The University of Southampton

2021/2022

## Faculty of Social Sciences

## Southampton Business School

## **MSc Dissertation**

Assess recent product returns fraud behaviour in retail

industry and explore how people treat this behaviour.

What are the most effective responses to protect

enterprise from the product returns fraud behaviour?

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Presented for MSc Business Analytics and Management Science

This project is entirely the original work of student registration number 33195749. I declare that this dissertation is my own work, and that where material is obtained from published or unpublished works, this has been fully acknowledged in the references. This dissertation may include material of my own work from a research proposal that has been previously submitted for assessment for this programme.

Word Count: 14204 words

## Abstract

With the development of the times and the impact of the Covid-19 epidemic, online shopping is rapidly evolving. Although online shopping provides great convenience to consumers, online shopping also makes returns more behavioural to some extent and makes the entire shopping and return process more complicated. As a result, more product returns fraud has been generated than ever before. This behaviour will not only directly endanger the interests of retailers, but also indirectly affect the loyalty of retailers. This study provides a t-test analysis, principal component analysis and correlation analysis of attitudes towards product returns fraud in the UK market. The findings suggest that although there are groups of people with a more positive view of the prevention of fraudulent goods and a more negative group in the population, negative attitudes are generally presented. It is widely believed that only labelled products can be returned at the time of returns, and consumers with continuous returns are blacklisted, and increasing security patrols and CCTV in stores may be the most effective means of controlling most product returns fraud. In addition, only accepting exchanges or only returning refunds to gift cards, having to present the original purchase receipt or confirmation email at the time of return, and filling out a return form with more personal information at the time of return may also play a relatively effective role in preventing product returns fraud. In addition, when looking for and developing new measures to prevent product returns fraud, it is also necessary to consider the interests of ordinary consumers, otherwise, it may cause consumer resistance. Addition, in addition to preventing product returns fraud, retailers and governments also need to increase penalties for return fraud. Product returns fraud is somewhat curbed when it is realized that the risks associated with product return fraud may outweigh the benefits.

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## Chapter 1: Introduction

## 1.1 Background

With the development of the economy, the progress of people's consumption level, and the pursuit of aesthetics, a large number of fashion brand retailers have emerged in the market. Driven by this wave, people's consumption concepts and shopping patterns have begun to change. Fast-selling fashion and online shopping models began to become popular. Easier means of shopping is one of the reasons why consumers tend to shop online (Jiang, Jiang and Liu, 2011). Consumers can easily browse a large amount of product information on the Internet and choose the products they need. And, as the market expands, a large number of brands begin to build chain stores. With the increase of stores and the gradual improvement of the supply chain, the waiting time for consumers to shop online is gradually shortening. Online shopping is a new phenomenon that is experiencing rapid growth in many countries worldwide (Mpinganjira, 2014). Especially under the impact of the Covid-19 epidemic, people's activities might be limited, so people had to look for new ways to shopping in order to adapt to the situation (Aryani et al., 2021). Thus, more and more consumers may begin to choose online shopping methods over the previous model of shopping in physical stores.

With the development of online shopping, the behaviour of returns is also gradually increasing. (Frei, Jack and Krzyzaniak, 2020). On one hand, some consumers will exploit the loopholes in the retailer's return policy, or try to deceive the retailer in the return process, so as to carry out return fraud. On the one hand, due to the nature of online shopping, there will be a higher probability of return of products purchased in physical stores than in physical stores. Yan et al., (2021, cited in Feinleib, 2017) mentioned that the average product returns

rate on online shopping is approximately more than 30%, which compared to the product returns rate in physical stores is significantly higher. These two reasons are the most: the difference between the picture and the real thing leads to dislike, and the size that is not tried out and the size is not suitable and needs to be returned. Pei, Z., and Paswan, A., (2018) classified legal product returns into four categories, (1) due to product defects, (2) due to seller's fault (3) due to consumers' change of mind, (4) consumers have found a better way to buy. On the other hand, depending on the retailer and policy, the way to return a product is not limited to whether it is returned by post or at the counter. As a result, uncertainty is high throughout the return process.

This kind of return fraud behaviour not only leads to a reduction in the retailer's profit margins, but is also an act that is both unethical and environmentally friendly. Returns affect retailers and reduce profit yields. Moreover, even ordinary return behaviour can lead to environmental pollution. Therefore, this problem needs to be solved, for the purpose of protecting the interests of retailers, and protecting the environment.

### 1.2 Objectives

Based on the discussion of the research background in 1.1, it can be found that with the popularity of online shopping, return fraud may also gradually increase. Moreover, return fraud can have many negative effects. Therefore, we need to learn more about return fraud and help retailers avoid it as much as possible.

This study focuses on a range of perceptions about return fraud. Through the measures that people believe are likely to effectively prevent the occurrence of return fraud, it is believed that the current return policy of retailers conducts t-test inspection and analysis on the prevention of return fraud, and deduces the

more feasible measures and the direction that needs to be paid attention to. In addition, through principal component analysis, the difference between gender groupings and age groupings can be compared, and the influence of gender and age on return fraud can be inferred. Through k-means clustering and correlation analysis, machine learning can be used to find potential correlations in the data.

All in all, this study focuses on some product returns fraud. By analyzing the data obtained in the questionnaire, we can further understand the current situation of return fraud in the UK market, how consumers perceive this behaviour, and how to better address the problem of return fraud.

## 1.3 Dissertation structure

In Chapter 1, the reasons for the occurrence of return fraud, the possible negative effects, and the significance of preventing return fraud from occurring. In addition, the research objectives of this study were determined based on the background of the study. In addition, we will outline the data and research methods that will be used in the process of conducting research.

In Chapter 2, the research background, research objectives, etc. introduced in the first chapter are explained in detail and related to the research problem.

In Chapter 3, the data sources, data structures, and the significance of data filtering used in this study are explained in detail. In addition, the purpose of the study is broken down into several parts, and a detailed explanation is given based on what methods will be used in each part and the reasons for choosing these methods.

In Chapter 4, the results obtained using the data and research methods in Chapter 3 are presented and analyzed in a comprehensive manner.

In Chapter 5, the results of the analysis referred to in Chapter 4 are further summarized and explained. Moreover, research questions would be answered in this chapter.

In Chapter 6, a summary of the full text is presented.

## Chapter 2: Literature review

## 2.1 Different types of product returns fraud behaviour

Return fraud refers to the act of obtaining benefits in the return process through an improper operation. On the one hand, in the process of purchase and return, some consumers may not know enough about return fraud, and have made incorrect judgments, behaviours and operations in a certain part of the return process, resulting in unconsciously occurring return fraud. On the other hand, more consumers are deliberately committing return fraud, despite having subjectively realized that this is a return fraud. Some of these consumers may have heard or learned about return fraud from various sources and found it to be a lucrative means to commit return fraud. Some consumers may have taken advantage of their own ingenuity to find that they can profit from it after committing return fraud and succeeding. As a result, it is therefore occasionally necessary to continue to exploit loopholes in the return policy and the return process after making a purchase. There are also some consumers who do not shop for the purpose of shopping, but professional criminals, taking advantage of the loopholes in the return process or online shopping, free or low prices to obtain new products for free or low prices and sell them in other channels or other acts of obtaining benefits.

Return fraud has a variety of manifestations, and it is difficult to summarize them very completely. Because there are too many steps throughout the shopping and returns process (Frei, Jack and Brown, 2020; Frei, Jack and Krzyzaniak, 2022). Thus, it could be possible to find loopholes at most steps, and there may always be people who try to commit new types of return fraud. Speights, D., and Hilinski, M. (2005) broadly divide the more common return fraud into six types: "Renting/Wardrobing", "Receipt Fraud", "Price Arbitrage", "Check Fraud", "Returning Stolen Merchandise", "Employee" Fraud".

"Renting/Wardrobing" mainly refers to the use of a product after purchase and then returning the product as lease-like return fraud. This part of the consumer, after the retailer purchased their favourite products, the normal use of several products. And in general, when inspecting the product, there are no traces of use, and then return the product to the retailer. This mostly happens in expensive dress products. Since consumers tend to only occasionally need to wear dresses. Also, there may be various problems with rented dresses. For example, there are no expensive styles to choose from, you need to pay rent that is not cheap, and some of the rented dresses may be older with traces of use. Under the influence of a range of factors, consumers may choose to buy high-end and completely new products. As long as you try to be careful when using it and don't leave a trace, you can return it to the retailer at the original price, which is equivalent to using the product for free. Most importantly, in this type of return fraud, many consumers may not realize that this is a return fraud at first. Consumers generally believe that they have only used the product a few times after purchase, and can even be called a "trial". Returning a product when it has not been seriously used should not be a serious matter. But consumers don't realize that this will cause a loss of profit for retailers. And, if such thoughts and behaviours are not widely educated and eradicated, they may become more and more serious.

"Receipt Fraud" refers primarily to the fraudulent act of returning goods through receipts. The main professional theft or team that conducts this part of the return fraud. They obtain shopping receipts in a variety of ways, including making their own forged receipts, taking away receipts thrown away by others, and buying unwanted receipts from others. Some criminals may even make deals with retailers' staff to get more authentic receipts through internal channels, or make it easier for them to create fake receipts. After obtaining a receipt, criminals will pick up items that have been on the receipt but not actually sold on the retailer to return them, or they will steal the items on the receipt instore and return them to the retailer later for return fraud. Either way, this pattern of return fraud is like stealing from a retailer with a "shopping list." Moreover, in this kind of return fraud, the criminals "return" the stolen products to the retailer, which saves the criminals from the link of selling stolen goods. Therefore, this kind of return fraud has become a new type of criminal channel that some criminals are very optimistic about.

"Returning Stolen Merchandise" is very similar to the "Receipt Fraud" mentioned above, referring to the return of the stolen product to the retailer. In addition to the above-mentioned acts of criminals stealing products themselves and returning them using false receipts, there are also consumers who buy products from thieves that may be relatively cheap and use the receipts to return them. In addition, there is a practice of obtaining gift cards or credit points by stealing and returning successful products, and then reselling them online at low prices. In this kind of return fraud, there are more participants in the process, which may include the team that conducts professional theft, the team that obtains false receipts, the team that sells stolen goods, and the people involved in the sale and purchase of stolen goods. Thus, "Returning Stolen Merchandise" is similar to "Receipt Fraud" and is also a kind of return fraud in which professional criminals are involved.

"Price Arbitrage" means taking advantage of the difference between the price of the Product at the time of purchase and the price of the Product at the time of return. In this type of return fraud, there are 3 more common behaviours. (1) After the retailer purchases the genuine product, return the imitation or defective product obtained through other channels to the retailer. This behaviour sometimes occurs at discount stores for some big-name goods. Because the clerk may not be very familiar with these products, it is difficult to quickly distinguish the quality and quality details from the returned products. Therefore, this gives criminals an opportunity to take advantage of it. (2) Before payment, replace the outer packaging of expensive products with cheap substitutes, or cover the barcodes of expensive products with cheap barcodes. This type of crime has evolved into a more common type of return fraud. Through this return fraud, a criminal group caused Walmart stores to cause a total of about \$1.5 million in losses in 19 U.S. states (Speights, D., and Hilinski, M., 2005). (3) Some criminals or consumers apply for a refund of the original price after the retailer purchased it at a discounted price. These people may have exploited vulnerabilities in the retailer's management of labels or receipts, or they may have obtained non-corresponding receipts from other channels. In short, either way, there is a return fraud to obtain the difference in price from the retailer.

"Check Fraud" refers to the purchase of goods using an irregular check or a cheque of the insufficient amount and returning it to the retailer to request a refund before the bank can find out. This kind of return fraud is also often linked to professional crime teams.

"Employee Fraud" refers to the act of participating as an internal employee of a retailer in the first few types of return fraud to profit from it. These employees may be individually or occasionally involved in criminal acts, or they may be people who are mixed into the retailer's work team as part of a professional criminal gang. Employees, as the closest group to retailers, can help criminal groups in a variety of ways, including opening warehouses for theft groups or lax security to make stealing products easier, providing receipts for counterfeiting groups, or acquiescing to the success of substandard product returns at the front desk. With the inside-out cooperation of the retailer's internal personnel, it is easier and less risky for criminal groups to commit return fraud. If left unguarded, it can lead to serious losses for retailers in the short term.

The above are 6 types of return fraud summarized by Speights, D., and Hilinski, M. (2005), which include subjects from a variety of perspectives, including ordinary consumers, malicious criminal groups, and retailer insiders. In this study, the average consumer perception of return fraud was mainly studied, so Speights, D., and Hilinski, M.'s definitions of "Renting/Wardrobing" and "Price Arbitrage" was largely used. "Returning Stolen Merchandise" and "Receipt Fraud" are counted as a class of return fraud, known as "Return Stolen Item". Because "Check Fraud" and "Employee Fraud" may be difficult for the average consumer to access and understand, this study did not examine these two types of return fraud as the main body.

Another type of return fraud that was added to this study was "Damaged fraud." This kind of return fraud has some similarities to "Renting/Wardrobing". Both consumers use the product normally after purchase. But in a "Damaged fraud" type of return fraud, a consumer returns a product damaged by his or her own negligence to the retailer, claiming that it was in its original condition at the time of purchase by the retailer, and asking for a refund or return at the original price. The rationale for separating "Damaged fraud" and "Renting/Wardrobing" into two types of return fraud is that the two types of products have different return statuses. Most of the products returned to retailers in the "Renting/Wardrobing" type are in good condition, and without careful inspection, they may not find that they have been used in the past, and may even be put into normal channels to continue selling. However, the product returned in the "Damaged fraud" type is a damaged product. Since the damaged state of such products may be permanently irreparable and recoverable, they can no longer enter the normal channel for sale. Therefore, the "Damaged fraud" type of return fraud is more harmful to the interests of retailers than "Renting/Wardrobing" and needs to be evaluated as a serious type of return fraud.

## 2.2 Causes of product returns fraud behaviour

There are two main types of entities that occur in product returns fraud. One is a professional criminal group that uses a series of operations to exploit loopholes in the return process in exchange for benefits. The other is that ordinary consumers, after normal consumption and use, falsify the user behaviour and commit product returns fraud.

Targeting professional criminal groups, often exploiting loopholes in the shopping and returns process to complete product returns fraud. Due to the complexity of the entire shopping and returns process (literature that describes the shopping and returns process). Therefore, in many steps, there is a lot of uncontrollability. For example, it is difficult to prove that the returned damaged product is not in this state when it is sold, it is difficult for the counter staff to immediately distinguish that the returned product is fake and not genuine, and it is difficult for the counter staff to immediately judge that the returned product is still new and not used, and it is not easy to perceive that the product that is required to be refunded may be a brand new product that has not been sold. Especially after the addition of online shopping, the whole process will become further complicated and difficult to control. Because one of the characteristics of online shopping is that it will lead to a lot of return behaviour (return behaviour brought about by online shopping). Because there are many consumers who will return and exchange the product because of the size and colour of the product and other details and put it inconsistency. When return fraud is hidden in the multitude of normal return behaviours, it is not easy to be wary of product returns fraud. Moreover, theft-type return fraud is a simpler and less risky way

to commit a crime than traditional theft that eliminates the step of selling stolen goods to criminal groups. Returns fraud becomes even more difficult to deal with when the theft team also has a corresponding presence within the retailer. Therefore, in the case that retailers are already difficult to control every link without problems to prevent product returns fraud, many types of criminal teams have begun to target product returns fraud. Moreover, when insiders have covered for criminals, product returns fraud is more likely to occur and it is more difficult for retailers to prevent it.

For ordinary consumers, it is generally divided into subjective want to return fraud caused by clever psychology, and some consumers have carried out some behaviours that they think can be tolerated due to insufficient understanding of return fraud, but in fact, they are product returns fraud. The first kind of consumer is generally due to the influence of the new consumption concept, every time after a period of time or on some specific occasions need some new clothes, but in fact, the real level of consumption can not allow themselves to make such a high frequency of purchases (it is best to have a professional description of this concept of consumption). As a result, product returns fraud after purchase and use have been generated. Another type of consumer is due to insufficient knowledge of return fraud. Sometimes, after buying some products, when I first used them, I didn't think it was the right one as I thought, so I had the idea of wanting to return them. (Definition of try-on) However, if the product is really still in the try-on stage, has not been used for a long time, and is not damaged, it can be returned normally. However, if the product has been used normally, it does not meet the normal return criteria. Therefore, for this part of the consumer, education on the correct product return standards should be strengthened. And when the staff carries out the return acceptance, the confirmation of a series of related problems and the careful inspection and remarks of the product may become an effective way to prevent the occurrence of product returns fraud.

## 2.3 The Bad Impact of Return Fraud

The direct adverse effect of this return fraud is to reduce the profit margin of the retailer. Product returns could cost retailers lost about \$100 billion a year, due to repackaging products, re-managing goods and other reasons (Petersen, J. A. and Kumar, V., 2010). Product returns fraud represented by "Damaged fraud" will no longer be able to re-sell the return of products, which makes retailers have to bear this part of the product loss. In the product returns fraud represented by "Price Arbitrage", retailers may receive cheap fakes to replace the original products. Such products cannot be sold after discovery, and retailers have to bear losses. In return fraud such as the "Return Stolen Item," criminals use in-store products to defraud retailers of benefits that the retailer may not be able to detect. In addition, the consumption of resources such as shopping bags, product packaging, receipt paper, manpower consumed in the process of shopping, reconfirmation and co-location of products also has to be borne by retailers. If such serious return fraud is not detected and stopped in time, it will directly lead to a continuous decline in the retailer's revenue.

In addition, return fraud can also reduce the quality and reputation of retailers. Sometimes retailers may receive defective products, fakes, used products, etc. that have been returned due to return fraud. If such products are not checked out and returned to normal channels for resale, it will cause consumers to have a sense of distrust and resistance to retailers, which may reduce customer loyalty to the brand. In this case, the enterprise not only suffers the direct loss of benefits due to return fraud, but may also cause secondary loss of benefits.

## 2.4 Research Gap

As a concomitant phenomenon to the development of online shopping, product return behaviour is a very common phenomenon. Although product return fraud can cause significant losses to retailers, the current research on product return fraud is not sufficient.

Kaushik et al., (2020) An analysis of the reasons for returns for online shopping in the apparel industry has identified important influencing factors that may reduce return behaviour. But Kaushik et al., whose research didn't address return fraud. Pei, Z., and Paswan, A. (2018) are concerned that returns are divided into legal returns and return fraud. Pei, Z., and Paswan, A. focused on legal returns, while Pei, Z., and Paswan, A. did not focus on illegal returns.

Frei, Jack and Brown (2020) discovered the complexity of the returns process and noticed that there were a number of vulnerabilities in the return process. Frei, Jack and Brown's research focuses on tackling return fraud through the problem of the returns process. This study looks at product return fraud from the consumer's perspective. Shih et al., (2021) also discovered the seriousness of return fraud, compared to traditional means to prevent return fraud, Shih et al., developed the means to use blockchain technology to check returned goods. This is a very novel technology, but until it is widely used, it makes sense to analyze and counter return fraud in a traditional way. This is also one of the purposes of this study.

Park (2008) conducted a study of product return fraud in South Korea, analyzing the perceptions of retailer employees. The purpose of this study is similar to Park's, but cuts to the issue from the perspective of consumers' perception of return fraud.

Ülkü, Dailey and Yayla-Küllü (2013) surveyed a retail store to examine the impact of return fraud on retailers' profits by making changes to return policies based on prices and return deadlines. But the research by Ülkü, Dailey and Yayla-Küllü focuses on the retailer's specific profit and loss. Davis, Hagerty and Gerstner (1998) conducted a study of return policies in hopes of striking a balance between rigour and consumer satisfaction. After analyzing the return policies that may need to be modified through this study, the Davis, Hagerty and Gerstner study may serve as a reference.

In summary, there is not much research on the focus of product return behaviour and product return fraud at present, and the focus is also different. Therefore, this study is very meaningful as a preliminary understanding of return fraud from the perspective of consumers.

## Chapter 3: Methodology

In this chapter, issues related to the sources of data acquisition, data structures, steps and reasons for data cleaning, and the choice and decision of data analysis methods are discussed. The following flowchart is made for the way how data analysis step is carried out, as shown in Figure 3-1.



Figure 3-1 The process of data analysis

## 3.1 Data

In this section, the data sources, data details, data filtering, and data cleaning principles are described in detail.

### 3.1.1 Data Overview

The data source for this study is a questionnaire based on the study regarding consumer fashion shopping behaviors during the Covid-19 pandemic. The target market for the study was the United Kingdom, so the target population of the survey was also limited to the United Kingdom. The questionnaire is a collection of answers from the respondents in the form of an online questionnaire. Online data collection can collect data outcomes over a wide area regardless of geographic barriers and could be able for researchers to collect data results for large sample sizes in a short period of time (Lefever, Dal and Matthíasdóttir, 2007). Because this study requires the use of unsupervised learning analysis methods for large amounts of data result. Therefore, the collection of questionnaires based on online answers could give the study the possibility of analyzing the results through a larger sample of data. In addition, the questionnaire is almost always based on single choice questions and scoring questions. Compared with interviews and other forms, this form of answer setting is very conducive to quantitative analysis, because it is easier to find correlations and differences between data in a large number of data samples through quantitative analysis. Therefore, the response settings of the questionnaire of the study regarding consumer fashion shopping behaviors during the Covid-19 pandemic are consistent with the subsequent analytical methods and are suitable data sources for this study.

#### 3.1.2 Data structure

The questionnaire used in this study can be divided into the following 8 sections, as shown in Tables 3-1, Tables 3-2, Tables 3-3, Tables 3-4, Tables 3-5, Tables 3-6, Tables 3-7 and Tables 3-9.

Table 3-1 is the basic information which are shown on and collected from the questionnaire about the respondent. Respondents are confirmed by Q2, which means only the results of the data are selected as "Yes" in Q2 would be considered as willing to participate in the survey. Only these part of data should be retained in the analysis. By screening the data caption of "Finished", only the results shown as "Finished" in the questionnaire would be retained, which means there are no questions omitted, all questions were completed. The reason for this screening is to ensure that in subsequent analysis, the sample

size in the same set of data should be maintained as the same, so that it is meaningful to make comparisons between different sample. Besides, in order to explore differences between different age groups and gender groups, the questionnaire set up age and gender selections. Therefore, in order to exclude miscalculations in the results due to the absence of a gender answer, only samples of male or female results in gender answers would be retained for data analysis.

In the questionnaire, some of the data sample have missing values. For these part of the data, it is necessary to use appropriate values to supplement the missing values. During the analysis, missing values could affect the normal process of the analysis. Moreover, if a sample is discarded because a value is missing, the number of samples may be much reduced. Therefore, it is necessary to determine the appropriate value to fill in the missing values. For missing values of numerical characteristics that appear in questionnaire samples, it is common to use an average value to fill in missing values (Enders 2022, p.26). The data processed in this approach could reduce the deformation of the characteristics of sample while maintaining the sample size. In addition, the purpose of screening the progress of the questionnaire is to ensure that the value replaced are only missing values, not questions that have no answer because of the progress. This ensures that while the sample size is guaranteed, the comparison between the samples is meaningful at the same time.

Data Caption	Data Description
Finished	Whether to complete all answers
Q2	Important Instructions
	1. Please note, this survey is for UK residents only.
	2. This is not a test. I am simply interested in your opinions of your shopping
	behaviours during the pandemic. Please complete the questions to reflect your
	thoughts and activities as accurately as possible. Please note that there are
	intention check questions.
	3. Please complete this survey in one sitting. You will not be able to save the

 Table 3-1 Information of questionnaire and personal details of respondents

 tion
 Data Description

Please click on the appropriate button below:       Q4     What is your age group?		answers and continue later.
Q4 What is your age group?		Please click on the appropriate button below:
	Q4	What is your age group?
Q5 Do you identify as?	Q5	Do you identify as?

In table 3-2, the purpose of this table corresponding to the question is to show the probability of product returns fraud behaviour happens. The answers setting for the question are "No, I do not know people who have ever done this", "Yes, I know people who do this regularly", "Yes, I know people who have done this a few times", "Yes, I know people who have done this once". From this question, it is relatively intuitive to see the severity of the current product returns fraud behaviour in the UK market. In addition, combined with the Q4 and Q5 sections in the Table 3-1, the difference in the probability of product returns fraud behaviour between age groups and gender groups could be further explored. Thus, it can be inferred that whether some of the group characteristics are relatively prone to occur product returns fraud behaviour.

Data Caption	Data Description
Q15	There have been incidences of people intentionally buying fashion items for a
	specific occasion and returning them afterwards. For example, a party dress was
	bought for a wedding with the intention of returning it afterwards. This is called
	"wardrobing".
	Do you know somebody who has bought a fashion item for a specific occasion
	with the intention of returning it after use?

In table 3-3, the main problem of this table corresponds to the product returns fraud behaviour that returning an already used product after purchasing in the return process. In the questionnaire, the respondents are asked to evaluate the effectiveness of a series of measures that may reduce product returns fraud behaviour happens, and the answers are set in the form of scoring. Through these questions, it is relatively intuitive to see how people evaluate the specific methods of protecting product returns fraud behaviour that occurs when returning already used products.

Data Caption	Data Description
Renting/Wardrobing_1	How effective do you think the following returns policies would be to reduce this wardrobing behaviour amongst people of your age and
	gender? - Retailers offer a shorter return period (e.g., 14 days vs 28 days).
	How effective do you think the following returns policies would be to
Renting/Wardrobing 2	reduce this wardrobing behaviour amongst people of your age and
Renting/Wardrobing_2	gender? - If returning to stores, the item can only be returned to the
	customer service desk.
	How effective do you think the following returns policies would be to
	reduce this wardrobing behaviour amongst people of your age and
Renting/Wardrobing_4	gender? - If returning via post or courier, customers need to fill in (online)
	forms to request return labels (instead of offering a return label in
	advance).
	How effective do you think the following returns policies would be to
Renting/Wardrobing_3	reduce this wardrobing behaviour amongst people of your age and
	gender? - Products can only be returned with tags still attached.
	How effective do you think the following returns policies would be to
Renting/Wardrobing_6	reduce this wardrobing behaviour amongst people of your age and
	gender? - Customers have to pay for the returns shipping fee.
	How effective do you think the following returns policies would be to
Renting/Wardrobing_7	reduce this wardrobing behaviour amongst people of your age and
	gender? - Retailers only offer an exchange or refund onto a gift card.
	How effective do you think the following returns policies would be to
Renting/Wardrobing_8	reduce this wardrobing behaviour amongst people of your age and
	gender? - Account registration is mandatory for returns.
	How effective do you think the following returns policies would be to
	reduce this wardrobing behaviour amongst people of your age and
Renting/Wardrobing_9	gender? - Retailers will blacklist serial returners or send warning
	messages.

Table 3-3 In the returns process, measures may be taken to reduce fraud on the return of used products

In table 3-4, the main problem corresponding to this table is the product returns fraud behaviour that after purchasing and using the good, returning the item that have been damaged. In the questionnaire, the respondents are asked to evaluate the effectiveness of a series of measures that may reduce such product returns fraud behaviour, and the answers are set in the form of scoring. Through these questions, it is relatively intuitive to see how people evaluate the specific type of method to reduce product returns fraud behaviour that occurs when returning damaged products.

Data Caption	Data Description
Damaged fraud_1	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - Retailers offer a
	shorter return period (e.g., 14 days vs 28 days).
Damaged fraud_2	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - If returning to stores,
	the item can only be returned to the customer service desk.
Damaged fraud_3	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - Products can only be
	returned with tags still attached.
Damaged fraud_4	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - If returning via post
	or courier, customers need to fill in (online) forms to request return labels
	(instead of offering a return label in advance).
Damaged fraud_6	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - Customers have to

## Table 3-4 In the returns process, measures that may reduce product returns fraud behaviour of damaged products

	pay for the returns shipping fee.
Damaged fraud_7	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - Retailers only offer
	an exchange or refund onto a gift card.
Damaged fraud_8	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - Account registration
	is mandatory for returns.
Damaged fraud_9	There have been incidences of people returning fashion purchases (e.g.,
	clothes, necklaces, or belts) that they damaged but claiming they had
	received the items in this state.
	How effective do you think the following returns policies would reduce this
	behaviour amongst people of your age and gender? - Retailers will blacklist
	serial returners or send warning messages.

In table 3-5, the main problem is that in the return process, the product returns fraud behaviour of returning cheap fake products instead of high-priced genuine products and profiting from returning them. In the questionnaire, the respondents are asked to evaluate the effectiveness of a series of measures that may reduce such product returns fraud behaviour, and the answers are set in the form of scoring. Through these questions, it can be intuitively seen that people's evaluation of how to reduce the occurrence of the return of cheap fake products instead of high-priced genuine products.

Data Caption	Data Description
Price Arbitrage_1	There have been incidences of people shipping back a different fashion item (e.g., a
	counterfeit or an older version of a dryer / sunglasses) instead of the original
	expensive one for a full refund.
	How effective do you think the following returns policies would reduce this behaviour
	amongst people of your age and gender? - Retailers offer a shorter return period
	(e.g., 14 days vs 28 days).
Price Arbitrage_2	There have been incidences of people shipping back a different fashion item (e.g., a
	counterfeit or an older version of a dryer / sunglasses) instead of the original
	expensive one for a full refund.
	How effective do you think the following returns policies would reduce this behaviour
	amongst people of your age and gender? - The original purchase receipt or
	confirmation email is required.
Price Arbitrage_3	There have been incidences of people shipping back a different fashion item (e.g., a
	counterfeit or an older version of a dryer / sunglasses) instead of the original
	expensive one for a full refund.
	How effective do you think the following returns policies would reduce this behaviour
	amongst people of your age and gender? - Products can only be returned with tags
	still attached.
Price Arbitrage_4	There have been incidences of people shipping back a different fashion item (e.g., a
	counterfeit or an older version of a dryer / sunglasses) instead of the original
	expensive one for a full refund.
	How effective do you think the following returns policies would reduce this behaviour
	amongst people of your age and gender? - Customers need to fill in (online) forms
	to request return labels.
Price Arbitrage_6	There have been incidences of people shipping back a different fashion item (e.g., a
	counterfeit or an older version of a dryer / sunglasses) instead of the original
	expensive one for a full refund.
	How effective do you think the following returns policies would reduce this behaviour
	amongst people of your age and gender? - Customers have to pay for the returns
	shipping fee.

## Table 3-5 In the return process, measures that may reduce the return fraud of returning fake products in lieu of genuine products

Price Arbitrage_7	There have been incidences of people shipping back a different fashion item (e.g.			
	counterfeit or an older version of a dryer / sunglasses) instead of the original			
	expensive one for a full refund.			
	How effective do you think the following returns policies would reduce this behaviour			
	amongst people of your age and gender? - Retailers only offer an exchange or			
	refund onto a gift card.			
Price Arbitrage_8	There have been incidences of people shipping back a different fashion item (e.g., a			
	counterfeit or an older version of a dryer / sunglasses) instead of the original			
	expensive one for a full refund.			
	How effective do you think the following returns policies would reduce this behaviour			
	amongst people of your age and gender? - Account registration is mandatory for			
	returns.			
Price Arbitrage_9	There have been incidences of people shipping back a different fashion item (e.g., a			
	counterfeit or an older version of a dryer / sunglasses) instead of the original			
	expensive one for a full refund.			
	How effective do you think the following returns policies would reduce this behaviour			
	amongst people of your age and gender? - Retailers will blacklist dishonest			
	returners or send warning messages.			

In table 3-6, the main return fraud problem of this form is that after buying something in one store, taking an identical but not paid product in another store request refund with the receipt of the previous purchase. Through the questionnaire, the respondents are asked to evaluate the effectiveness of a series of measures that may reduce the fraud of such product returns fraud behaviour, and the answers are set in the form of scoring. Through these questions, it is relatively intuitive to see people's evaluation of how to reduce the occurrence of such product returns fraud behaviour with a theft nature.

Data Caption	Data Description			
Return Stolen Item_1	There have been incidences of people making a purchase, leaving the store, re-entering another store, and picking up an identical item for a refund using the original purchase receipt.			
	How effective do you think the following return policies / arrangements would reduce this behaviour amongst people of your age and gender? – Retailers increase the coverage of CCTVs and guards.			
Return Stolen Item_2	There have been incidences of people making a purchase, leaving the store, re-entering another store, and picking up an identical item for a refund using the original purchase receipt.			
	How effective do you think the following return policies / arrangements would reduce this behaviour amongst people of your age and gender? – Product can only be returned to the customer service desk.			
Return Stolen Item_3	There have been incidences of people making a purchase, leaving the store, re-entering another store, and picking up an identical item for a refund using the original purchase receipt.			
	How effective do you think the following return policies / arrangements would reduce this behaviour amongst people of your age and gender? – Products can only be returned with tags still attached.			
Return Stolen Item_7	There have been incidences of people making a purchase, leaving the store, re-entering another store, and picking up an identical item for a refund using the original purchase receipt.			
	How effective do you think the following return policies / arrangements would reduce this behaviour amongst people of your age and gender? – Retailers only offer an exchange or refund onto a gift card.			
Return Stolen Item_8	There have been incidences of people making a purchase, leaving the store, re-entering another store, and picking up an identical item for a refund using the original purchase receipt.			
	How effective do you think the following return policies / arrangements would reduce this behaviour amongst people of your age and gender? – Customers need to fill in a returns form and provide more information (e.g., a signature, email account and postcode).			

## Table 3-6 In the return process, measures may be taken to reduce product returns fraud behaviour that is theft nature

In table 3-7, which primarily corresponds to measures that may prevent produce return fraud behaviour occurring. Though the questionnaire, respondents

evaluated the effectiveness of a series of measures that may prevent fraudulent product returns. The setting of the answer is the form of choosing among the five levels of tendency, and the detailed corresponding options are shown in table 3-8. Through these questions, it is relatively intuitive to see people's evaluation of how to avoid the occurrence of product returns fraud behaviour from the source of the ideological level.

Data Caption	Data Description			
Q13_1	Imagine people of your age and gender who have displayed any of the following			
	behaviours (i.e., wardrobing, returning stolen, damaged, or counterfeit items for a refund).			
	Please indicate to what extent you agree or disagree they would be (further) discouraged			
	from these discussed behaviours if they knew the retailer might not survive if			
	there are too many returns.			
Q13_2	Imagine people of your age and gender who have displayed any of the following			
	behaviours (i.e., wardrobing, returning stolen, damaged, or counterfeit items for a refund).			
	Please indicate to what extent you agree or disagree they would be (further) discouraged			
	from these discussed behaviours if they knew that many items cannot be resold			
	and will be wasted.			
Q13_3	Imagine people of your age and gender who have displayed any of the following			
	behaviours (i.e., wardrobing, returning stolen, damaged, or counterfeit items for a refund).			
	Please indicate to what extent you agree or disagree they would be (further) discouraged			
	from these discussed behaviours if there was a higher chance of getting			
	caught.			
Q13_4	Imagine people of your age and gender who have displayed any of the following			
	behaviours (i.e., wardrobing, returning stolen, damaged, or counterfeit items for a refund).			
	Please indicate to what extent you agree or disagree they would be (further) discouraged			
	from these discussed behaviours if they knew that what they did was illegal.			
Q13_5	Imagine people of your age and gender who have displayed any of the following			
	behaviours (i.e., wardrobing, returning stolen, damaged, or counterfeit items for a refund).			
	Please indicate to what extent you agree or disagree they would be (further) discouraged			
	from these discussed behaviours if there were fewer opportunities for "bending"			
	the returns rules.			

Table 3-7 Measures that may avoid product returns fraud behaviour

Imagine people of your age and gender who have displayed any of the following behaviours (i.e., wardrobing, returning stolen, damaged, or counterfeit items for a refund).

Please indicate to what extent you agree or disagree they would be (further) discouraged from these discussed behaviours if \_\_\_\_\_\_ - there was a chance of being blacklisted by the retailer.

Table 3-8 Choice of degree of consent		
Decode	Options	
1	Strongly disagree	
2	Somewhat disagree	
3	Neither agree nor disagree	
4	Somewhat agree	
5	Strongly agree	

Respondents replied to the extent to which specific retailers could prevent produce return fraud behaviour in their current return policies. The questionnaire listed 12 retailers as shown in Table 3-9. The original question is "To the best of your knowledge, please indicate to what extent the following particular retailers' returns policies are more likely to discourage these dishonest behaviours (i.e., wardrobing, returning stolen, damaged, or counterfeit items for a refund)?". The setting of the answers is in the form of preference selection, the unfamiliar option is added based on the 5 degrees shown in table 3-8. The detailed corresponding preference options are shown as table 3-10. These questions provide a relatively straightforward understanding of how people assess how well a retailer's current return policy settings of preventing product returns fraud.

Data Caption	Description
Q20_1	River Island
Q20_2	John Lewis
Q20_3	Marks & Spencer
Q20_4	Next
Q20_5	H&M
Q20_6	ASOS
Q20_7	New Look
Q20_8	Primark
Q20_9	TK Maxx
Q20_10	Reiss
Q20_11	Matalan
Q20_12	Zara

#### Table 3-9 A list of specific retailers

Table 3-10 The tendentious choice of policy prevention and control strength on awareness of product returns fraud behaviour

Decode	Options		
0	Not applicable (never/rarely shop with this retailer)		
1	Very weak policies		
2	Somewhat weak policies		
3	Neither weak nor strong		
4	Somewhat strong policies		
5	Very strong policies		

### 3.2 Analysis methods

In this section, the selection of data analysis methods is described in detail.

#### 3.2.1 One Group Data

Firstly, a one-sample t-test is performed for each set of data in tables 3-3, tables 3-4, tables 3-5, tables 3-6, tables 3-7, tables 3-9. Comparing the mean value between samples by the one-sample t-test could determine whether there is a significant difference between the samples (Gerald, 2018). Therefore, through the one-sample t-test, it can be estimated whether there is a clear difference in people's main attitudes towards the same type of return fraud problem.

#### 3.2.2 Multiple Group Data Correlation

It is necessary to perform principal component analysis, clustering analysis and correlation analysis, when looking for potential associations between multiple sets of data.

Principal component analysis is to simplify and reduce dimensionality by converting the original variables into linear combinations of the original variables, while preserving the main information. In order to compare whether there are gender differences in weightlifting techniques that limit athletes' performance, Sadler, Graham and Stevenson (2013) used a large number of exercise data to analyze whether gender had an impact on the main factors and how to reduce dimensionality appropriately by principal component analysis. In this study, drawing on the analytical methods of Sadler, Graham and Stevenson (2013), unsupervised principal component analysis was performed by using gender and age as grouping standard. By reducing the dimensionality of a large number of analytical items, observing the items that primarily affect consumers' perceptions of product returns fraud behaviour, as well as the differences in responses to scales between different groups.

The purpose of k-means clustering analysis is to find similarities by clustering all variables by the properties they are displayed, regardless of order effects. K-means is often used in many research areas, such as market analysis, to gradually target large amounts of data as clustering targets to confirm the rationality of clustering (Zhu and Liu, 2021). Using the k-means clustering method, it could exclude the influence of human classification on data correlation, and more objectively find the similarities shown in various indicators. In this study, the k-means clustering method would be used to evaluate the

commonality of sample attitudes towards policy formulation by scoring policy views on the control of shopping fraud in a scale.

The purpose of correlation association analysis is to explore whether there is a dependency between variables. In this study, the answers to the scale questions in the sample are considered to see the propensity and correlation of the population to answer different questions.

## Chapter 4: Results and Analysis

## 4.1 Data cleaning and decoding

According to the screening method mentioned in 3.1.2, the data caption "Finished" should only remain the part which is "Yes", and the sample selected in Q2 should only remain people who is willing to participate in the survey and gender should be limited to men or women in Q5. The final number of data is 503 groups, the specific compilation is shown in Table 4-1. For quantitative scoring data, the data are described after replacing the missing values with the average, as shown in Table 4-2.

Data Caption	Decode	Options	
	1	18 - 24	
04	2	25 - 34	
	3	35 - 44	
Q4	4	45 - 54	
	5	55 - 64	
	6	Over 65	
05	0	Female	
Q5	1	Male	
	1	No, I do not know people who have ever done this.	
015	2	Yes, I know people who do this regularly.	
QIS	3	Yes, I know people who have done this a few times.	
	4	Yes, I know people who have done this once.	
	1	Extremely unlikely	
	2	Somewhat unlikely	
Q23	3	Neither likely nor unlikely	
	4	Somewhat likely	
	5	Extremely likely	
	1	Extremely unlikely	
	2	Somewhat unlikely	
Q9	3	Neither likely nor unlikely	
	4	Somewhat likely	
	5	Extremely likely	
013 1	1	Strongly disagree	
Q13_1	2	Somewhat disagree	

Table 4-1 Answers corresponding to the question and decode

	3	Neither agree nor disagree		
	4	Somewhat agree		
	5	Strongly agree		
	1	Strongly disagree		
	2	Somewhat disagree		
Q13_2	3	Neither agree nor disagree		
	4	Somewhat agree		
	5	Strongly agree		
	1	Strongly disagree		
	2	Somewhat disagree		
Q13_3	3	Neither agree nor disagree		
	4	Somewhat agree		
	5	Strongly agree		
	1	Strongly disagree		
	2	Somewhat disagree		
Q13_4	3	Neither agree nor disagree		
_	4	Somewhat agree		
	5	Strongly agree		
	1	Strongly disagree		
	2	Somewhat disagree		
Q13 5	3	Neither agree nor disagree		
_	4	Somewhat agree		
	5	Strongly agree		
	1	Strongly disagree		
	2	Somewhat disagree		
Q13_6	3	Neither agree nor disagree		
_	4	Somewhat agree		
	5	Strongly agree		
	0	Not applicable (never/rarely shop with this retailer)		
	1	Very weak policies		
000 1	2	Somewhat weak policies		
Q20_1	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
Q20_2	1	Very weak policies		
	2	Somewhat weak policies		
	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
Q20_3	1	Very weak policies		
	2	Somewhat weak policies		

	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
	1	Very weak policies		
000 4	2	Somewhat weak policies		
Q20_4	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
	1	Very weak policies		
020 F	2	Somewhat weak policies		
Q20_5	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
	1	Very weak policies		
000 0	2	Somewhat weak policies		
Q20_6	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
	1	Very weak policies		
020 7	2	Somewhat weak policies		
Q20_7	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
	1	Very weak policies		
020 8	2	Somewhat weak policies		
Q20_0	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
	1	Very weak policies		
Q20_9	2	Somewhat weak policies		
	3	Neither weak nor strong		
	4	Somewhat strong policies		
	5	Very strong policies		
	0	Not applicable (never/rarely shop with this retailer)		
020 40	1	Very weak policies		
Q20_10	2	Somewhat weak policies		
	3	Neither weak nor strong		

	4	Somewhat strong policies	
	5	Very strong policies	
	0	Not applicable (never/rarely shop with this retailer)	
	1	Very weak policies	
020 11	2	Somewhat weak policies	
Q20_11	3	Neither weak nor strong	
	4	Somewhat strong policies	
	5	Very strong policies	
	0	Not applicable (never/rarely shop with this retailer)	
000 40	1	Very weak policies	
	2	Somewhat weak policies	
Q20_12	3	Neither weak nor strong	
	4	Somewhat strong policies	
	5	Very strong policies	

Table 4-2 Average of responses to quantitative scoring questions

Data Caption	Range	Mean
Renting/Wardrobing_1	1-100	35.63
Renting/Wardrobing_2	1-100	38.83
Renting/Wardrobing_3	1-100	72.23
Renting/Wardrobing_4	1-100	36.21
Renting/Wardrobing_6	1-100	54.74
Renting/Wardrobing_7	1-100	63.37
Renting/Wardrobing_8	1-100	44.34
Renting/Wardrobing_9	1-100	69.43
Damaged fraud_1	1-100	32.79
Damaged fraud_2	1-100	43.59
Damaged fraud_3	1-100	68.76
Damaged fraud_4	1-100	37.73
Damaged fraud_6	1-100	54.56
Damaged fraud_7	1-100	58.56
Damaged fraud_8	1-100	45.63
Damaged fraud_9	1-100	69.09
Price Arbitrage_1	1-100	25.84
Price Arbitrage_2	1-100	63.37
Price Arbitrage_3	1-100	74.8
Price Arbitrage_4	1-100	43.95
Price Arbitrage_6	1-100	49.48
Price Arbitrage_7	1-100	55.58
Price Arbitrage_8	1-100	48.47
Price Arbitrage_9	1-100	72.83
Return Stolen Item_1	1-100	63.84

Return Stolen Item_2	1-100	44.46
Return Stolen Item_3	1-100	47.55
Return Stolen Item_7	1-100	48.72
Return Stolen Item_8	1-100	60.93

# 4.2 Current status of product returns fraud behavior in the UK market

Regarding the occurrence of return fraud, the results are shown in Figure 4-1. This article investigates people's perceptions of fraud and divides people's awareness of fraud into 1 (No, I do not know people who have ever done this), 2 (Yes, I know people who do this regularly), 3 (Yes, I know people who have done this a few times), and 4 (Yes, I know people who have done this once) four degrees. From the perspective of different genders, whether there was a difference in the degree of awareness of shopping fraud, the results showed that the distribution frequency of different genders in different levels of cognition was similar, and there was no significant difference in the degree of awareness of shopping fraud between different genders (P = 0.268).



Figure 4-1 The incidence of return fraud

# 4.3 People's main attitude towards product returns fraud behavior

### 4.3.1 Addresses shopping scams that return items after purchase

Considering that the current shopping scam has the behavior of customers who purchase and use the goods before returning them, the following strategies are formulated in the scale: shorten the return time (Renting/Wardrobing\_1), return to the customer service counter (Renting/Wardrobing\_2), fill out a form (Renting/Wardrobing\_4), and return the goods only when the label is still (Renting/Wardrobing\_3), increase the return tax (Renting/Wardrobing\_5), retailers only offer replacement or refund to gift cards (Renting/Wardrobing\_6), force return to registered account (Renting/Wardrobing\_7), and blacklist consecutive returns (Renting/Wardrobing\_8. According to the scoring of this

centralized strategy by the survey population (Figure 4-2), the strategy of returning goods only while the label is still there, blacklisting continuous returns and forcing return to the registered account is a more effective control in people's minds. Of these three, 3 and 9 are significantly higher than the others. 6 and 7 are also higher than other projects. Nonparametric tests (kruskal.test) found that, 3,7,9, these three strategies were scored significantly higher than other methods (P< 0.001).



Figure 4-2 Strategies for returning items after a customer has purchased and utilized it

4.3.2 The scam of customers returning clothes damaged due to their own negligence

Given the current product returns fraud behavior of customers returning their damaged products in shopping, the scale sets out the following strategies: shorten the return period (Damage fraud\_1), the item can only be returned to

the customer service counter (Damage fraud\_2), customers need to fill in online forms to request return labels (Damage fraud\_4), products can only be returned with tags still attached (Damage fraud\_3), customers have to pay for the returns shipping fee (Damage fraud\_5), retailers offer only replacement or refund to a gift card (Damage fraud\_6), need to register an account for return products (Damage fraud\_7), blacklisting of consecutive returns customer (Damage fraud\_8). According to the score of this concentrated strategy by the survey population, it can be seen that the results shown in Figure 4-3 are similar to Figure 4-2, and the strategy of returning goods only while the label is still attached, blacklisting consecutive returns, and forcing register an account for return products are relatively more effective controls in people's opinion. The nonparametric test (kruskal.test) found that the three strategies were scored significantly higher than other methods (P < 0.001), indicating that these three strategies are effective methods against corruption scams in people's opinion.



Figure 4-3 Strategies for customers to return products that they have damaged by their own fault

4.3.3 The scam of customers returning fake goods to impersonate the original

Considering that there are customers in shopping today who return different fashion products instead of original expensive products and get a full refund, the scale sets out the following strategies: shorten the return time (Price Arbitrage\_1), the original purchase receipt or confirmation email (Price Arbitrage\_2), fill out the form (Price Arbitrage\_4), return only when the label is still (Price Arbitrage\_3), Increase the Price Arbitrage\_5, retailers only offer replacement or refund to the Price Arbitrage\_6, force return to the registered account (Price Arbitrage\_7), and blacklist consecutive returns (Price Arbitrage\_8). The results are shown in Figure 4-4, with significant differences in 2, 3, and 9. Blacklisting, original purchase receipts or confirmation emails, and only making returns while the label is still present are considered significantly effective strategies (P < 0.001).



Figure 4-4 Strategies for fraudulent behavior in which customers return counterfeit goods to impersonate the original packaging

#### 4.3.4 Using other store tickets to commit fraud

In the scam of people shopping, leaving the store and possibly re-entering another store, and then picking up an identical item with the original purchase receipt for a refund, the scale lays out the following strategies: retailers increase the coverage of CCTV and security (Return Stolen Item\_1), products can only be returned to the customer service desk (Return Stolen Item\_2). Item\_3), retailers only offer replacement or refund to (Return Stolen Item\_7 and customers are required to fill out (Return Stolen Item\_8). As shown in Figure 4-5, the five strategies differ little in terms of scoring, with retailers increasing CCTV and security coverage and customers needing to fill out return forms considered to be the most effective means of tackling fraud (P < 0.001).



Figure 4-5 Strategies related to fraudulent use of other store tickets

4.3.5 What strategies can be used to reduce the likelihood of product returns fraud

To reduce the incidence of shopping scams, filter people on effective strategies based on the results of the questionnaire, including: telling people that if too many returns may lead to retailers not surviving (Q13-1); Inform that many items that cannot be resold will be wasted (Q13-2); May be caught (Q13-3); Know that this is an offence (Q13-4); here were fewer opportunities for "bending" the returns rules (Q13-5), blacklisted by retailers (Q13-6). The sample in the questionnaire scored the above behaviors as shown in the figure, with the higher scoring methods being likely to be caught, being blacklisted by retailers, and Q13-5, respectively. A single-sample t-test analysis found that these three methods had a significant effect on organizing people's shopping scams (P < 0.001).



Figure 4-6 Evaluation of a series of strategies that may reduce product returns

4.3.6 Whether some retailers' current product return systems can effectively prevent product returns fraud

Though, analyze how effective it is to formulate a specific retailer's return policy in organizing dishonest behaviors such as shopping fraud: River Island (Q20-1); John Lewis (Q20-2); Marks & Spencer (Q20-3); Next (Q20-4); H&M (Q20-5); ASOS (Q20-6); New Look (Q20-7); Primark (Q20-8); TK Maxx (Q20-9); Reiss (Q20-10); Matalan (Q20-11); Zara (Q20-12), the results are shown in Figure 4-7. A questionnaire listing the feedback from different retailers on shopping fraud prevention policies found that John Lewis, Marks & Spencer and Next were the most effective retailers, and Reiss was the retailer with the least effective policy feedback and was significant compared to other retailers (P < 0.001). Based on the results, in terms of policy guidance, choosing John Lewis, Marks & Spencer and Next may choose better retailers, while Reiss may need to choose other policies to prevent fraud.



Figure 4-7 Some retailers currently have a strong prevention of product returns

# 4.4 Gender and age differences towards People's perceptions of returns fraud behavior

According to the scale collection, the population background includes age and sex, so unsupervised principal component analysis is performed with gender and age as group information, respectively, to observe responses to the scale between different groups. Figure 4-8 shows that the different grouping scatters are evenly mixed without obvious separation. It shows that there are no significant differences in responses to the scale between different genders and different age groups, and that there are similar views on policies for the prevention and control of shopping fraud between men and women and at different ages.



Figure 4-8 Principal component analysis of scale responses based on gender and age grouping

# 4.5 People's common opinions on product returns fraud behavior

Considering that there is no significant separation between different ages and genders in the baseline information of the population, the k-means clustering method is used to score the policy views on the control of shopping fraud in the scale for unsupervised clustering to explore the differences in the views and attitudes of the samples on policy development. The K-means clustering results are shown in Figure 4-9, and the samples can be divided into two categories according to the questionnaire responses of the scale, and the two types of samples have good separation. Further comparing the differences in question answers between groupings based on k-means clustering analysis is shown in Table 3 (only the difference results section is shown). The policy bias scores of Renting/Wardrobing, Damaged Fraud, Price Arbitrage, and Return Stolen Item were significantly lower than those in clustering 2, but the policy choices for each type of scam were exactly the same for both groups.

Detailed discussion on other issues, Q23 question cluster 1 group prefers to rent clothes or remain neutral; Q13-1 problem in the cluster 1 group biased returns too many retailers may not survive; Q13-2 problem in the cluster 1 biased goods can not be resold will cause waste; Q13-4 question in the cluster 1 group tends to believe that people subjectively realize that shopping fraud is illegal; Q13-6 The cluster 2 group in question favors blacklisting people who have committed fraudulent behavior.



Figure 4-9 K-means clustering analysis

Table 4-3 Differences in scale problem scoring between different k-means clustering

groups					
Options	K_Cluster_1	K_Cluster_2	OR	p.ratio	p.overall
Number	N=281	N=222			
Renting/Wardrobing_1	41.8 (24.2)	27.8 (19.9)	0.97 [0.96;0.98]	<0.001	<0.001
Renting/Wardrobing_2	46.9 (27.8)	28.6 (21.4)	0.97 [0.96;0.98]	<0.001	<0.001
Renting/Wardrobing_4	45.9 (25.1)	24.0 (17.6)	0.95 [0.95;0.96]	<0.001	<0.001
Renting/Wardrobing_3	79.9 (21.7)	62.6 (27.4)	0.97 [0.96;0.98]	<0.001	<0.001
Renting/Wardrobing_6	63.4 (26.3)	43.8 (25.4)	0.97 [0.97;0.98]	<0.001	<0.001
Renting/Wardrobing_7	71.1 (23.9)	53.5 (26.6)	0.97 [0.97;0.98]	<0.001	<0.001
Renting/Wardrobing_8	56.4 (28.1)	29.0 (21.5)	0.96 [0.95;0.97]	<0.001	<0.001
Renting/Wardrobing_9	79.0 (21.8)	57.4 (26.8)	0.97 [0.96;0.97]	<0.001	<0.001
Q23:					0.019
2	11 (3.91%)	19 (8.56%)	Ref.	Ref.	
5	53 (18.9%)	55 (24.8%)	0.61 [0.25;1.38]	0.237	
1	42 (14.9%)	34 (15.3%)	0.47 [0.19;1.12]	0.091	
4	144 (51.2%)	102 (45.9%)	0.41 [0.18;0.90]	0.026	
3	31 (11.0%)	12 (5.41%)	0.23 [0.08;0.62]	0.003	
Damaged fraud_1	40.5 (24.6)	23.0 (18.9)	0.96 [0.95;0.97]	<0.001	<0.001
Damaged fraud_2	52.2 (26.1)	32.6 (23.2)	0.97 [0.96;0.98]	<0.001	<0.001

Damaged fraud_4		48.5 (22.8)	24.1 (17.2)	0.94 [0.93;0.95]	<0.001	<0.001
Damaged fraud_3		78.2 (22.2)	56.8 (30.1)	0.97 [0.96;0.98]	<0.001	<0.001
Damaged fraud_6		66.7 (24.5)	39.2 (24.9)	0.96 [0.95;0.97]	<0.001	<0.001
Damaged fraud_7		70.7 (22.9)	43.2 (26.8)	0.96 [0.95;0.97]	<0.001	<0.001
Damaged fraud_8		60.7 (26.7)	26.6 (19.1)	0.94 [0.93;0.95]	<0.001	<0.001
Damaged fraud_9		80.7 (20.8)	54.4 (27.4)	0.96 [0.95;0.97]	<0.001	<0.001
Price Arbitrage_1		33.2 (25.5)	16.5 (15.7)	0.96 [0.95;0.97]	<0.001	<0.001
Price Arbitrage_3		82.6 (20.4)	64.9 (28.9)	0.97 [0.96;0.98]	<0.001	<0.001
Price Arbitrage_2		75.3 (24.8)	48.2 (29.2)	0.97 [0.96;0.97]	<0.001	<0.001
Price Arbitrage_4		57.9 (24.7)	26.4 (19.0)	0.94 [0.93;0.95]	<0.001	<0.001
Price Arbitrage_6		62.8 (25.1)	32.6 (23.6)	0.96 [0.95;0.96]	<0.001	<0.001
Price Arbitrage_7		66.9 (24.6)	41.2 (25.8)	0.96 [0.96;0.97]	<0.001	<0.001
Price Arbitrage_8		63.2 (27.0)	29.9 (22.4)	0.95 [0.94;0.96]	<0.001	<0.001
Price Arbitrage_9		83.9 (19.6)	58.9 (28.6)	0.96 [0.95;0.97]	<0.001	<0.001
Return Stolen Item_1		72.3 (22.9)	53.1 (25.5)	0.97 [0.96;0.98]	<0.001	<0.001
Return Stolen Item_2		57.2 (26.9)	28.3 (22.3)	0.96 [0.95;0.97]	<0.001	<0.001
Return Stolen Item_3		59.8 (31.5)	32.1 (26.2)	0.97 [0.96;0.98]	<0.001	<0.001
Return Stolen Item_7		60.7 (27.2)	33.6 (24.7)	0.96 [0.96;0.97]	<0.001	<0.001
Return Stolen Item_8		73.3 (22.1)	45.3 (26.0)	0.96 [0.95;0.96]	<0.001	<0.001
Q13_1:						0.002
	5	45 (16.0%)	57 (25.7%)	Ref.	Ref.	
	2	103 (36.7%)	97 (43.7%)	0.74 [0.46;1.20]	0.228	
	3	53 (18.9%)	28 (12.6%)	0.42 [0.23;0.76]	0.004	
	4	73 (26.0%)	38 (17.1%)	0.41 [0.24;0.72]	0.002	
	1	7 (2.49%)	2 (0.90%)	0.24 [0.03;1.08]	0.064	
Q13_2:						0.03
	5	45 (16.0%)	57 (25.7%)	Ref.	Ref.	
	2	111 (39.5%)	84 (37.8%)	0.60 [0.37;0.97]	0.037	
	3	45 (16.0%)	39 (17.6%)	0.69 [0.38;1.23]	0.204	
	4	67 (23.8%)	36 (16.2%)	0.43 [0.24;0.75]	0.003	
	1	13 (4.63%)	6 (2.70%)	0.37 [0.12;1.03]	0.058	
Q13_3:						0.001
	5	3 (1.07%)	4 (1.80%)	Ref.	Ref.	
	4	4 (1.42%)	14 (6.31%)	2.51 [0.34;18.1]	0.356	
	3	11 (3.91%)	21 (9.46%)	1.43 [0.23;8.09]	0.687	
	2	127 (45.2%)	102 (45.9%)	0.61 [0.11;2.98]	0.537	
	1	136 (48.4%)	81 (36.5%)	0.45 [0.08;2.22]	0.323	
Q13_4:						<0.001
	5	29 (10.3%)	38 (17.1%)	Ref.	Ref.	
	2	58 (20.6%)	73 (32.9%)	0.96 [0.53;1.74]	0.897	
	3	52 (18.5%)	40 (18.0%)	0.59 [0.31;1.11]	0.103	
	4	84 (29.9%)	53 (23.9%)	0.48 [0.27;0.87]	0.016	
	1	58 (20.6%)	18 (8.11%)	0.24 [0.11;0.49]	<0.001	

Q13\_5:

<0.001

	5	3 (1.07%)	6 (2.70%)	Ref.	Ref.	
	4	21 (7.47%)	28 (12.6%)	0.69 [0.12;3.02]	0.626	
	2	31 (11.0%)	43 (19.4%)	0.71 [0.13;3.02]	0.654	
	3	158 (56.2%)	119 (53.6%)	0.39 [0.08;1.55]	0.182	
	1	68 (24.2%)	26 (11.7%)	0.20 [0.04;0.84]	0.028	
Q13_6:						<0.001
	5	3 (1.07%)	7 (3.15%)	Ref.	Ref.	
	4	13 (4.63%)	30 (13.5%)	1.01 [0.18;4.43]	0.989	
	2	33 (11.7%)	38 (17.1%)	0.51 [0.10;2.06]	0.354	
	3	131 (46.6%)	112 (50.5%)	0.38 [0.08;1.43]	0.157	
	1	101 (35.9%)	35 (15.8%)	0.15 [0.03;0.61]	0.007	

# 4.6 Dependencies correlations on people's perceptions and evaluations of returns fraud behavior

The answers to the scale questions in the sample were shown in Figure 4-10 to see how likely the population was to answer different questions and how correlated they were. The relevance heatmap clearly shows a high positive correlation between the policy-biased samples of Renting/Wardrobing, Damaged Fraud, Price Arbitrage, and Return Stolen Item, suggesting that the strategy of making returns only while the label is still alive, blacklisting consecutive returns, and forcing returns to registered accounts is an effective means of controlling these three types of problems. In addition, in the Q20 series of questions, the tendency to score different return policies of specific retailers that may prevent shopping fraud shows a synergy of people's perceptions of retailers' return policies.



Figure 4-10 Correlation analysis

## **Chapter 5: Discussion**

## 5.1 People's opinion upon the product returns fraud behaviour

According to the results of the survey on people's understanding of product returns fraud, more than half of the people have not had returns fraud around them. Men are slightly more likely to commit product returns fraud than women, but neither of them is over 4%. Women have had several product return frauds than men. Indicates that women may be more likely to continue multiple product return frauds after a successful product returns fraud. However, product returns fraud does not show significant differences in gender. Nor did the difference in gender and age show a significant difference in perceptions of returns fraud.

However, people's overall evaluation can be divided into two categories. The proportion of these two groups of people is similar, and it can be seen in all the scoring items that one group of people has a significantly higher answer than the other. It can therefore be inferred that the main differences in people have a positive or negative attitude toward product returns fraud. The result of this attitude may be due to the inadequacy of the current return policy, or it may be that the current prevention measures against returns fraud are not effective enough. Although both groups as a whole are not optimistic enough about measures to prevent product returns fraud, the number of relatively positive people is slightly more than the number of relatively negative people.

When evaluating current retailers' return policies, John Lewis, Marks & amp; Spencer and Next are the retailers who are recognized as significant protections against product returns fraud in their current return policies. Reiss is the least effective at preventing product returns fraud. As a result, Reiss urgently needs to change its return policy so that it can control product returns fraud. In addition, John Lewis, Marks & amp; Spencer and Next can serve as reference samples for most retailers when revising their return policies.

# 5.2 Measures that may protect businsses from effective response to product returns fraud

People have a more unified view that products with labels can only be returned when returning, consumers with continuous returns are blacklisted, and increasing security patrols and CCTV in stores may be the most effective means to control product returns fraud.

For product returns fraud of the "Renting/Wardrobing" and "Damaged fraud" types, it is believed that returning the goods only while the label is still there, blacklisting consecutive returners, and only exchanging or returning to gift cards are relatively effective measures to prevent fraud. For "Price Arbitrage" type of product returns fraud, it is widely believed that blacklisting the perpetrators of consecutive returns, only with the original purchase receipt or confirmation email, and only when the label is still there, is a relatively effective measure to prevent fraud. For "Return Stolen Item" type of product returns fraud, it is widely in their stores, and the way that customers need to fill out return forms with more personal information, is considered to be a relatively effective measure to prevent fraud.

The measures provided in the questionnaire that may discourage product returns fraud from occurring are thought to be possible in three ways. In these three ways, the probability of being caught spreading the word about product returns fraud becomes higher, there is less chance that the return rule may be distorted, and the continuous return behaviour is blacklisted. Among the options that told them that the returns fraud was illegal and that it would hurt the retailer's interests, the respondents showed a distinctly negative assessment. It shows that most of the people who believe that the majority of people who commit product returns fraud are still committing fraud knowing that product returns fraud is incorrect. Therefore, it may be a more effective way to implement a stricter return inspection system and penalties than educating and reminding consumers.

## **Chapter 6: Conclusion**

## 6.1 Summary

With the development of the times and the impact of the Covid-19 epidemic, in addition to the development of traditional physical stores, online shopping is also developing rapidly. Although online shopping provides great convenience to consumers, online shopping can still bring some returns to consumers due to not having seen the product in person. And, due to the development of online shopping, the shopping and return process as a whole has become more complex and difficult to control. As a result, it gives some people the opportunity to commit product returns fraud. This kind of behavior will not only cause direct losses to the interests of retailers, but also may indirectly affect the reputation and user loyalty of retailers. Therefore, it is necessary to control product returns fraud.

By investigating the current attitudes towards returns fraud in the UK market. By performing t-test analysis, principal component analysis, and correlation analysis on 503 samples after screening, the following results can be obtained.

- 1) More than half of the people have never had a returns fraud with them.
- 2) More women have experienced several product returns frauds. Overall, however, there is no significant difference in the probability of product returns fraud occurring between genders. Regardless of gender, there is a need to strengthen the management of returns fraud.
- 3) There is a clear difference in attitudes between the two attitudes in people's perceptions of returns fraud. Some people are relatively optimistic about preventing the occurrence of product returns. Others have a relatively negative attitude.
- 4) The factors that lead to the general negative view of preventing product returns fraud may be that the current existing measures are not strong enough to prevent and control

product returns fraud, or it may be because more manpower and material resources and more clever means are required to truly implement measures that can effectively control product returns fraud.

- 5) It is widely believed that John Lewis, Marks & amp; Spencer and Next's current return policies are relatively effective in preventing product returns fraud. Reiss' return policy has a poor prevention of product returns fraud, and there is an urgent need to change the return policy.
- 6) It is widely believed that only labeled products can be returned at the time of return, and consumers with continuous returns are blacklisted, and increasing security patrols and CCTV in stores may be the most effective means of controlling most product returns fraud.
- 7) For different types of product returns fraud, it is believed that some measures can also be relatively effective control. For example, retail stores can only accept exchanges or can only return refunds to gift cards, must present the original purchase receipt or confirmation email when returning, and need to fill in a return form with more personal information when returning may also play a relatively effective role in preventing product returns fraud.
- 8) There is widespread negative sentiment about some measures to prevent product returns fraud. These measures include providing a shorter return period, returning orders requiring an additional form to be requested instead of being attached at the outset, and products that can only be returned to the help desk. In addition to the perception that these measures are not strong enough to combat product returns fraud, it is also possible that these measures also hinder the return experience of ordinary consumers.
- 9) In addition to stricter policies in the return process, some publicity that may discourage product returns fraud may also be effective in preventing such behavior. For example, the probability of being caught spreading product returns fraud to people becomes higher and there is less chance that the return rule may be distorted. Therefore, strengthening penalties for return fraud and publicizing people about the consequences of product returns fraud may be effective means of preventing return

fraud.

All in all, this study provides a preliminary understanding of what people think about return fraud. Among the retailers involved in this study, Reiss urgently needs to revise its return policy, which could result in serious losses due to product returns fraud. John Lewis, Marks & amp; Spencer and Next's return policies are relatively good, and retailers can refer to the relevant policies to revise. Through this study, people currently lack confidence in existing measures to prevent product returns fraud, so more effective measures need to be found. However, before finding and formulating new measures, it is also necessary to take into account the interests of ordinary consumers, otherwise it will cause consumers to have negative emotions. In addition, in addition to preventing this behavior from occurring, retailers and governments also need to increase penalties for return fraud. This behavior is reduced to some extent when it is realized that the risks associated with product returns fraud may outweigh the benefits.

### 6.2 Limitations

At present, there is not much research on product returns fraud, and the types of product returns fraud are endless, and it is difficult to classify and investigate all product returns fraud well. The research data used in this study as a preliminary analysis, while some results were achieved, there are some measures that can prevent return fraud that are not mentioned. Moreover, the study was conducted from the perspective of ordinary consumers, and if the relevant personnel of retailers can also be investigated, there may be more effective results.

## 6.3 Further research

In this study, it was found that the return policies of John Lewis, Marks & amp; Spencer and Next may be relatively effective in preventing product returns fraud. Therefore, it makes sense to specifically analyze which of these retailers' terms are effective for other retailers to learn and improve their return policies in the future.

There has been a positive response to the fact that refunds can only be returned as gift cards, so whether refunds can only be returned to the original electronic payment channel and the way in which cash cannot be returned is also a meaningful measure worth studying in the future.

The study is conducted by ordinary consumers, and in the future, a questionnaire survey will be conducted for retailers in order to more completely look at the problem of product returns fraud from multiple perspectives. Moreover, this investigation alone does not concretize the criminal tendency to commit fraudulent product returns. In future research, a survey of retailers with more experience of product returns fraud may reveal retailers and product characteristics that are more likely to occur with product returns fraud. For example, product returns fraud is more likely to occur in large stores or small stores, whether the type of product is inclined (clothing, daily necessities, food), and what level of the price range of the product is approximately.

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