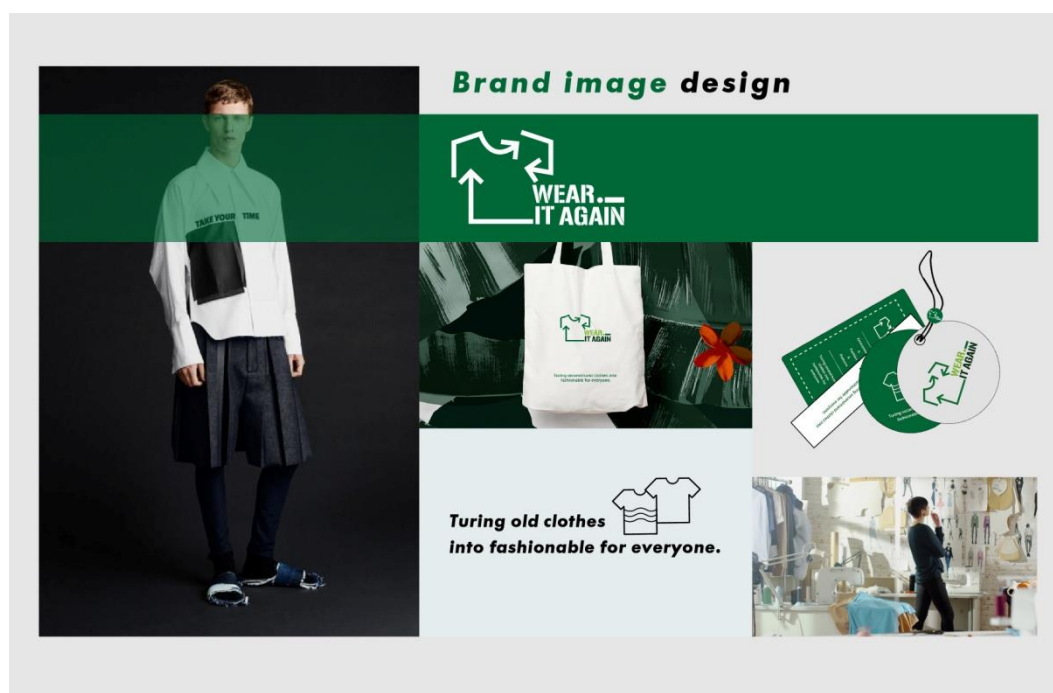
- Redesign of fabric. Adding new elements and embellishments to clothes or adding some exciting patterns or shiny materials; Give clothes new added value and artistic characteristics
- The redesign of the style. Altering the garment style (for example, sleeve and collar), transforming or adding craftsmanship, or redesigning the garment into a new one
- The redesign of color. Dying and other secondary processes of clothes can make old clothes change color.
- Deconstruct and reorganize. The original clothing was decomposed, dismantled, re-assembled, and rebuilt to form a new design so the idle clothing's style and function of the transformation can be realized.
- Add functionality to clothes. Give and develop new functions to clothes and make them worthwhile



- Degenerated design. Design and transform idle clothes into a variety of interesting articles for daily use

#### 4.2.2 Final design: Brand image design

Brand image design is from the perspective of the reuse of second-hand clothes. Lines and arrows are used to outline the concept of clothing and circulation. The whole logo expresses the concept and value of the brand with green color to draw people's attention to the value of second-hand clothes. The brand's name is "Wear It Again" (Figure 23).



**Figure 23** Brand logo "Wear It Again" and image design

Regarding the brand culture, the brand "Wear It Again" is committed to making clothes useful again by collecting unused and second-hand clothes and giving them more fashion elements and functionality through redesign and re-transformation.

According to the characteristics of idle clothes, the product feature is through different transformation methods; more than two pieces of clothes are for recombination design, second-hand clothes are given the value of reuse, clothes are made with more design sense and fashion sense, and more possibilities and functionality are added to old clothes.

The brand is positioning as a brand of used clothing that is functional and interesting.

The target market is 17-35 years old consumers with the characteristics of personality, environmental protector, and fashion lover.

#### 4.2.3 Product design and display

The study found that the most common and idle clothing types are formal clothes, sports or outdoor clothes, jackets, shirts, and jeans. So the author, mainly for these types of clothing, has carried on the actual product design and transformation by cutting, re-assembling and joining, and adding fabric and accessories. The author has transformed the following products (Figures 24-28) to increase exciting elements and product function to the clothing, making it more design feeling and fashionable feeling. Second-hand clothes developed new value and led the new fashion cycles.



The first product transformation was transforming unused four pairs of trousers into a new product form – skirts by re-cutting and redesigning the old trousers (Figure 24). The four pairs of pants were made of different materials and colors. They were transformed to create new fashion and value—the leading solution for various reasons in people's wardrobe idle clothing problems.



**Figure 24** The first product redesign design - skirt

The second product transformation was a combination of shirts and jeans (Figure 25). New fashion elements were added to the clothes through re-cutting and designing, making the dull clothes more exciting and fashionable and increasing their design sense. This kind of transformation can solve the problem of idle clothes due to the monotonous style and design style.



**Figure 25** The second product modification design - denim clothing

The third product transformation added more possibilities and interest to two shirts made of different materials (Figure 26). By re-cutting and redesigning, multiple parts of the garment can be changed and



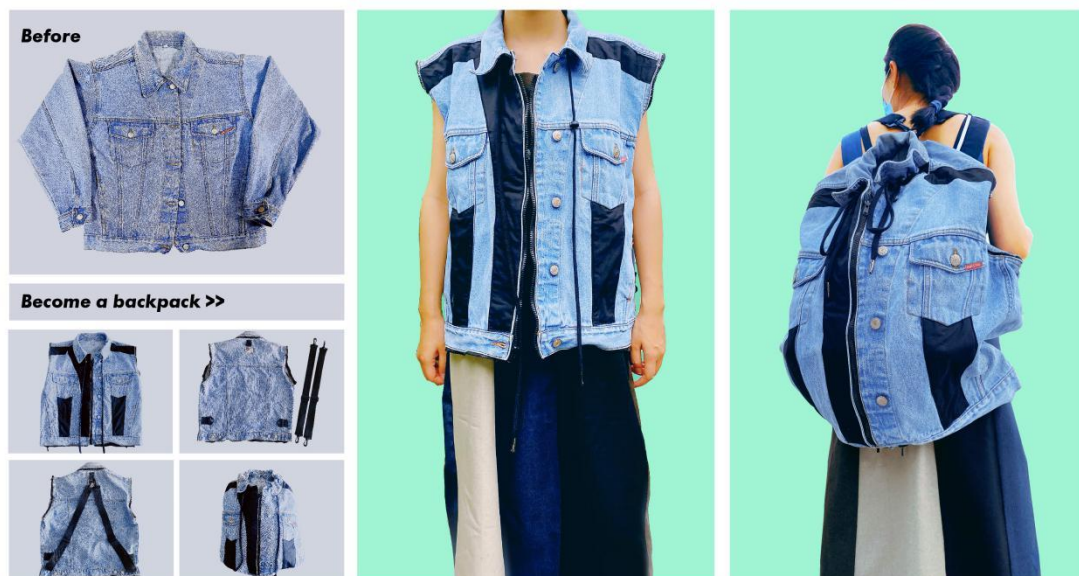


adjusted as needed. For example, the sleeves can be changed, the front part can be removed to change the style, and the back of the dress included an exciting element of the zipper. Through transformation, the fashion and design sense of the clothes were increased so that the clothes became exciting and layered. This makeover can add more elements and style to a variety of clothes.



**Figure 26** The third product transformation design - fashion shirt

The fourth product modification was to add functionality to the clothing. By cutting and redesigning, the denim garment was transformed into something that could be used as either a garment or a backpack when needed (Figure 27), while also adding elements to make the garment fun. This kind of transformation can make the unused clothes more interesting and functional, making them valuable again.



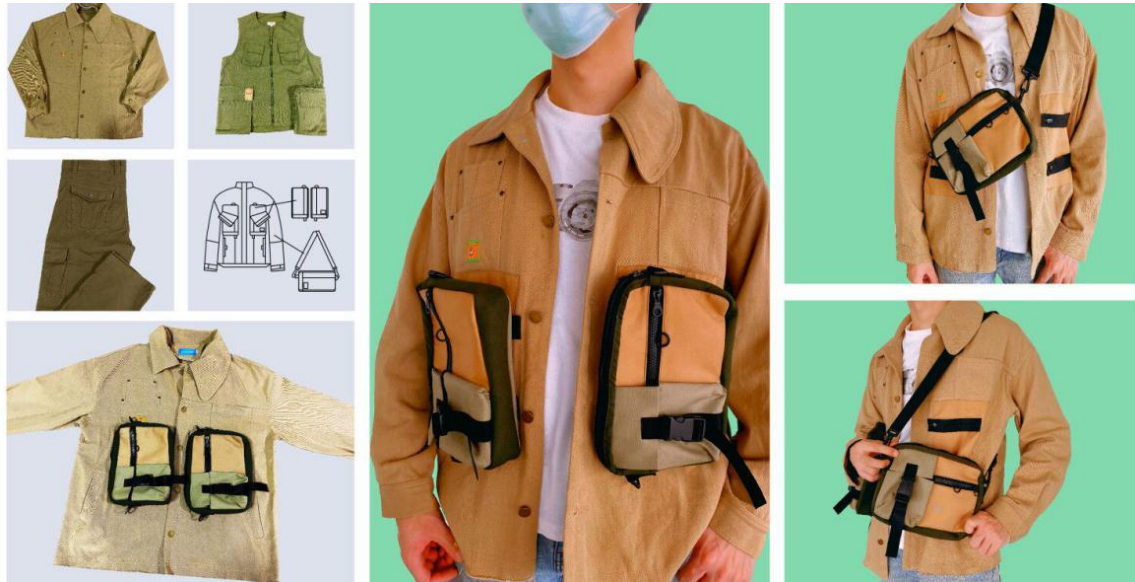
**Figure 27** The fourth product transformation design - functional jeans

The fifth product modification was to add functionality and interest to the clothing (Figure 28). By cutting and redesigning three pieces of clothes, the author added a backpack design to the clothes, which, at the same time, increased a lot of storage space for the clothes and added an interesting design to them. Two





backpacks can be used as decorative elements and storage space for clothing or can be removed separately to install straps and use as a small backpack, making the clothes more stylish and more design-oriented through the modification.



**Figure 28** The fifth product transformation design - fashion functional jacket

#### 4.2.4 Sales platform

Through the brand image design of second-hand clothes and the development and transformation of second-hand clothes series of products, the author carried out an online sales platform design. Brands and products will be publicized and sold through online platforms and websites (Figure 29). The website modules mainly include product display and sales, news and information about second-hand clothes, DIY classrooms (providing simple methods and steps to transform unused clothes), after-sales service, and recycling module. Through the sales platform and brand image display, second-hand clothes can create a new circular fashion and trend economy. In this way, more people pay attention to the reuse of second-hand clothes so they buy fewer new clothes and choose to buy recycled fashion clothes.

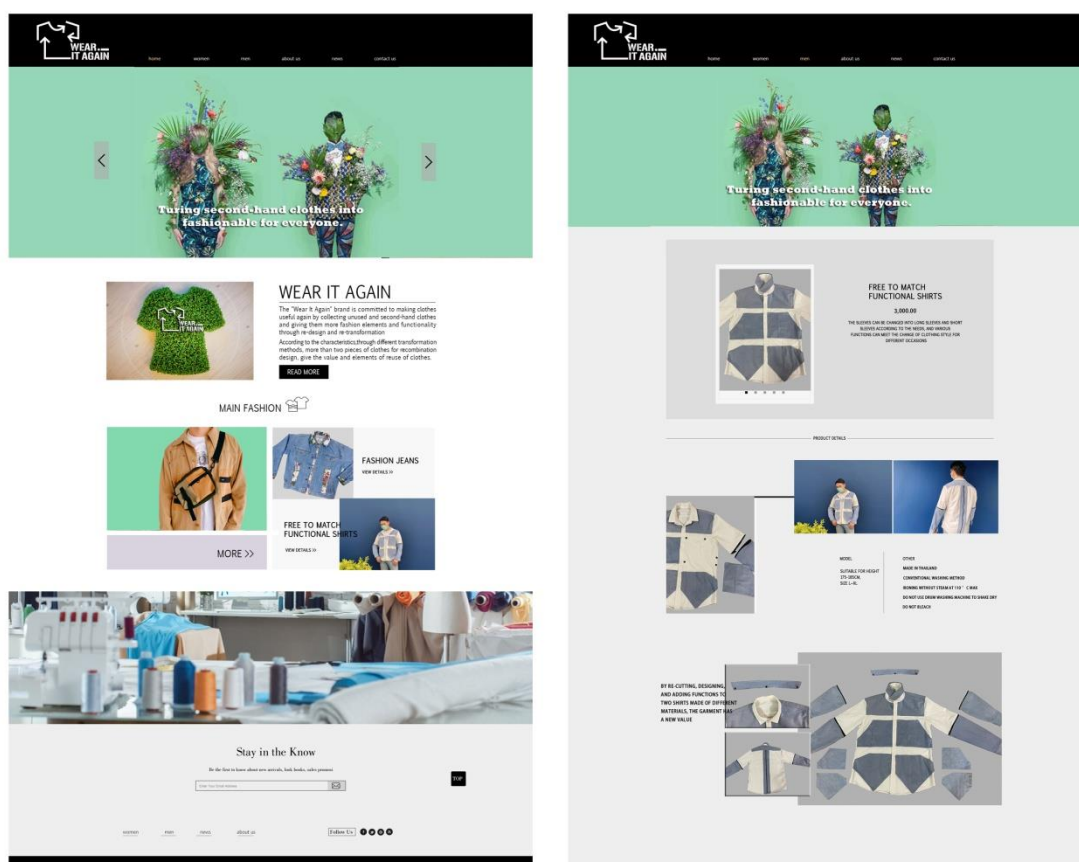


Figure 29 Online sales platform - website design

## 5. Conclusion

Based on the research of the relevant information and history and recycling second-hand clothes investigation, the author found that each person has their idea about the recycling of second-hand clothes. To fundamentally improve people's negative perceptions of the value of used clothing and to solve the problem of the idle and utilization of second-hand clothes, more people should concern whether there is a better way to redefine the value of second-hand clothing. The author collected people's treatment of second-hand clothes and different views through a network questionnaire. Eventually, a better solution was found.

Given second-hand clothing's existing problems, the author's idea was to establish a sustainable clothing brand. The brand's product concept was to redesign and transform idle clothes and sell them in a new form. The method of design and modification for the products to increase interest and function, increasing the product's recognition and identification. To effectively solve the problem of idle clothing, the design and transformation methods were used to add more interesting and functionality to the products; so that the products have a high degree of recognition. Through this brand, we can convey the concept of sustainable development and circular economy of the fashion industry and influence and educate people to start a low-carbon and environmentally friendly life in a new way. To allow more people to participate in the reuse of second-hand clothes, more communication and publicity activities on unused clothes can be carried out through this brand. Through the establishment of sustainable clothing brands, the ultimate goal is to influence people's reuse of clothing, establish healthy and environmentally friendly consumption concepts, and enable the fashion industry to realize the cradle-to-cradle reuse mode.

To sum up, the author has been exploring ways to redesign and re-transform second-hand clothes and create and develop new values for second-hand clothes. By promoting sustainable clothing fashion and the concept of recycling, the core idea of the brand is not to produce anything new but to transform what



already exists. It will make people consider it from a different perspective, vigorously promote the reuse of second-hand clothes, and advocate a low-carbon and environmentally friendly living consumption model that can meet people's pursuit of fashion and also achieve sustainable development of society and clothing enterprises.

This study was conducted based on an in-depth understanding of relevant data and questionnaire results. The main limitations of this research were that the small sample size of the survey and certain limitations in the form of a questionnaire conducted through the website and the limited range of respondents. Later, with further study, the survey scope will be expanded, and various forms of survey sampling will be used to improve the survey data's accuracy. The current solution is to promote and guide people to reuse second-hand clothes in new ways and create new value for second-hand clothes through brand image, redesigning, and transformation of second-hand clothes. Although this solution cannot completely solve all the problems of second-hand clothes, with the deepening of research and technological innovation, it is believed that fashion clothes will have a better future.

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