The University of Southampton 2021/22

Faculty of Social Sciences

Southampton Business School

MSc Dissertation

An assessment of the impact of the use of item-level identification technology on managing product returns

ERGO number: (your ERGO reference number)
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Presented for MSc (MSc Bus Analytics & Management)

This project is entirely the original work of student registration number (32572557). I declare that this dissertation is my own work, and that where material is obtained from published or unpublished works, this has been fully acknowledged in the references.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: xxxxx words

Abstract

Even while item-level RFID technology plays a significant role in enhancing the efficiency of the returns process, it has not been widely used in the retail business, according to the research. As a result, we anticipated discovering the attitudes of various types of retailers concerning item-level RFID technology and evaluating the obstacles RFID presents when used in the returns process.

Chapter 1: Introduction

1.1 Overview

This chapter will begin with a discussion of the context of omnichannel return networks and the application of item-level identification technology to the return process to provide context for this study. The research questions and objectives will follow the context and inspiration for this study. The structure of this study will be described in the concluding section of this chapter.

1.2 Background and motivation

Due to the prevalence and rapid expansion of online shopping, more and more retailers choose to open online sales channels (Frei et al., 2022). All retailers' strategies in a highly competitive market are based on "customer focus." Developing a more convenient omnichannel return network is essential for businesses to increase customer satisfaction, which makes customers quickly return things. One study mentioned that 23% of the retailers surveyed have strictly separate returns between channels and that online orders must be returned by mail (Hübner et al., 2016). However, consumers do not typically opt to buy from such retailers that do not facilitate returns (Promocodes, 2017). As a result, many retailers provide omnichannel returns services, allowing customers to return online purchases in-store (Jin D. et al., 2020).

Reports indicate that return rates for online purchases are two to three times greater than for purchases made in physical stores, even though Internet sales are notably high (Jack et al., 2019). This means that, with the emergence of omnichannel return networks, a substantial amount of online purchases may be returned to retail shops. Existing return systems must take on the new retail omnichannel return service. Still, one of the most prominent problems with that return system is its traditional IT systems. Many retailers still rely on IT systems developed just for physical store operations, making it tough to manage multi-channel returns (Helo & Szekely, 2005). The inability of online and in-store sales systems to communicate with each other and track products throughout the journey. Consequently, it is difficult for store personnel to match the accurate sold information for cross-channel returns, making it nearly impossible to stop fraudulent consumer returns. Moreover, according to a 2016 survey by Hübner et al., approximately 67% of retailers store these returns in their in-store inventory after receiving them. The increasing number of online returns to offline can have a direct impact on the limited in-store storage space (Bernon et al., 2016).

To meet the challenge of omnichannel returns, the issue of return process improvement is worth investigating. A successful returns process needs not only the easy receiving of return requests for sold products but also serves as a buffer in the supply chain to coordinate the return of products to the subsequent processing step, such as storage, secondary resale, and repair (Kevin et al., 2005). Therefore, retailers need a better grasp of where each product is returned to receive returns accurately and share return information promptly (Choi et al., 2015). Thus, the return process management should be based on the traceability of each returned product.

Tracking each product is only possible if it has a unique identity (Prater & Reyes, 2005). The item's identity is based on a unique product ID, which can either be affixed as an individual product serial number or an electronic code (RFID tag) attached to each item. Then, with the handheld barcode scanners currently in use or more modern devices, the identity of each product can be determined, enabling item-level identification of the product (Gaukler, 2011). RFID (Radio Frequency Identification) is one of the newest item identification systems that employ radio frequency (RF) technology to identify objects and information (Teicholz & IFMA, 2012). RFID at the item level enables complete product visibility from source to the shop and real-time tracking of individual items (Kevin et al., 2005). Moreover, after RFID devices are deployed in all sales channels, once a consumer confirms payment, the sales record of the item is updated to the back-end database so that store clerks can verify the historical transaction information of returned items in real time (Choi et al., 2015). Therefore, adopting RFID technology appears to be a practical method for improving the management of multi-channel returns, allowing retailers to monitor and control their products at the item level.

While some worldwide retail giants such as Wal-Mart and Marks & Spencer have adopted RFID to manage their supply chains, many retailers have been sluggish in implementing the technology (Erickson et al., 2007). This is mainly because many academics and retailers remain sceptical about the benefits of using RFID technology. In addition, the high cost of RFID tags is a significant barrier to its widespread adoption (Pfahl & Moxham, 2014). Consequently, this report seeks to evaluate how item-level identifying technology, particularly advanced item-level RFID technology, has a practical impact on the application of omnichannel return processes. And the challenging factors in adopting it.

This research is motivated by the fact that the issue of product returns remains underestimated and understudied. To date, the sustainability of product returns has not been considered a priority by most retailers, and return costs are considered an unavoidable cost of doing business. This has led to senior management's neglect and unwillingness to invest in better and more advanced technology. This report argues that, in light of the transition of brick-and-mortar retail to an omnichannel business model, it is crucial to make product returns a strategic management priority and that there is significant room for improvement in the returns process. By analysing the benefits of the practical application of item-level RFID technology to the returns process, researchers and retailers will get insight into the technology's help and facilitate them to modify their returns processes.

1.3 Research questions and objectives

Even while item-level RFID technology plays a significant role in enhancing the efficiency of the returns process, it has not been widely used in the retail business, according to the research. As a result, we anticipated discovering the attitudes of various types of retailers concerning item-level RFID technology and evaluating the obstacles RFID presents when used in the returns process.

The following research questions will be addressed in this report:
RQ1: What challenges do retailers encounter when implementing RFID technology?
RQ2: Does implementing RFID to manage returns achieve the expected benefits?
RQ3: What are the causes of expected deviations after RFID implementation?

Regarding the questions above, the following are the research objectives of this thesis:
RO1: Identify the critical factors retailers may consider while implementing RFID technology.
RO2: Evaluate retailer satisfaction with RFID's positive impact on managing returns.
RO3: Determine the range of RFID implementation among retailers.

1.4 Structure of the dissertation

Chapter 2 provides an in-depth review of the relevant literature on omnichannel retailing trends, the challenges facing omnichannel return strategies, the potential benefits of item-level identification technology for managing returns, and presents hypotheses around the research questions. Chapter 3 then describes the research methodology, which includes the data collection and modelling processes. Chapter 4 then presents the results of model testing. Discussion is included in Chapter 5. Chapter 6 concludes by summarising the study and discussing its limitations and suggestions for further research.

Chapter 2: Literature Review

2.1 Overview

This chapter's purpose is to provide an overview of previous research to inform the research questions used for further exploration and the methods chosen to attain the research objectives. We will examine each study, evaluate our work, and highlight our contribution to this literature review.

First, an overview of omnichannel retailing is presented, covering the trend of retailers opening online sales channels and the significance of providing omnichannel return services.

Then, by examining the limitations of the traditional returns system, it identifies the challenges that can arise in managing cross-channel returns.

This is followed by explaining why automating the tracking of each returned product is a feasible means of optimising the returns process.

The research then examines how RFID technology may effectively manage the returns process at the item level.

Next, a summary of the previously discussed studies and a discussion of research gaps are provided.

Finally, the hypothesis is developed in light of the research question.

2.2 Omnichannel Retail

2.2.1 Digital retail

The move toward digital retail is becoming more noticeable as online shopping is increasingly popular. It is now anticipated that global online sales will increase to $6.5 trillion by 2022, up from $3.5 trillion in 2019 (Frei & Jack, 2021). In addition, there are predictions made in the research that by 2040, as much as 95 percent of all shopping will be done online. Brick-and-mortar giants like Wal-Mart, Best Buy, and Home Depot, among others, have been forced to establish and extend their online presence in response to the rise of online shopping as a shopping channel (Frei et al., 2022).

According to Buldeo et al. (2019), the recently conceived omnichannel retailing model calls for the retailer's store to double as a pickup point. "omnichannel retailing" refers to integrating traditional offline channels, such as brick-and-mortar stores, with internet channels, such as online storefronts. Some stores allow customers to pick up their online purchases in-store and return them in-store (Zhang et al., 2010). This means that customers can use various shopping channels throughout their buying journey in a flexible, convenient, and seamless manner tailored to their interests and requirements. The retailing practices known as "buy online, pick up in store," "buy online, ship to store," and "purchase online, ship from store" are all examples of omnichannel retailing tactics that are now in use (Hu et al., 2018). The omnichannel retailing strategy is quickly becoming more prevalent in the retail industry.

On the other hand, not all stores succumb to the allure of the strong purchasing power of the internet (Jack & Frei, 2021). This is because additional fees will be incurred if an internet channel is launched. Even when there are now no transactions, the process of this new channel still requires maintenance costs. This is a problem for lower-priced products, where the cost of processing exceeds the revenue from the item's sale. For this reason, a retail business that specialises in selling things at low prices, such as Primark, probably will not opt to establish an online retail channel.

2.2.2 Omnichannel Returns Strategy

In addition to the omnichannel sales process, which has received much attention recently, the omnichannel returns process also merits consideration. Return rates for online retailers are two to three times greater than those of traditional brick-and-mortar retailers (Jack et al., 2019). At least thirty per cent of all items purchased online are sent back, but only nine per cent of items bought in traditional retailers are returned. As a result, omnichannel retailers face a significant challenge concerning managing customer returns.

Return policies are handled differently by various retail establishments. BORP is an acronym for "Buy online, return to a physical store", It is mentioned in the research conducted by Jin et al. (2020). BORP is one of the most common return strategies for omnichannel retailing. Retailers who implement a BORP policy frequently take advantage of it as an additional option to online returns via the postal service. Some businesses may restrict the return policy to only apply to particular types of merchandise and advise customers to send other things back "only by mail." Some companies may choose not to provide BORP as an option at all.

When an omnichannel retailer has a BORP policy, customers can return or exchange items purchased online at the retailer's brick-and-mortar location. More customers may be convinced to buy online if a BORP policy is in place. This is because consumers can return items in-store for a full refund. Promocodes (2017) notes that there is evidence to suggest that the return policies of businesses influence customers' purchasing decisions. A survey by Jin, D. et al. (2020) noted that 51% of customers will not purchase at establishments with stringent return policies, and 63% of customers said they would not return to a store after having an unpleasant experience with a return. As a result, providing a hassle-free approach for customers to return items can set merchants apart from their rivals. This would imply that making BORP plans available to customers can be a competitive tactic for retailers.

In this study, we look at omnichannel retail strategies, which are implemented by stores with both an online and a physical presence and sell goods to customers through both channels. Managing product returns in omnichannel retailing is a challenge that is often underestimated. There is not a lot of research available on omnichannel return tactics. Even though more and more products are being sent back through omnichannel retailing, many retailers and manufacturers are still unaware of the significance and scope of the problem. As a result, in the next phase, it is essential to identify the challenges facing the current returns process under an omnichannel returns network.

2.3 Omnichannel returns management challenges

2.3.1 Lack of visibility of cross-channel products

When retailers offer omnichannel returns services, the lack of visibility of cross-channel products in the supply chain might pose various issues for the present returns process.

Product visibility depends on sharing information transmission between supply chain actors (Barratt & Oke, 2007). The shared product information includes sales data, client orders, and inventory level data (Jonsson & Mattsson, 2013). Several studies have highlighted the importance of information sharing amongst supply chain partners (Lee & Whang, 2000). Therefore, it is necessary to share relevant product information among supply chain participants to manage better the product life cycle (Jonsson & Myrelid, 2016).

However, most retailers' current return systems lack real-time product visibility (Angulo et al., 2004). This is primarily because most retailers continue to employ systems designed solely for traditional store operations, and product information cannot be communicated between sales systems in different channels (Helo & Szekely, 2005). This status quo hinders product visibility in the supply chain and makes it impossible for retailers to identify the cross-channel sales sources of returned goods. It is becoming increasingly important for retailers to comprehend the current condition of item tracking, the procedures it has undergone, and its transactional history (Pfahl & Moxham, 2014). Item-level tracking systems increase the visibility of individual goods throughout the supply chain (Zhou, 2009). Therefore, enhancing the visibility of each item is essential for optimising the return process.

In this literature research phase, the existing return system utilised in brick-and-mortar businesses does not support tracking items. And it is almost impossible for store employees to rely on the in-store system for more information about online returns. Therefore, receiving returns in-store may be subject to uncontrollable risk factors. Next, this study will determine what return management concerns result from a retailer's inability to acquire real-time information regarding returned products.

2.3.2 Fraudulent returns

Although retailers proactively offer generous return policies to increase their market competitiveness and consumer satisfaction (Ren et al., 2021). Consumers may abuse flexible return policies to achieve their specific goals by engaging in illegal or unethical return behaviour, despite being aware that their return behaviour may violate the retailer's return policy (Seger -Guttmann et al.,2018).

82% of large retailers, according to research, believe fraudulent returns to be a significant concern (King, 1999). Consumer return fraud is getting increasingly prevalent. 12 percent of consumer returns contained fraud, according to the early investigations of fraudulent consumer returns (Zabriskie, 1972). Subsequently, Jolson (1974) discovered that 22% of returns involved exploiting return policy gaps to defraud shops. In recent years, an examination of clothes returns from mass merchants revealed that fifty percent of returns are fraudulent (King & Dennis, 2001). Reynolds & Harris (2005) claimed that 54 percent of their sample consisted of fraudulent returns. Nearly 92% of the consumers surveyed in Harris' (2010) study admitted to intentionally fraudulent returns.

Consumers and store staff agree that fraudulent returners with extensive knowledge of the retailer's return policy are substantially more likely to make fraudulent returns (Harris, 2010). Due to the retailer's initiative to provide a flexible return policy that ensures customer satisfaction, the likelihood of success for those customers' requests for return refunds is high (Chang & Yang, 2022). Some retailers' revenues can be reduced by 10 percent due to fraudulent returns by customers (King, 2004). Therefore, understanding how to limit this theft is crucial for merchants to maximise the seller's interests without offending customers seeking legitimate returns.

First, let's examine how fraudulent returns are received successfully. Even with omnichannel return strategies, obtaining consumer receipts for returns is a standard procedure (Shang et al., 2017). In receipt fraud, return fraudsters (fake consumers) search shopping carts and bags for cash receipts (Cook & McKnight, 2014). Then, it is sufficient to obtain the actual customer's cash transaction receipt and bring the identical item to the retail store to be eligible for a complete refund (Chang & Guo, 2021). Thus, the return fraudster (fake customer) only brings the receipt of the actual customer's cash transaction and the identical item to possibly receive a complete refund from the retail store (Chang & Yang, 2022). This strategy looks to provide numerous opportunities for fraudulent returnees to exploit weaknesses. It is important to note that employees can take advantage of this policy loophole to pose as customers and facilitate fraudulent returns (Appelbaum et al., 2006).

Then, the report needs to determine whether store associates can prevent the growing problem of return fraud when receiving omnichannel returns. Typically, store workers can accept returns through a checkout system or by making their determinations (Akturk et al., 2021). However, typical checkout systems have trouble detecting the details of each transaction on a receipt, and it is especially challenging for store personnel to prevent return fraud using less leader technology (Cook & McKnight, 2014). Because the standard receipt lacks a barcode based on the unique serial number of the goods, it cannot be used to identify transaction data for each stock-keeping unit (SKU) (Akturk et al., 2021). Even though some shops have upgraded their barcode technology to identify each SKU sold in-store, they cannot identify SKUs sold through other channels (Harris, 2010).

As a result, depending on store workers rather than the system to manually verify the eligibility of returns may increase the likelihood of fraudulent returns. When confronted with returns from online channels, retail personnel must frequently spend additional time comparing information (Cook & McKnight, 2014). This is because online sales channels offer more stock-keeping units (SKUs) than traditional sales channels (Hübner et al., 2016). This can easily result in a returned order exceeding the assortment of SKUs available at the actual store. If store staff accept returns without verifying the sold information, they could be misled.
Moreover, internet returns often consist of both product returns and swaps. Customers can reorder replacement goods online but must return the original product to the store to receive a refund (Dailey & Ulku, 2018). Due to the lack of information, store-level staff may presume this is a pickup item and not realise they must ask the consumer to return the returned item to complete the transaction (Jin, D. et al., 2020). Consequently, shop employees are likely to fall victim to fraudulent returners when retail store systems do not provide visible product information.

Thus, flexible return rules and a significant number of unethical consumers are the causes of the prevalence of fraudulent returns. And it appears that greater product traceability assists store employees in identifying fraudulent returns, hence reducing losses during the returns receipt process.

2.3.3 In-store inventory pressure

In addition to the problem of large-scale fraudulent returns, the storage of returns after they have been successfully received is a sometimes overlooked obstacle.
Bernon et al. (2011) believe that the process of "customers requesting in-store returns" is unaffected by the omnichannel concept since the store bagging and returning the online product to the warehouse remains unaltered when the customer returns the item to the shop. On the other hand, according to Stock and Mulki (2009), the 'Buy online, return to a physical store' (BORP) strategy should assess whether a retail store's limited shelf space can accommodate a large volume of returns from the online channel.

Shelf space at retailers' shops is typically restricted, and the store's only option for storing merchandise generally is on the shelves (Prater et al., 2005). Retail managers frequently face difficult choices about the placement of products on limited shelf space within the store (Palmer, 2009). It will directly impact the inventory levels of high-demand items if the in-store stock is cluttered with unmanageable returns (Urban, T. L., 2002).

A survey of retailers conducted by Buldeo et al. (2019) found that one-third of merchants will choose to forward returns to a returns centre; Two-thirds of merchants will decide to include in-store returns as part of their store inventory. In other words, there is a strong likelihood that returns from other channels will occupy retail shelf space. Since retailers lack real-time information about the location of return points for each online good, the person in charge of returns cannot make timely judgments regarding the next step to be taken when processing returns (Fosso, 2012). In addition, some retailers reported that after implementing omnichannel returns, the store got too many returns which could not resell (Bernon et al., 2016). This means that identifying the point of return for each product and processing it promptly is essential for preserving the store's available storage space.

Therefore, returns can be facilitated if the return information is exchanged with the supply chain system in real-time when they are received so that the person responsible can immediately see and process the return. This can alleviate inventory strain in the store and free up shelf space for more in-demand items.

2.4 Methods for managing omni-channel returns

2.4.1 Product tracking technology and customer profiles

Increasing the trace ability of information about each product and attaining product visibility in the supply chain can have a good impact on managing fraudulent returns and in-store inventory pressures, according to this study. This paper will continue to investigate the available ways for tracking the entire product lifecycle across the supply chain.

Akturk et al. (2021) offer product tracking technology as a viable countermeasure to address both return issues. This technology provides product visibility throughout its lifecycle (Gul et al., 2022). Utilising serial numbers and other unique product identifiers, product tracking technology can enable simple and seamless traceability and sharing of product information throughout the supply chain (Secreto, 2019). Importantly, it allows store clerks to acquire the transaction details of returned products in real-time using unique product serial numbers, hence facilitating the detection and rejection of those unethically returned (Secreto, 2017). Thus, product tracking technology appears to offer enormous potential benefits for return process management.

Utilising product tracking technology has a good effect on balancing in-store inventory. This is because it successfully tracks the precise location of products along the supply chain, from where they are sold to where they are returned, enabling real-time visibility of products (Fawcett et al., 2009). This greater product visibility enables retail stores to effectively manage their in-store inventory (Gul et al., 2022). Cachon and Fisher (2000) investigate how knowledge sharing might be utilised to improve inventory allocation. Retail stores share in-store returns information, such as returns data and inventory status from the previous day's activity, with important supply chain partners in a timely way, allowing decision makers to make better decisions regarding returns being processed promptly and mitigating the impact of returns on in-store shelf space (Angulo et al., 2004).

Although product tracking technology may be tracked back to each transaction record of a product, it is more beneficial for store workers to identify the genuine consumer when used in conjunction with customer profiles (Akturk et al., 2021). Creating a database of returned customers is an efficient method for managing returns since it allows for improved monitoring of repeat returners and serves as a deterrent (Chang & Yang, 2022). The quantity, frequency, and amount of returns for each customer are stored in a database of customer profiles, and store staff can access the customer's transaction history by looking up the customer's id in the system (Kang & Johnson, 2009). Based on the customer's past return behaviour, the store clerk can decide whether to accept legal return consumers or refuse frequent return consumers. Large stores, including Home Depot, Best Buy, Sephora, and J.C. Penney, utilise consumer profile databases to manage returns (Howland, 2018).

Consequently, adopting product tracking technologies and consumer profiles improves merchants' ability to manage returns. Managers or store employees who receive returns can obtain information about the products sold, accept the correct returns, and process them promptly by looking for the unique serial numbers of the products.

2.4.2 Item level identification

Only when each item has its own identity can its precise position across the supply chain be determined using product tracking technology (Prater & Reyes, 2005). Traditional retailers manage products by categorising them based on similar attributes, including size, colour, material, packaging, manufacturer, etc. (Cook & McKnight, 2014). The categorisation is subsequently entered as a unique identification for inventory management, termed SKU (Stock Keeping Unit) (Hübner et al., 2016). However, SKU coding is to identify each group instead of each item and cannot be used to find a particular product by this code, according to Harris (2010). Therefore, a unique identity for each retail product is required for item-level tracking of product information.

In the historical literature, various methods for using a unique identifier for an item, such as printing a serial number on a device or affixing an RFID tag with a unique electrical code. However, retailers must consider which item-level identification technology can be most effectively applied to the supply chain to identify and record information on each item.

In the retail industry of many nations, handheld scanners for barcode recognition have been crucial information technology for many years (Beck et al., 2005). Using handheld scanners to identify each stock-keeping unit (SKU) connected with a barcode improves the accuracy of product information entry and the speed of data transfer compared to manual entry methods (Manthou & Vlachopoulou, 2001). However, it does not appear to be appropriate as an advanced item identification technique for supply chain applications, even though it can be used to uniquely identify products by supplementing the usage of relevant databases to encode item-level information (Beck et al., 2011). The lack of real-time traceability necessary for automated mass production is one of the main reasons it is unsuitable for item-level identification (Kincade, 2005). This is because accessing item information often requires employees to use a scan gun and contactively scan the barcode on each item (Research & Markets, 2011). This may delay scanning and acquiring product information, which is not real-time (Atali et al., 2006). Additionally, hand scanning results are prone to numerous data mistakes (Angulo et al., 2004). These erroneous data might cost retailers up to 10 percent of their earnings (Raman et al., 2001). Therefore, when less advanced handheld scanners are utilised, the visibility of the entire supply network is poor (Hoffman & Mehra, 2000).

RFID (Radio Frequency Identification) technology uses an RFID tag with a unique electrical code as the identifier for a unique item-level identity instead of printing a serial number on a device (Gaukler, 2011). According to the study by Choi et al. (2015), RFID tags are manufactured using a unique chip's serial number as the tag's unique identifier. RFID can then automatically identify each item based on its RFID tag using RF technology (Teicholz & IFMA, 2012).

RFID technology offers several unique advantages over handheld barcode scanners for item-level identification. First, the identification of each product is improved in terms of real-time and accuracy (Fosso, 2012); second, multiple RFID tags within the field of view of the reader can be read together automatically, even if the object is covered with non-metallic or opaque materials such as paper, wood, or plastic (Kincade, 2005). Besides, RFID tags are robust and can be read repeatedly and have an expected lifetime of up to 10 years (Koschan et al., 2006). Most importantly, RFID enables real-time data exchange, eliminating the information gap in supply chain management, particularly in the retail and logistics industries (Boeck & Wamba, 2008).

RFID technology is widely recognised for better supporting supply chain management (Fawcett, 2009). Beck and Wey (2011) projected that the "retail revolution" will see the widespread use of RFID technology. RFID has already been used by several big retailers and manufacturers, including Walmart and its suppliers (Zhou, 2009). Implementing RFID technology is a crucial business strategy, and effective information sharing and real-time data transfer enable improved supply chain management (Angeles, 2005). Enhanced product visibility facilitated by RFID deployment facilitates the seamless exchange of data throughout the supply chain, including the receiving and processing of returns (Spekman & Sweeny, 2006). RFID technology's ability to record item-level information and track the position of individual objects, in addition to its ability to share information, enables rapid and efficient identification even in mass production (Choi et al., 2015). When utilised for asset tracking, RFID may significantly reduce lost or misplaced products and losses (Pfahl & Moxham, 2014). Using RFID tags to track documents, for instance, can improve document management by rapidly detecting those that have been misplaced (Zhou, 2009). The usage of RFID at the item level has resulted in a 90% reduction in time spent locating where things are stored (Anon, 2007). RFID readers mounted on retail store shelves may rapidly pinpoint where returns are placed on the shelves and even notify managers of available shelf space, enabling more efficient return management (Koschan et al., 2006).

Our research revealed that modern RFID identification technology at the item level could automatically identify the RFID tag on each product. Product tracking technology's successful and efficient application requires using RFID tags based on unique electrical product codes.

2.4.3 Integration of sales channels

In addition to figuring out the place of each product in the supply chain, the key to future business success is combining the various sales channels into one (Ashworth et al., 2006). This is because it is becoming increasingly crucial to track its transaction history across sales channels and the precise back location of return to address the multi-channel return dilemma (Nurmilaakso, 2008). Visibility of sold products is contingent upon cross-channel data interchange and integration of product tracking mechanisms (Piramuthu, 2005). According to Ganesan et al. (2009), integrating transaction data across sales channels can help retailers identify unethical returns. For omnichannel retailers to effectively manage returns, integrating sales channels, including online and all retail store sales channels, and detecting and conveying information about sold transactions of each item are essential.

The integration of product information across sales channels relies on RFID identification technology at the item level (Fosso Wamba & Chatfield, 2009). RFID tags enable the creation of "high level" information integration technological capabilities, such as sell-through and return flow integration across channels, by providing the framework for handling data consistently across the supply chain (Fosso Wamba, 2012). By installing RFID scanners in all sales channels, scanning sold products, and identifying them with a "sold" state in the consumer profile database, it is possible to integrate sold information flows (Hardgrave et al., 2013). Hence, RFID scanners set at all sales channels are crucial for tracking and handling returns.

Consequently, integrating sales channels is accomplished by installing RFID scanners, which enable tracking of the return status of sold products. This indicates that product tracking technology based on channel integration not only assists store workers in identifying unethical returns but also monitors the whereabouts of returned products.

2.5 Research Gaps and Highlights

This chapter highlights relevant research on the significance of omnichannel retailing strategies, the problems of omnichannel returns, and optimization solutions in terms of returns management processes. Extensive research demonstrates that item-level RFID identification technology plays a crucial role in the field of supply chain management, particularly in the management of returns.

An omnichannel return strategy focused on buying online and returning in-store (BORP) is essential for retailers to preserve a competitive advantage (Jin et al., 2020). Additionally, in the highly digital world, people favour businesses that enable BORP returns for their products (Promocodes, 2017). However, traditional supply chain systems do not support sharing of item-level information (Helo & Szekely, 2005). This makes it a considerable challenge for store personnel to accept returns. Due to the inability to identify the sales information of each item, store employees successfully receive a substantial percentage of fraudulent returns (Chang & Yang, 2022). Two-thirds of merchants chose to initially stock returns on shop shelves after receiving them. Due to the system's inability to capture the location of returned products and process them in a timely manner, the limited in-store shelf space is taken with returns (Buldeo et al., 2019). This report focuses on fraudulent returns and in-store inventory pressure as key challenging issues for retailers to manage omni-channel returns.

Lack of product visibility and information-sharing capabilities in the supply chain process significantly contributes to these return-receiving difficulties (Helo & Szekely, 2005). Tracking the information of products through the supply chain, based on a unique identifier for each product, is a helpful method for optimising the return process. The study states that RFID technology is among the most advanced existing item-identifying technologies. It can be applied to large-scale supply chains, enabling automated product identification based on a unique RFID tag attached to each item. RFID technology at the item level can offer the following advantages for returns process management: enhanced visibility of products in the supply chain, the ability to share supply chain information, and the ability to track the location of products.

In addition to enhancing product visibility, the key to successful returns management is tracking each product's sold and return status in real-time. RFID instruments in online sales channels and retail storefronts facilitate the integration of sales channels, allowing managers to centrally control product information across all channels (Dini Wahyuni et al., 2021). By identifying the state of each product sold and monitoring each transaction, it is possible to effectively prevent fraudulent returns since store workers can accept eligible returns by collecting the transaction history of the return from the system (Kevin et al., 2005). Also, after receipt by store associates, the tracking system automatically captures information regarding the location of returned products across channels and shares it with the entire supply chain, enabling managers to make return handles as quickly as possible, thereby balancing in-store inventory levels (Nurmilaakso, 2008).

Finally, this report found that developing a consumer profile can assist retailers in managing returns. Connecting each item sold with a client profile makes it easy to identify serial return customers, and placing limits on them can have a deterrent impact (Chang & Yang, 2022).

Although there is some research on the implementation of RFID technology in supply chain management, research on omnichannel returns management in the retail industry remains limited despite the interest of many top retailers in the technology's potential benefits. From previous surveys, few researchers have specifically studied product visibility in omnichannel returns to analyse retailers' abilities to track sold products. RFID is one of the current hot areas of technology that permits information traceability throughout the supply chain, according to the literature reviewed for this study. Our study intends to examine the impact of employing item identification technology to manage the retail return receiving process. The practical application of this technology involves two aspects: the use of RFID tags with unique product ID chips to achieve product visibility and information sharing capabilities; and the placement of RFID identification instruments at all channels of sale to receive this product information and enable the tracking of product sold and return information.

This study focuses on potential topics related to the effective management of returns and evaluates the performance of item-level RFID identification technology in real-world applications. While academic researchers and some retailers are aware of the potential benefits of RFID technology, it is unclear if its practical application in returns management can realise these benefits. In the following chapters, we will use our research with retailers to determine whether they recognise the practical implementation benefits of using item-level RFID identification technology to manage returns, as well as the specific factors that have contributed to their inability to implement RFID technology effectively.

2.6 Hypotheses development

Following a study of the literature, we have learned many advantages to implementing item-level RFID technology, particularly with a potentially positive impact on returns management. Some studies have even predicted that RFID will "revolutionise" supply chain management (Pfahl & Moxham, 2014). However, not all supply chains have utilised RFID technology effectively. Many retailers use a mix of two processes, including an RFID system and a traditional supply chain system, resulting in incomplete item-level information visibility (Zhou, 2009).

Figure 1 illustrates the incomplete receipt of product information because not all supply chain segments set the necessary RFID infrastructure (Zhou, 2009). This means product information cannot be adequately tracked throughout the supply chain to improve the returns process's challenging issues. Consequently, an incomplete implementation of RFID technology may not reveal its returns management benefits.

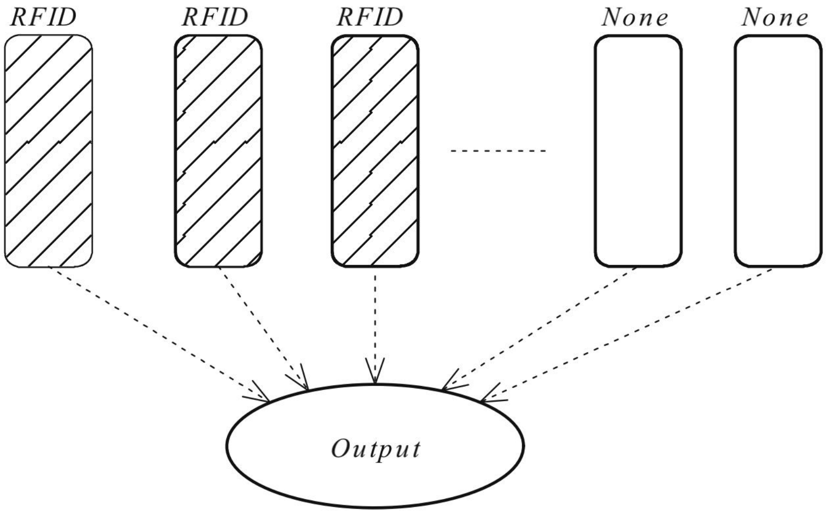

Figure 1. Incomplete reception of product information (Zhou, 2009)

Obtaining feedback on satisfaction levels from implemented retailers is one of the most credible ways for retailers to recognise the genuine benefits of RFID to comprehend its actual value in return management. Therefore, to gain a deeper understanding of how retailers evaluate the real post-implementation benefits of item-level RFID technology, we must continue investigating whether their expectations have been satisfied. Consequently, this study suggests:

H1: Retailers"satisfaction' is determined by their 'perception' of the benefits of item-level RFID technology.

H2: The effective and complete implementation of RFID technology is a determining factor in retailers' perception of its advantages.

RFID technology enables a new business model, meaning business processes within existing organisations must be redesigned (Bernon et al., 2016). To properly adopt RFID, retailers must switch from the prevalent method of gathering sales channel data via handheld barcode scanners to a new process of getting real-time item-level product information (Fosso Wamba et al., 2006).

Retailers need to authorise additional investments to transform existing processes to implement RFID technology (Pfahl & Moxham, 2014). Gonzalez Fernandez et al. (2009) discovered that some brand-new enterprises already utilise RFID-integrated systems and that process transformation costs less than conventional retail organisations. There are two significant important sites of change within the processes of traditional retail enterprises. First, the retail organisation needs to procure RFID tags to replace the current SKU code as the unique identifier for the items. Second, retailers need to invest in and deploy RFID readers across all sales channels to receive product information. Using the new RFID system, item-level data may be automatically detected and shared across the supply chain to support real-time tracking of the movement of sold products, hence decreasing retailers' costs associated with managing returns (Fawcett et al., 2009).

Fosso Wamba and Chatfield (2009) concluded that retailers' successful application of RFID technology is contingent on the organisation's technological skills, the degree of channel integration, and the organisation's willingness to change and innovate. Managers who do not work with their technology partners to explore the best fit for RFID implementation may end up with the wrong approach to RFID introduction and significant investment costs (David, 2003). Only by effectively managing organisational change can the consequences of unsuccessful RFID technology implementations be avoided (Shih et al., 2004). Thus, the technical ability to re-engineer processes and the financial backing from the organisation's top management can be classed as variables determining a retailer's process re-engineering capabilities. Capability for process re-engineering is essential for the efficient application of RFID technology. Therefore, this study proposes that the greater an organisation's process re-engineering competence, the greater the possibility of a successful implementation of item-level RFID technology at the retailer.

H3: The capacity of the organisation to reengineer processes is a crucial aspect of effectively implementing item-level RFID technology.

While many experts view technology innovation as a sustainable competitive advantage for businesses, business change must also be supported by top management investment and resources for process reengineering (Aizcorbe et al., 2009). When adopting new technologies, businesses frequently consider the costs and benefits (Hall & Khan, 2003). Fosso Wamba et al. (2006) evaluate and discuss the high price of RFID tags as a significant implementation hurdle to RFID's actual application in the real world. RFID tags are improbable to be free, and bar codes are without cost (Gaukler, 2011). Retailers may continue to believe that RFID tags are not a particularly cost-effective solution (Pfahl & Moxham, 2014). Although the price of RFID tags and readers has decreased, the total cost of adopting RFID technology remains substantial (Gaukler, 2011). Therefore, the implementation of RFID technology is a risky venture for retailers.

On the other hand, in addition to investment costs, businesses are also concerned about the benefits of RFID technology. Although some top retailers and their suppliers have begun employing RFID technology to manage the returns process, many merchants remain cautious, mainly because the potential benefits of deploying RFID traceability technology are poorly understood (Zhou, 2009). Other retailers challenge RFID's ability to deliver the anticipated benefits (Choi & Sethi, 2010). Some merchants fear that their suppliers may defraud them when RFID solutions are presented, according to Boeck and Wamba (2008). For instance, the supplier may insert two RFID tags on each product, so doubling the tag's price. Thus, it appears that retailers may not view RFID technology as trustworthy. Kincade (2005) contends that RFID tags cannot easily replace serial numbers on conventional product packaging. Because its application is not mature enough, there is not yet a sound support system in the consumer industry (Erickson and Kelly, 2007). Due to a lack of awareness of the benefits of RFID tracking products, retailers are likely to reject the implementation of RFID technology due to the significant investment risk involved.

In summary, this report argues that retailers' insufficient knowledge of RFID technology's benefits can restrict an organisation's willingness to invest in change and innovation, hence impeding RFID technology implementation. In other words, retailers' decisions to implement RFID technology are significantly influenced by their strong perception of the technology's potential advantages and willingness to restructure their processes. Therefore, our research concluded that raising retailers' understanding of the potential benefits of RFID technology, and hence the willingness of top management to commit money and resources to rebuild business processes, facilitates retailers' initiating to implement RFID technology.

H4: A strong perception of RFID technology's potential advantages is crucial for retailers to enhance their process re-engineering capacity.

H5: A retailer's decision to implement RFID technology is strongly influenced by the perceived potential advantages and the organisation's capacity for process reengineering.

Chapter 3: Methodology

3.1 Overview

The objective of this chapter is to provide a full explanation and description of the research methodologies and strategies that were utilised in this study, as well as the entire data gathering and modelling process.

To begin, this chapter will describe the reasoning for the decision to design a survey instrument to collect data, as well as the ethical concerns that were taken into consideration.

Next, the chapter discusses the features of the research population, the reasons behind targeting that population, and the strategies employed.

This chapter will explain how the research questions were answered after the sample data was obtained. This includes providing an explanation of the constructed variables and the relationship between the variables contained inside the conceptual model.

3.2 Research Method

This study's methodology must be considered to assess the hypotheses in Chapter 2's literature review. According to Hyde (2000), hypothesis models are typically evaluated utilising deductive procedures. Typically, deductive approaches employ data analysis outcomes to test the previously proposed hypothesis theory (Blaikie & Priest, 2017). Therefore, deductive methodologies are appropriate for this research. Typically, deductive methods are associated with quantitative analysis (Collis & Hussey, 2009). Generally, quantitative investigations are used to increase the objectivity of the results based on objective numerical data (Harwell, 2011).

This study's primary purpose is to determine the degree to which various factors influence retailers' decisions to use RFID technology completely. Based on the literature review's theoretical foundation, a survey instrument will be created to investigate the determinants of whether different types of retailers consider the full deployment of RFID technology. The questionnaire survey's raw data can be utilised to answer research questions and evaluate hypotheses (Hox & Boeije, 2005). To address the study questions, it is necessary to consider the views of various retailers. It is anticipated that by administering a questionnaire to these retailers, it will be possible to acquire a variety of insights from them, such as the primary factors that impede their implementation and the actual benefits of implementing RFID technology.

For this study, empirical data will be collected through a qualitative research methodology, including collecting subjective text from retailers and administering an exploratory survey of merchants. The qualitative questions will consist of "categorical questions" and "text box questions" in the questionnaire. The "categorical questions" are typically closed-ended, and their purpose is to collect and categorise basic information about the participants and get a general image of them (Folz, 1996). For instance, we use specific vital questions to identify our target population and some general questions to assist us in understanding the fundamental characteristics of the people participating in our studies. The "text box questions" allow respondents to choose whether or not to submit any additional content for an explanation, and they are open-ended and voluntary. The "text box questions" allow dialogue with the respondent and help the researcher understand the respondent's thoughts better (Dillman et al., 2014).

This investigation will seek retailers' responses to a series of "attitude questions" within the quantitative research framework. People express their ideas about a subject by their agreement or disagreement with statements about that topic. On the questionnaire, the most critical questions will be on a 5-point Likert scale ranging from 1 ("strongly agree") to 5 ("strongly disagree") (Joshi et al., 2015). Respondents will be able to express their attitudes on a range of scales (Harland et al., 2015). The scale has been implemented in various research projects and has been demonstrated to have high levels of reliability and validity. Additionally, the closed-ended questions are intended to make automated analysis easier to perform. In sum, the research approach used in this investigation was a hybrid approach.

3.3 Research Strategy

Appropriate data gathering techniques are essential for answering research questions and achieving study objectives. This study employed a structured Internet-based questionnaire to eliminate the researcher's influence on the participants. The online questionnaire method is appropriate for research with limited time and resources and accelerates the data collection and analysis processes (Sunders et al., 2007).

To acquire a representative sample of data, it is crucial to select the most suitable sampling method for the study (Alvi, 2016). Random sampling, one of the most frequent sampling techniques, can lessen the likelihood of systematic error and sample bias (Sharma, 2017). Stratified random sampling may produce representative samples from varied populations (Alvi, 2016). The stratified random sampling method chosen for this study allows for the segmentation of retailers into various types of study subjects, including retailers who have fully implemented RFID technology, retailers who have partially implemented RFID technology, retailers who have plans to implement RFID technology, and retailers who have no plans to implement RFID technology. A representative random sample of retailers' views regarding RFID adoption was done after classification to obtain valid and trustworthy results.

Ethical issues were fully considered throughout the process of conducting the study. The researchers deemed the data collection, analysis and results in this paper to be in the public interest and did not pose any risk to the retailers interviewed. Ethical considerations were given thorough review throughout the entirety of the conduct of the study. The school institutional committees assessed the study design to ensure that it complied with the study's standards for participants' right to privacy. This poll required human participants, and all responses were kept confidential. This research was conducted ethically because it solicited the participation of merchants after obtaining their informed consent through questions posed before the commencement of the questionnaire. This study only made use of remarks relevant to the application of RFID technology, and no personally identifying information, such as the respondents' actual names or the names of their companies, was obtained. In addition, all of the data were kept in a safe location and could only be accessed for research or academic purposes. The submission of ethical applications and obtaining ethical permission through Ethics and Research Administration Online came before the data gathering began.

3.4 Questionnaire Design

3.4.1 Study Subjects

This research was carried out with the participation of a representative sample of retailers from the UK Retailers Association and retailers from China to gain an understanding of the various perspectives held by retailers operating in multiple types regarding the application of RFID technology to the process of managing returns. This study focuses on how retailers respond to the challenges they face when offering omnichannel returns services. Therefore, the target group of our research is omnichannel retailers that have digital sales channels and provide in-store returns. The questionnaire included screening questions to help us identify and determine whether respondents were among our primary research subjects. These screening questions inquired whether retailers have online sales channels and whether they permit consumers to return their online purchases in-store.

Based on a stratified random sampling strategy of the retailer population, three highly representative samples will be obtained using categorical items in the questionnaire of this study (Alvi, 2016). Based on their varying degrees of RFID adoption, retailers will be divided into three groups:

- Introduced and deployed throughout the product's life cycle (Category A retailers)
- Introduced but not deployed in the selling and taking back process (Category A retailers).
- No plan to introduce FRID (Category B retailers).
- FRID is scheduled for implementation (Category C retailers).

Each layer of the questionnaire contained an average of 15 questions, including most scale, several single-choice, and additional open-ended questions. Respondents were given five minutes to complete the questionnaire. The 5-point Likert scale allowed the researcher to gauge the retailer's level of agreement with the statements (Harland et al., 2015).

To find the answers to the research questions, separate examinations of each sample tier were done. First, for the sample of Category A retailers, the study seeks to establish whether they are enjoying the anticipated implementation advantages and to uncover why they are not reaching expectations. Then, data from Category B retailers were utilised to comprehend better the primary obstacles impeding their adoption of RFID technology. Using data from a sample of Category C etailers, the final objective is to discover the factors influencing their decision to implement RFID technology.

To test the hypotheses stated in the literature review, this study will build a model for each type of retailer based on the form of scale questions design.

3.4.2 The conceptual model for category A retailers

To get insight into the effectiveness of RFID technology in practice, a study was conducted with retailers of Class A who have implemented RFID technology. This model's aims centred on establishing if these retailers are satisfied with the benefits of implementing RFID technology for managing returns and identifying the reasons for their unhappiness.

The literature evaluation identifies potential advantages of RFID technology that may draw merchants' interest in this research. After the previous chapter, hypotheses regarding the relationship between perceived advantage, the level of RFID implementation, and the ability to re-engineer organisational processes about retailer satisfaction with performance benefits were presented. Figure 3-1 depicts the Group A sample's built model.

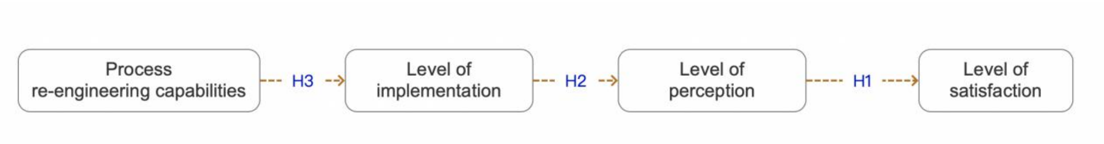

Figure 3-1 The conceptual model for Group A

The model's four variables were constructed in the questionnaire, as shown below:

Level of implementation

This variable will examine the degree to which retailers have adopted RFID technology. There will be one scale question for this variable. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- The scope of implementation

Satisfaction

The "Satisfaction" variable will assesses the degree to which retailers are content with the advantages of applying RFID technology. This variable will measure the "attitude" of the retailers through the use of a scale question that will be found in the questionnaire. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- Satisfaction with performance

Process re-engineering capabilities

The capability of a retailer to create strategic change is reflected in its capacity to re-engineer existing processes. This competency is contingent on the investment plan adopted by a business that is a retailer. This indicates that there needs to be a strong willingness at the organisation's top to invest capital and resources to strongly support process transformation and implement item-level product tracking technology throughout the supply chain. Specifically, this means there needs to be a solid willingness to track individual items. This variable is made up of two elements entirely independent of one another. These are stakeholder involvement and technology resources. As a result, in the survey, this variable will measure the retailer's financial and technical capabilities through 2 scale questions. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- RFID facilities are deployed in all sales channels
- Results of senior management-driven change

Level of perception

The "perceived level" variable assesses the degree to which retailers know the advantages of using RFID technology. Therefore, in the survey, this variable will be evaluated using four scale questions to determine whether or not they have a better awareness of the actual benefits of RFID technology in the returns process. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- Cost savings
- Labor savings
- Real-time retrieval of trans-channel transaction records for returned merchandise
- Automatically track and inform the supply chain of the return location of sold products

3.4.3 The conceptual model for category B retailers

For retailers' considerations, a survey of Class B stores with no plans to embrace RFID will help us better comprehend these obstacles. This model aims to determine the barriers to RFID implementation for this sort of retailer.

In this study, the literature review investigates the factors influencing merchants' widespread use of RFID technology. After the preceding chapter, hypotheses were presented regarding the relationship between the level of perceived advantage and organisational process re-engineering capability variables associated with the impediments to RFID implementation. Figure 3-2 depicts the model construction for the B sample.

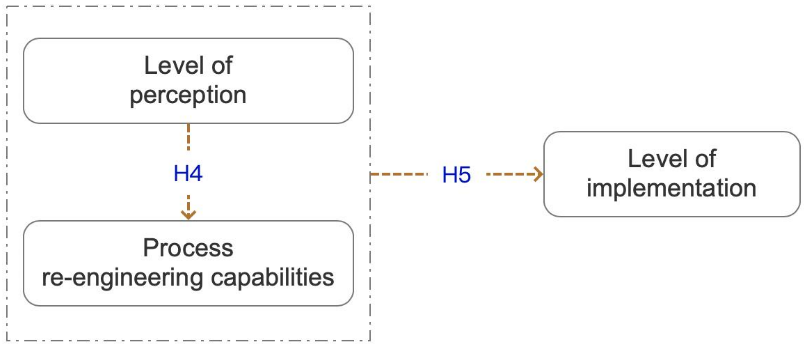

Figure 3-2 The conceptual model for Group B

All questions involving the three model variables will be scored reversely on the scale. The construction is described below.

Level of implementation

This variable will measure retailers' unwillingness to implement RFID technology. This variable will employ a single scale question. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- Possibility of implementing RFID

Level of perception

This variable measures the retailer's knowledge of the potential benefits of item-level RFID technology and the ability to be aware of the return challenges faced in an omnichannel retail environment. Additionally, this variable measures the retailer's awareness of the challenges of returns in an omnichannel retail environment. Therefore, in the survey, this variable will examine the knowledge and comprehension of merchants regarding the new technology through five scale questions. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- Unaware of the challenges of the omnichannel return process
- Lacking knowledge of RFID system benefits
- doubt RFID can enhance return management
- Consider RFID technology to be immature
- Doubt the actual effect of RFID

Process re-engineering capabilities

This variable reflects a strong willingness at the organisation's top to make changes to business processes and provide financial and resource support to empower process re-engineering. Specifically, this variable indicates a strong willingness to change the IT infrastructure. Therefore, this variable will analyse the distribution of process re-engineering capabilities among this group in the survey using four scale questions.

(5-point Likert scale, "Strongly agree" to "Strongly disagree")

- Too much overall change
- Consider input costs
- Consider implementation a poor investment opportunity
- No strong motivation for change from upper management

3.4.4 The conceptual model for category C retailers

The findings of the survey of retailers in Category B allow for identifying the primary concerns that keep those businesses from adopting the RFID technology. If these concerns are overcome may assist us in determining whether or not these retailers are committed to implementing the RFID technology. The purpose of this research for retailers who fall into Category C is to identify whether or not the motive that drives their dedication to implementing the RFID technology is related to eliminating the worries that Category B retailers hold. In the Class C model, we will evaluate the hypothesised association between the level of perceived advantage and the organisational process reengineering competence factors associated with retailers' RFID implementation likelihood. As illustrated in Figure 3-3, sample C's concept model is identical to sample B's.

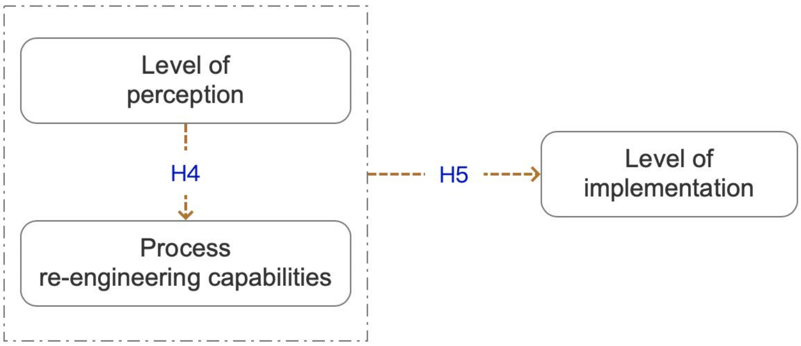

Figure 3-3 The conceptual model for Group C

The model's three variables were constructed in the questionnaire as described below.

Level of implementation

This variable will evaluate retailers' intention to implement RFID technology. This variable will include one scale question. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- RFID implementation plan scope

Level of perception

This variable is intended to quantify merchants' expectations regarding the advantages that can be gained from using RFID technology to handle omnichannel returns. Therefore, the variable will measure retailers' expectations about the possible benefits of RFID technology in the questionnaire through five scale questions. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- Significant return on investment is expected
- Expected to enable automated inventory management
- Expected to improve supply chain product visibility
- Anti-fraud measures are expected to be effective
- Real-time product return tracking expected

Process re-engineering capabilities

When a programme to adopt RFID is undertaken by a retailer, this variable is used to quantify the degree to which the organisation supports the initiative and the degree to which change is anticipated. As a result, in the questionnaire, this variable will assess the significance of process re-engineering capabilities in this group using two scale questions. (5-point Likert scale, "Strongly agree" to "Strongly disagree")

- RFID use is anticipated across all sales channels
- The result of senior management heavily investing in change

3.5 The entire conceptual model's interrelationships

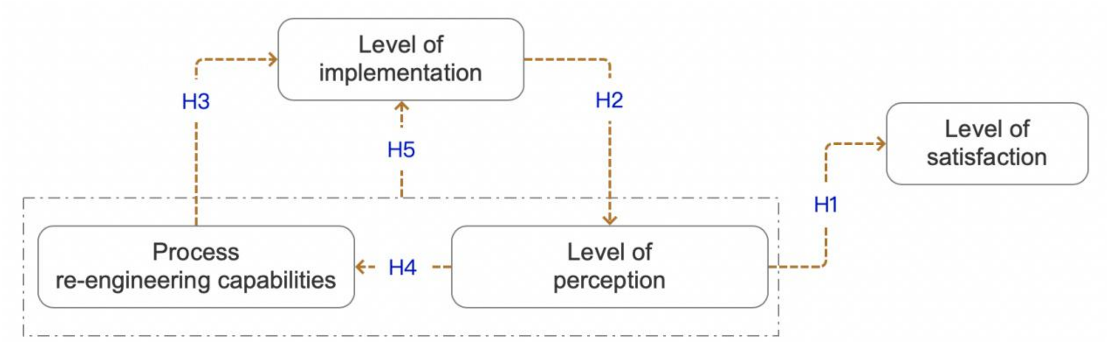

Figure 3-4 The comprehensive conceptual model

In this study, three submodels were developed independently based on a stratified sample of retailers selected at random (Alvi, 2016). The comprehensive conceptual model is depicted in Figures 3-4 to coherently answer the hypothetical questions specific to the study objectives. The inherent relationships of the model's variables are as follows:

Perceived benefits of implementation determine the level of satisfaction.

This relationship suggests that the positive impact of implementing item-level RFID technology on returns management will affect retailers' overall satisfaction. In an omnichannel retail context, automated product tracking capabilities and real-time product visibility in the supply chain through the adoption of RFID technology appear to be effective methods for managing omnichannel returns. The more executives know the potential benefits of RFID technology applications in the supply chain, the bigger anticipated. In other words, their level of satisfaction is contingent upon whether or not the advantages satisfy their expectations. The more comprehensively RFID technology is implemented in the supply chain, the more likely retailers will attain the robust functionality they anticipate. Conversely, retailers may be unhappy. By quantifying "perception" and "satisfaction" for Category A retailers, this study will explore the relationship between the satisfaction level and the actual implementation benefits. It will also establish whether their displeasure is attributable to the incomplete implementation of RFID technology.

For the benefits to be delivered, the decisive factor is the effectiveness and completeness of the technological implementation.

This pathway argues that the degree to which an RFID system is adopted will define its level of performance, i.e. a broader deployment of RFID will result in more business benefits. This indicates that the more extensive the use of RFID technology in the supply chain, the greater the likelihood that retailers will receive the robust functionality they expect. Understanding the actual implementation efficacy of RFID technology in handling returns requires further segmentation of retailers according to their deployment degree. This study will quantify the "perceptions" of Class A retailers to examine the significant differences in this variable between the group with complete adoption of RFID technology and the group without full implementation.

Process re-engineering capability, a determinant for the effective technology implementation.

This relationship suggests that the organisation's planning process, expressed goals, and willingness to invest will influence the degree to which RFID systems are deployed throughout the supply chain. Literature research also suggests that retailers are more proactive with their implementation plans and are more likely to embrace a comprehensive process change. This study will examine the significant differences in the "process re-engineering capability" variable of Category A retailers between the group with entirely deployed RFID technology and the group without fully deployed.

Process re-engineering capabilities, is influenced by the potential advantages.

This relationship suggests that an organisation's "capacity" to transform processes will depend on its "knowledge" of RFID systems' benefits. In other words, as an organisation's expertise increases, so does its willingness to incorporate new technology to modify legacy processes. Some merchants appear to have more defined implementation objectives and expectations for new technology. Conversely, the fewer retailers comprehend the advantages of implementation, the more it will impede their will to transform their processes. This study will analyse "perceived level" and "process re-engineering capabilities" for Category B and C retailers to examine the correlation between these two variables.

The anticipated benefits and the process reengineering capacity, are decisive factors in effective deployment.

This pathway implies that the level of understanding within an organisation of the potential benefits of using RFID technology and the desire to reform processes are crucial determinants of whether or not an organisation will adopt it. The potential benefits of RFID in managing returns are noted in the literature, but many shops have yet to utilise it. In other words, retailers examine RFID's benefits before deploying it. In addition, the literature also mentions that retailers do not believe they will gain the expected benefits from implementation and do not want to invest in high costs to try to change quickly. Therefore, retailers must assess performance benefits and the willingness to change processes within the organisation. In other words, the more the stakeholders understand the new technology's potential benefits, the greater their desire to change and the more capable they are of making better decisions. This path provides a means of testing the relationship between the variables "perceived level and the process reengineering capacity" and implementation decisions. This study will classify the survey data for retailers in Category B as the group that does not adopt RFID and the survey data for retailers in Category C as the group that has implemented the decision. Then, the "perception" and "process reconstruction capability" variables will be quantified to test for statistically significant differences between the two groups' characteristics.

In summary, this study provides a solution in the literature review to the first research question: it highlights the most common challenges retailers face in receiving returns from an omnichannel process. Then, in this chapter, the second research question can be answered by surveying Category A retailers to determine whether the actual effectiveness of retailers in resolving returns problems after implementing item-level identification technology is contingent on the efficiency and thoroughness of their implementation process. The survey of Category B and C retailers allows us to answer the third study question, which examines whether the perceived level of implementation advantages and the organisation's process re-engineering capabilities are deciding factors in deploying the technology.

3.6 Data Analysis Techniques

After completing the survey, the Excel file will be exported from Microsoft's online survey software (form) and reviewed for mistakes. Then, modelling and analysis were conducted using IBM Statistical Package for the Social Sciences (spss) version 22 software.

According to the research objectives, we must comprehend the trends behind the three types of data models. This study will therefore employ linear regression analysis to test the provided hypothesis in the literature review question. Models of linear regression analysis are frequently used to determine if the dependent variable can be represented by a linear transformation of the independent variable (Pandis, 2016). Using linear regression, the significance of the independent variable can be determined (Hess & Hess, 2017). Multiple linear regression permits the simultaneous comparison of the means of various variables and the reporting of the significance of differences (Seber & Lee, 2017). This study will therefore use linear regression to confirm the presence of a linear connection between each pair of target variables in each of the three conceptual models and describe the significance of the differences.

Chapter 4: Survey results and analysis

4.1 Overview

This chapter shows the findings of the research based on the analysis of data collected from an online questionnaire regarding retailers' attitudes concerning the deployment of RFID. The study begins by describing and explaining the questionnaire responses' outcomes. The constructed models are then subjected to correlation and linear regression analysis. The discussion in the following chapter will be based on these findings.

4.2 Responses to the survey

The online survey was initiated on 15 August 2022 and concluded on 15 September. Four UK retailers and fifty-four Chinese retailers and manufacturers clicked the survey link and participated in the study, with three and fifty-four completing the questionnaire. However, just 2 of the surveyed UK retailers and 9 of the surveyed Chinese retailers matched the screening criteria for the target study population, having at least one online sales channel and a physical store sales channel with an omni-channel returns service.

As a result, there were only 11 valid data samples, and the conversion rate from useful surveys to URL visitors was only 19%.

Even though the sample size did not match expectations, we gleaned some thinking from this survey's results. For instance, the link to the online survey was sent to a retail organisation comprised of 500 retailers, but only four retailers responded. This indicates, in part, that most retailers pay inadequate attention to returns management and underestimate the return issues they may face today. As a result, there is a lack of desire for them to change the returns processes. This leads to a high likelihood that retailers do not wish to comprehend the potential benefits of tracking items at the item level. Besides, the sample originating from China had only 17% availability due to no similar retailer associations we could connect and the difficulty in identifying a highly representative target sample from an enormous random scope. Regardless, this survey is meaningful. This study will continue to learn more about the characteristics of these respondents in anticipation of gaining more insight.

Due to the small sample size, this study will relax the restriction condition on the sample of respondents in the analysis session. And all respondents' responses will be eligible for inclusion in the analysis. This would have minimal effect on the study's aims, as the focus could be shifted from understanding omnichannel retailers to understanding the perspectives of all retailers on the practical application of RFID to the returns management process and the factors limiting their use of RFID.

From Figure 4-1, it can be seen that 25% of the retailer respondents were classified into the Group A sample, and in common, they all have already implemented RFID technology in their business; 60% of the retailer respondents were classified into the Group B sample, and all have no intention to implement RFID technology in their company; 15% of the retailer respondents were classified into the Group C sample, and all have already implemented RFID technology in their business.

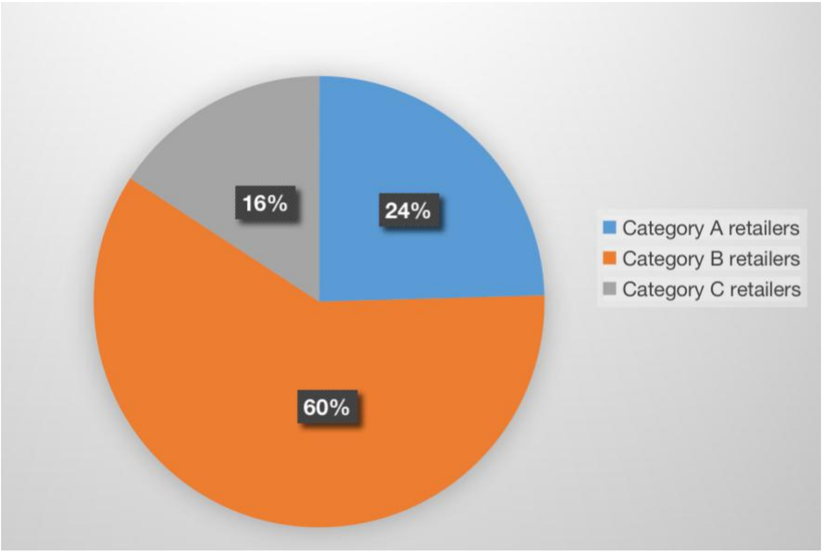

Figure 4-1 Sample stratification

As shown in Figure 4-2, 61.4% of respondents sold products of 'others good', with the majority answering 'food' in the open text box. The remaining products sold by respondents were homeware and furnishings (26.3%), apparel and accessories (8.8%), sports and recreation (3.5%), electronics and electrical appliances (0%), and repair / reselling companies (0%), repair / reselling enterprise (0%).

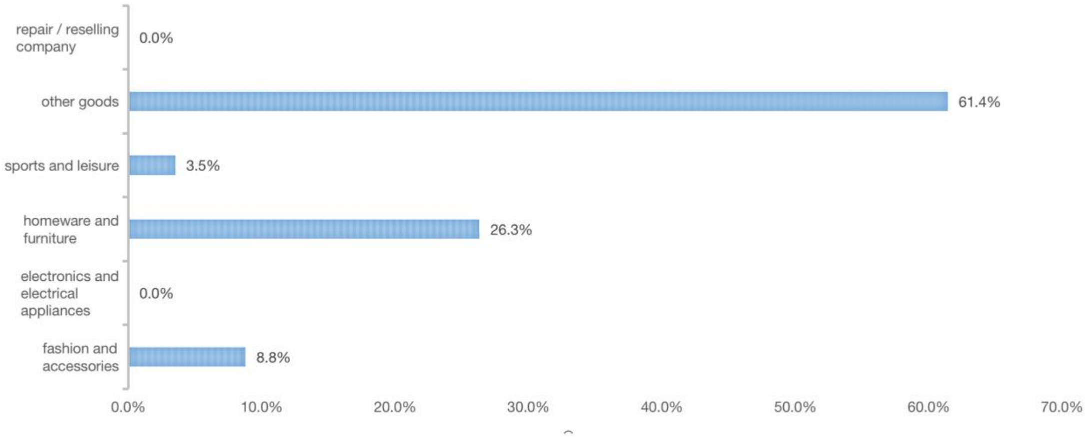

Figure 4-2 The retail type of respondents

The size of respondents' brick-and-mortar stores is depicted in Figures 4-3. 63% of respondents do not have physical stores; 32% of retailers have physical locations, but are small, less than 100 stores; and 6% of respondents have more than 100 stores.

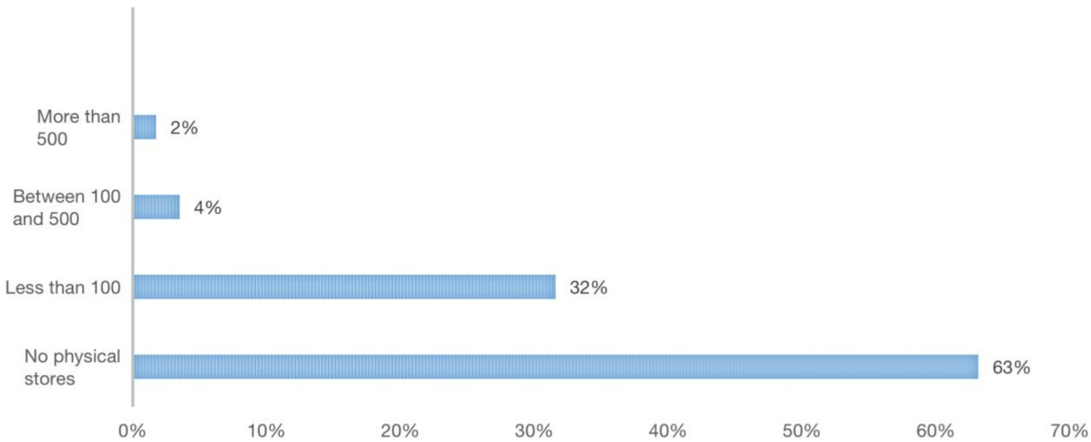

Figure 4-3 The size of the respondent's physical store

In Figure 4-4, it is noteworthy to observe that 87% of the retailers polled had created at least one online sales channel, confirming our analysis of digital retail in the literature review that an increasing number of retailers are interested in selling on the Internet.

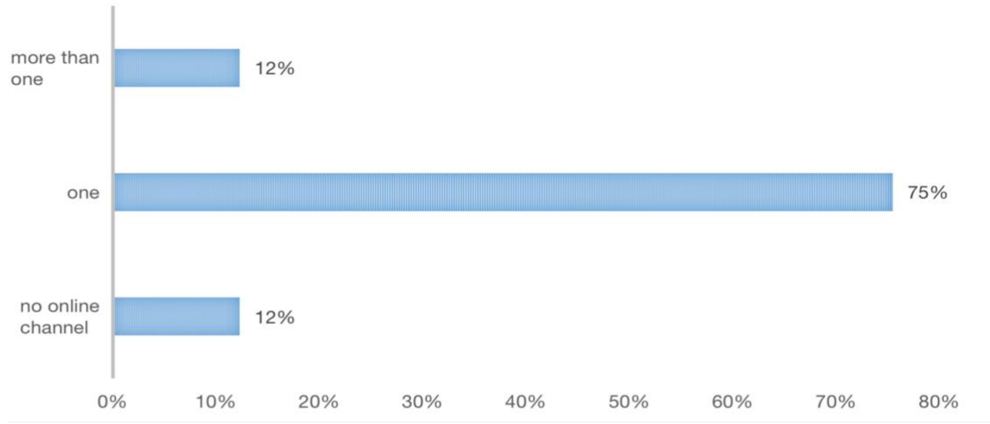

Figure 4-4 Number of respondents' online sales channels

81% of the 57 respondents did not offer omnichannel returns, as depicted in Figures 4-5. Noticeably, two of the three U.K. respondents claimed that they provide omnichannel returns, while one explained that they do not have a physical location. Thus, the percentage of retailers from the UK sample that offer omnichannel retail services is high, even though the sample is small.

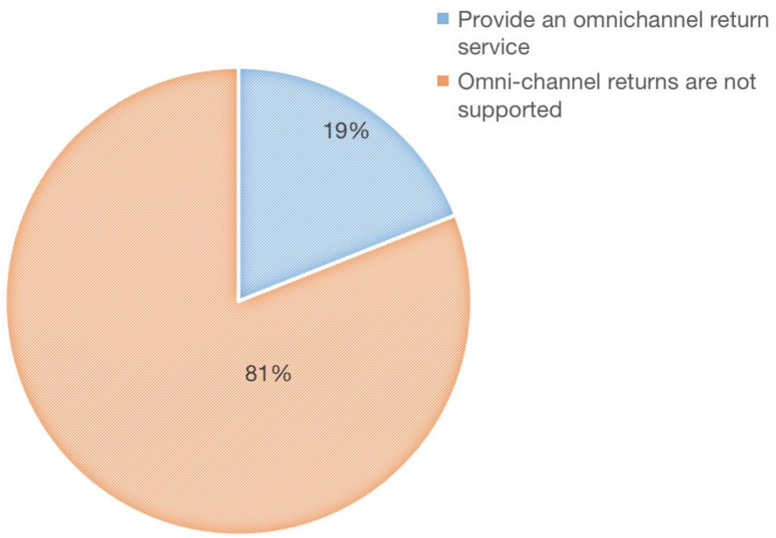

Figure 4-5 Allow products bought online to be returned in-store

Sixty percent of respondents do not intend to use RFID technology, indicating that the stratified survey sample was unbalanced. It means most of the total pieces belong to category B retailers. Nonetheless, because distinct models were developed for the stratified sampling based on different types in this investigation, the sample data from the various strata did not influence one another. The subsequent phase of this investigation will therefore validate the three models separately.

4.3 Correlation Analysis

The correlation test method determines whether variables have a positive association (Seber & Lee, 2017). In this study, the Pearson correlation coefficient, a statistic describing the linear relationship between two variables, will be applied to each of the three models to investigate the correlation between two variables (Hess & Hess, 2017).

4.3.1 Test of correlation (Group A model)

A total of 14 A-stratified samples were obtained from the questionnaire. This study will analyse the correlations between the Level of implementation, Satisfaction, Perceived level, and Process re-engineering capabilities variables in the Group A model based on the eight scale questions in the sample.

First, Figure 4-6 illustrates the results of comparing the two variables, Perceived level and Satisfaction. The Pearson correlation coefficient between both was 0.841, and the p-value was less than 0.05, showing a strong positive association between Perceived level and Satisfaction (p-value<0.01).

Then, the results showed that The Pearson correlation coefficient between the Level of implementation and the Perceived level was 0.896. The p-value was less than 0.05, demonstrating a meaningful positive connection between the Level of implementation and the Perceived level (p-value<0.01).

Finally, The results showed that the Pearson correlation coefficient between Process re-engineering capabilities and Level of implementation was 0.818. The p-value was less than 0.05, demonstrating a significant positive association between Process re-engineering capability and Implementation level (p-value<0.01).

In conclusion, it is known that the correlations between Level of implementation, Satisfaction, Perceived level, and Process re-engineering capabilities have all reached statistical significance, indicating that there is a strong correlation between the dimensions. However, a regression analysis based on correlation will be conducted to determine whether there is a predictive effect between the dimensions.

Correlation analysis between the dimensions

	Level of implementation	Satisfaction	Perceived level	Process re-engineering capabilities
Level of implementation	1			
Satisfaction	0.798**	1		
Perceived level	0.896**	0.841**	1	
Process re-engineering capabilities	0.818**	0.695**	0.877**	1

** Correlation is significant at the 0.01 level (2-tailed)

Figure 4-6 Tests of correlation for the Group A model

4.3.2 Test of correlation (Group B model)

34 B-stratified samples were acquired from the questionnaire, and correlations between the Level of implementation, Perceived level, and Process re-engineering skills variables in the Group B model will be examined based on the ten scale questions in the sample.

First, Figure 4-7 illustrates the results of comparing the two variables, Level of implementation and Perceived level. The Pearson correlation coefficient between both was 0.722, and the p-value was less than 0.05, showing a strong positive association between Level of implementation and Perceived level (p-value<0.01).

Then, the results showed that The Pearson correlation coefficient between the Process re-engineering capabilities and Level of implementation was 0.580. The p-value was less than 0.05, demonstrating a meaningful positive connection between the Process re-engineering capabilities and Level of implementation (p-value<0.01).

Finally, the results showed that The Pearson correlation coefficient between the Perceived level and Process re-engineering capabilities was 0.616. The p-value was less than 0.05, demonstrating a meaningful positive connection between the Perceived level and Process re-engineering capabilities (p-value<0.01).

Consequently, the above results demonstrate a correlation between the critical variables, and this study will conduct further regression analysis to validate the Group B model.

Correlation analysis between the dimensions

	Level of implementation	Perceived level	Process re-engineering capabilities

Level of implementation	1		
Perceived level	0.722**	1	
Process re-engineering capabilities	0.616**	0.580**	1

** Correlation is significant at the 0.01 level (2-tailed)

Figure 4-7 Tests of correlation for the Group B model

4.3.3 Test of correlation (Group C model)

A total of nine C-stratified samples were acquired from the questionnaire, and correlations between the Level of implementation, Perceived level, and Process re-engineering skills variables in the Group C model will be examined based on the eight scale items in the sample.

First, Figure 4-8 illustrates the results of comparing the two variables, Level of implementation and Perceived level. The Pearson correlation coefficient between both was 0.889, and the p-value was less than 0.05, showing a strong positive association between Level of implementation and Perceived level ($p\text{-value}<0.01$).

Then, the results showed that The Pearson correlation coefficient between the Process re-engineering capabilities and Level of implementation was 0.852. The p-value was less than 0.05, demonstrating a meaningful positive connection between the Process re-engineering capabilities and Level of implementation ($p\text{-value}<0.01$).

Finally, the results showed that The Pearson correlation coefficient between the Perceived level and Process re-engineering capabilities was 0.882. The p-value was less than 0.05, demonstrating a meaningful positive connection between the Perceived level and Process re-engineering capabilities ($p\text{-value}<0.01$).

Consequently, the above results demonstrate a correlation between the critical variables, and this study will conduct further regression analysis to validate the Group C model.

Correlation analysis between the dimensions

	Level of implementation	Perceived level	Process re-engineering capabilities
Level of implementation	1		
Perceived level	0.889**	1	
Process re-engineering capabilities	0.852**	0.882**	1

** Correlation is significant at the 0.01 level (2-tailed)

Figure 4-8 Tests of correlation for the Group C model

4.4 Linear regression analysis

4.4.1 Test of regression (Group A model)

This study will conduct a linear regression on the Group A model to determine the relationship between the construct variables.

To examine the potential causal relationship between Perceived level and Satisfaction, the independent variable Perceived level is paired with the dependent variable Satisfaction. Figure 4-9 depicts the regression analysis's findings. According to the results, the R Square value is 0.707, indicating that the variable Perceived level explains 70.7% of the variable Satisfaction. In addition, the F-value is statistically significant at the 0.001 level, indicating that the regression model is valid from a global perspective and that the influence of Perceived level on Satisfaction is relevant. The significance test was then performed on the regression coefficients, and the value of Unstandardized Coefficients for Perceived Level was 0.738, which was significant at the 0.01 level. This means that each rise in Perceived level raises Satisfaction by 0.738. According to the validation results of the regression analysis, the Perceived level has a statistically significant positive effect on the dependent variable, Satisfaction.Therefore, this study concluded that the results of this analysis supported the H1 hypothesis.

To determine the relationship between Implementation Level and Perceived Level. The implementation level was designated as the independent variable, while the perceived level was selected as the dependent variable. According to the results of the regression study, the R Square value is 0.802, indicating that the variable Level of implementation explains 80.2% of the variable Perceived level. In addition, the F-value is significant at the 0.01 level, meaning that the regression model is valid overall and that the influence of the Level of implementation on the Perceived level was statistically significant. The significance test was then performed on the regression coefficients; the value of Unstandardized Coefficients for the Level of implementation was 0.848, which was significant at the 0.01 level. This means that each level of Implementation can increase the Perceived level by 0.848. According to the validation results of the regression analysis, the Level of Implementation had a statistically significant positive effect on the dependent variable, the Perceived level. Therefore, this study concluded that the results of this analysis supported the H2 hypothesis.

To identify the potential causal relationship between Process re-engineering capabilities and Level of implementation, the independent variable Process re-engineering capabilities and the dependent variable Level of implementation are used. The independent variable is Process re-engineering capabilities, while the dependent variable is the Level of implementation. R Square has a value of 0.669, which indicates that Process re-engineering capabilities explain 66.9% of the Level of implementation variable. In addition, the F-value is significant at the 0.01 level, indicating that the regression model is valid from a global perspective; therefore, the influence of Process re-engineering capabilities on the Level of implementation is meaningful. After testing the significance of the regression coefficients, it was determined that the Unstandardized Coefficients for Process re-engineering skills were 0.800, which was statistically significant at the 0.01 level. Therefore, each extra Process re-engineering capability raises the Level of implementation by 0.800. Accordingly, the validated results of the regression analysis indicate that Process re-engineering capabilities have a strong positive influence on the dependent variable Level of implementation. Therefore, this study concluded that the results of this analysis supported the H3 hypothesis.

Regression analysis between the dimensions

	Model1	Model1	Model1
	Model1 （Level of implementation）	Model2（Perceived level）	Model3（Satisfaction）
	Unstandardized Coefficients	Unstandardized Coefficients	Unstandardized Coefficients
(Constant)	-0.4	0.739	0.381
Process re-engineering capabilities	0.800***		
Level of implementation		0.848***	
Perceived level			0.738***
R	0.818	0.896	0.841
R Square	0.669	0.802	0.707
F	24.264***	48.695***	28.924***

Figure 4-9 Tests of regression for the Group A model

4.4.2 Test of regression (Group B model)

This study will conduct a linear regression on the Group B model to determine the relationship between the construct variables.

To examine the potential causal relationship between Perceived level and Process re-engineering capabilities, the independent variable Perceived level is paired with the dependent variable Process re-engineering capabilities. Figure 4-10 depicts the regression analysis's findings. According to the results, the R Square value is 0.337, indicating that the variable Perceived level explains 33.7% of the variable Process re-engineering capabilities. Compared to other variables, this variable's explanatory power is insufficient. Then, the F-value is statistically significant at the 0.001 level, indicating that the regression model is valid from a global perspective and that the influence of Perceived level on Process re-engineering capabilities is relevant. The significance test was then performed on the regression coefficients, and the value of Unstandardized Coefficients for Perceived Level was 0.377, which was significant at the 0.01 level. According to the validation results of the regression analysis, the Perceived level has a statistically significant positive effect on the dependent variable, Process re-engineering capabilities. Therefore, this study concluded that the results of this analysis supported the H4 hypothesis.

A multiple linear regression analysis was undertaken to predict the relationship between the two independent variables, Perceived level and Process re-engineering skills, and the dependent variable, Level of implementation. R Squared = 0.580 indicates that the two variables, Perceived level and Process re-engineering skills, explained 58.0% of the Level of implementation, respectively. The F-value was statistically significant at the 0.01 level, suggesting that the regression model was globally valid and that the impacts of Perceived level and Process re-engineering skills on the Level of implementation were associated. The significance of the regression coefficients was then evaluated, and the unstandardised coefficient value for the Perceived level and Process re-engineering capabilities was 0.555 and 0.461, which was significant at the 0.01 level. Perceived level and Process re-engineering capabilities were found to have a substantial positive effect on the dependent variable Level of implementation, according to the validation results of the regression analysis. Therefore, this study concluded that the results of this analysis supported the H5 hypothesis.

Regression analysis between the dimensions

	Model1（Process re-engineering capabilities） Unstandardized Coefficients	Model2（Level of implementation） Unstandardized Coefficients
(Constant)	1.96	0.527
Perceived level	0.377***	0.555**
Process re-engineering capabilities		0.461*
R	0.580	0.762
R Square	0.337	0.580
F	16.233***	21.4***

Figure 4-10 Tests of regression for the Group B model

4.4.2 Test of regression (Group C model)

Multiple Linear regressions will determine the relationship between the construct variables on the Group C model.

A multiple linear regression analysis was undertaken to predict the relationship between the two independent variables, Perceived level and Process re-engineering skills, and the dependent variable, Level of implementation. The significance of the regression coefficients was evaluated, and the unstandardised coefficient value for perception level and process re-engineering capability were 0.715 and 0.371, with a p-value > 0.05 (Figure 4-11). Therefore, this regression model failed to identify a significant relationship between Perceived level and Process re-engineering capabilities and the dependent variable Level of implementation. Consequently, this analysis concludes that the model cannot support the H5 hypothesis.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.900[a]	.811	.748	.794

a. Predictors: (Constant), Perceived level, Process re-engineering capabilities

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.214	2	8.107	12.846	.007[b]
	Residual	3.786	6	.631		
	Total	20.000	8			

a. Dependent Variable: Level of implementation

b. Predictors: (Constant), Perceived level, Process re-engineering capabilities

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.870	.804		-1.083	.320
	Process re-engineering capabilities	.375	.458	.308	.818	.445
	Perceived level	.715	.436	.617	1.639	.152

a. Dependent Variable: Level of implementation

Figure 4-11 Tests of regression for the Group C model

4.5 Statistical analysis

The distribution of retailers' satisfaction with the implementation's benefits is depicted in Figures 4-12. 43% of retailers agreed with the advantages and scored a four or above on the satisfaction scale, while 29% were less happy.

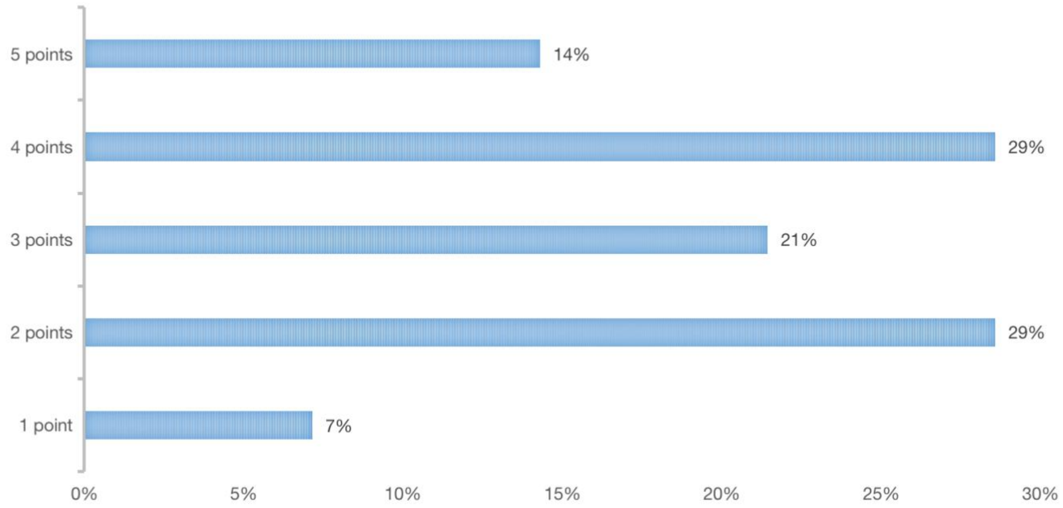

Figure 4-12 Distribution of satisfaction in the Group A sample

The relationship between the level of RFID implementation and retailer satisfaction is depicted in Figures 4-13. It is clear from the trends that the more RFID devices are deployed, the greater the likelihood of retailer satisfaction; conversely, the retailer may not be satisfied with the performance of RFID for returns management.

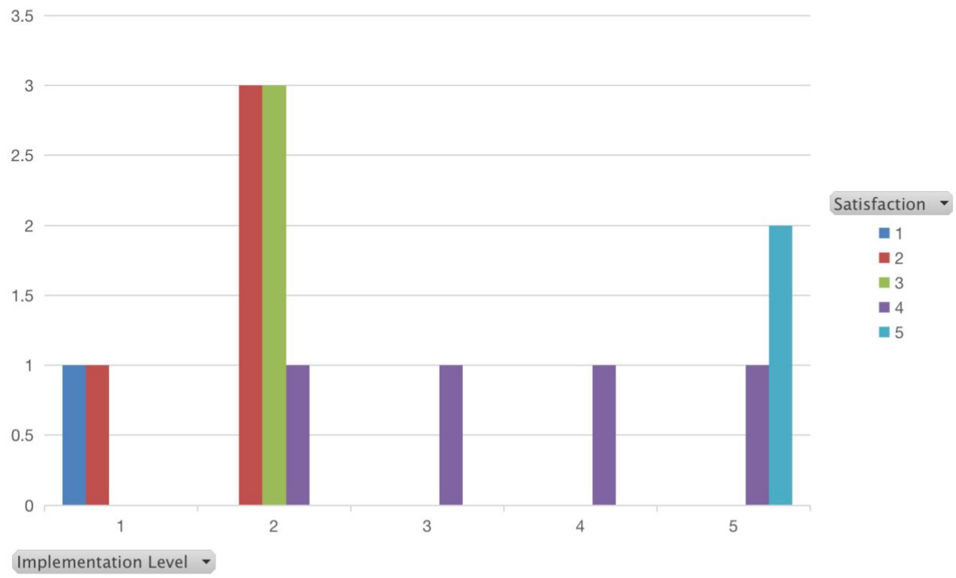

Figure 4-13 The relationship between level of implementation and satisfaction

The amount of retailer recognition of the four benefits is depicted in Figures 4-14. According to the findings, retailers have a low acceptance of the notion that RFID can help to cost savings. Only 29% of merchants are highly optimistic about this advantage. The reasons for this are worth investigating.

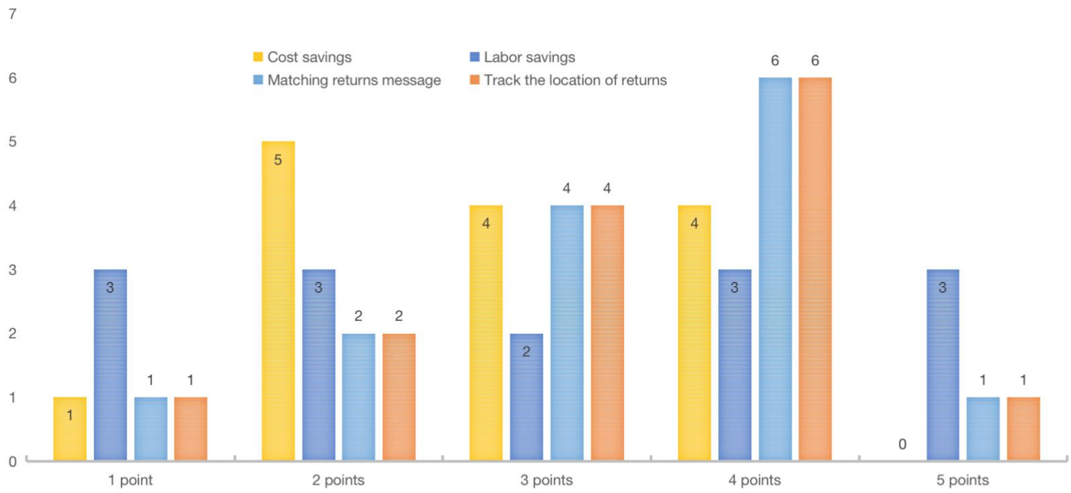

Figure 4-14 Agree on the benefits of RFID implementation

The status of RFID technology implementation by retailers is depicted in Figures 4-15. It is noticed that 64% of retailers have chosen just partially to implement RFID technology.

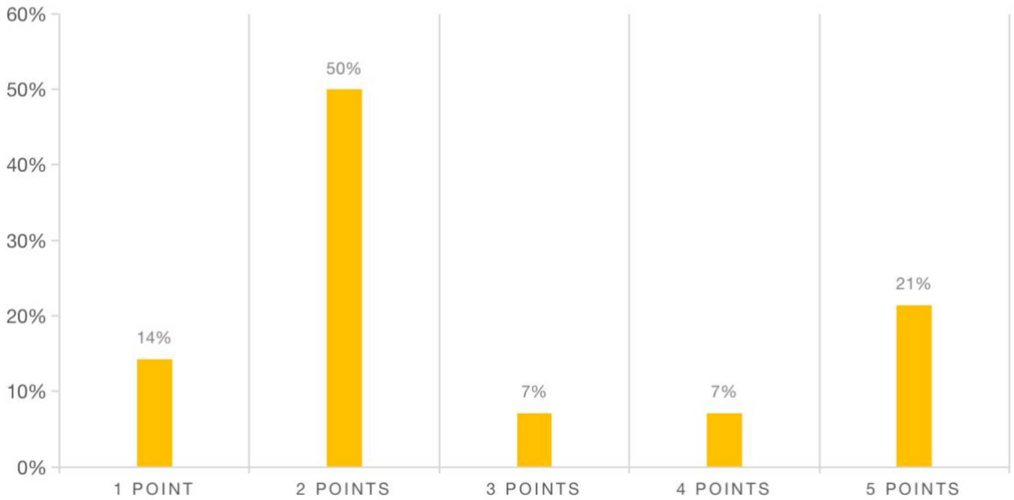

Figure 4-15 The level of RFID technology implementation.

4.6 Summary of results

In this chapter, the results of the questionnaire analysis provide insights that can aid in the comprehension of the findings. Even though the amount and quality of the sample for this data collection fell short of expectations, it was helpful to determine that not all retailers responded positively to introducing new technology. This study validated the model analysis's positive relationship between most of the constructed variables. And could contribute to answering the research questions.

Chapter 5: Discussion

5.1 Overview

Based on the significant findings of the literature and the study findings, the three research questions will be examined and elaborated upon in this chapter. In addition, a comparison will be made between the content of prior studies and the present findings, their parallels and differences will be examined, and some reasons will be provided.

5.2 Practical benefits of RFID technology

Assessing the practical impact of deploying RFID technology at the item level to manage returns is one of the critical research issues for this report. This study collected three types of sample datasets from the questionnaire. This research question will concentrate on the Category A sample, which is intended to gain insight from the respondents who have implemented RFID technology.

The research of Group A sample data revealed that 43% of retailers were satisfied with the beneficial impact of adopting RFID technology for controlling returns (scale scores of 4 or 5). In addition, the survey discovered that retailers with fully installed RFID devices at all points of the supply chain were satisfied (100%) with the benefits of RFID technology.

Therefore, based on the study of Category A sample data, RFID technology's positive contribution to improving the returns process is evaluated positively by retailers who have adopted it, especially when it is highly deployed.

In historical studies, numerous scholars have recognised the benefits of RFID for the supply chain and have high hopes for its future implementation in supply chain management. According to a study by Pfahl and Moxham (2014), RFID technology could have the potential positive impact of favouring businesses' return handling. In addition, Gonzalez Fernandez et al. (2009) claim that RFID integrated systems are beginning to be widely adopted by brand new firms and that the use of RFID technology to manage the entire product lifecycle will become a retail sector trend in the future. According to Fawcett et al. (2009), item-level management of products provides increased visibility of products in the supply chain. It improves organisational oversight by tracking products' sold and returned status in RFID systems. In agreement with the researchers above, the findings of this study indicate that putting RFID technology in the supply chain can aid in controlling the supply chain, including the sales and return processes.

The advantages can be explained using the scale in the questionnaire created for this study. Specifically, using the scale questions, explain the following four benefits. And the third and fourth advantages focus primarily on returns management. Respondents express a high level of agreement with a score of 4 or 5 on the scale questions.

- The first benefit is cost reductions, which 29% of retailers find extremely valuable.
- The second benefit relates to labour savings, which is strongly recognised by 43% of retailers.
- The third benefit is the real-time tracking of cross-channel transaction information for returned products, which 50% of retailers find extremely valuable.
- 50% of retailers recognise automated tracking and identifying the return location of products to the supply chain as the fourth benefit.

Some academics and retailers may disagree with this assessment, even though many retailers in the samples strongly agree with these few RFID benefits. According to Choi and Sethi (2010), some shops do not believe that RFID technology offers the anticipated benefits. Interestingly, Boeck and Wamba (2008) found in their research that some retailers are apprehensive about paying extra due to the risk that more RFID tags will be installed on their products. This viewpoint contradicts the conclusions of this report. This study considers that various retailers have different anticipated advantages, which could explain this disparity. The results are illustrated by the fact that just 29% of retailers are satisfied with the "cost reduction." This may imply higher expectations from retailers for cost savings, but it is more difficult to quantify the amount of savings in a short period. Until RFID technology was deployed, retailers likely did not know the total cost of managing returns, for instance.

In conclusion, the research question has been satisfactorily validated. It is apparent from this sample that retailers who have deployed RFID technology are more pleased with the enhancements RFID has brought to returns management. Moreover, this study would like to suggest retailers on the fence about RFID technology should focus more on its process management benefits than on its cost.

5.3 Effective RFID implementation

The second research topic of this report is to investigate the reasons for the bias in retailers' implementation expectations of RFID technology. This study will expand upon the assessment of the first research question by examining the essential elements that determine the benefits of implementation in greater detail.

In his study, Zhou (2009) found that many retailers have implemented RFID technology promptly but do not have the RFID infrastructure in place throughout their supply chain. His findings are consistent with the results of this investigation. It is accurate that 64% of retailers have not thoroughly implemented RFID technology. Therefore, the limited number of application scenarios may be a significant reason for the anticipated RFID adoption bias. Next, we will further explain the impact of different levels of implementation on the benefits of performance.

Based on the sample data, it can be stated that the implementation benefits are recognised to a greater extent when RFID devices are installed throughout the entire sales channel, with an average score of 4. While partially implementing RFID technology, the implementation benefits are recognised to a lesser extent, with an average score of 2.5.

Therefore, incomplete implementation strongly correlates with not realising the anticipated benefits. In the conclusions of the Group A model analysis, we also confirmed that the actual level of RFID implementation by Category A retailers had a substantial impact on the perceived benefits. Therefore, it is possible to argue that the level of implementation is the primary reason for the bias in application expectations.

This report speculates why most retailers are reluctant to embrace RFID completely. This study argues that academics and retailers pay little attention to the challenges posed by the returns process. Chang & Yang's (2022) study supports this report's conjecture that the retailers they interviewed believe that the cost of returns is necessary for doing business and that there is no need to make a significant investment to manage returns. However, 92% of buyers admitted to unethical returns, necessitating merchants' vigilance, and large-scale fraudulent returns can impose additional expenses on shops (Harris, 2010). In addition, one plausible explanation is that several retailers only want to have RFID devices installed in their warehouses to avoid the laborious process of manually scanning product identification tags. In this respect, even with a partial implementation of RFID, retailers believe they achieve item-level management of their products. In other words, the retailer may think that it is enough that each returned product is visible in the warehouse as soon as it returns to the warehouse. However, this group of retailers may be unaware that assigning a unique identifier to each product is merely the starting point for obtaining a product that can be tracked throughout the supply chain.

This study contends that RFID item-level identification technology deployed throughout the supply chain will have a more significant favourable influence on returns management. In addition, this study advises that retailers should be aware of the considerable challengings with the current returns process and recognise the significance of reforming the returns process in a competitive omnichannel retail strategy.

5.4 Considerations for deploying RFID technology

This report's third research topic explores the elements influencing retailers' decisions to implement RFID technology. In the research of this question, a sample of Category B retailers and a sample of Category C retailers have a substantial sample representation. This is because they have not yet implemented the technology. We may learn from the questionnaire data of Group B about the barriers that impact their RFID usage and from the questionnaire data of Group C about what factors make them decide to use RFID.

According to our model analysis of the Group B sample, the degree of perception and process reconfiguration capabilities can substantially impact retailers' decisions to deploy RFID. In addition, the model validates that the degree of perception determines the ability to process reconfiguration. This study will elaborate on the connection between these variables. First, the average level of knowledge regarding the advantages of RFID technology was determined by comparing Group B and Group C's replies. The data indicate that Group C respondents who wanted to deploy RFID had a better level of understanding than Group B respondents, with a mean score of 3.4 versus 2.3. Then, when comparing their internal process re-engineering capabilities, Group C scored 3.6, whereas Group B received a 2.2. Due to the overall lack of knowledge about RFID technology among Group B retailers, this study conjectures that managers are unlikely to commit organisational resources and money to a project with unpredictable benefits. After assessing the benefits and cons, Group C retailers' senior management is willing to invest in introducing RFID technology to manage their supply chains because they have a thorough understanding and expectation of the technology.

This survey's findings are compatible with several arguments in the academic literature. This study contends that retailers are only likely to assess if an investment is profitable if they are provided with sufficient information to comprehend it. According to Hall and Khan (2003), organisations frequently evaluate the costs and benefits of introducing new technologies when making decisions. Aizcorbe et al. (2009) note that investment in technical innovation is risky and that firms undertake such investments only when the benefits are sufficiently alluring. According to Erickson and Kelly (2007), RFID technology is not mature enough to make it challenging for retailers to judge its specific benefits.

This study concludes that the information retailers knowledgeable about RFID and the financial and technical backing inside their organisations substantially impact whether they are determined to adopt it. In addition, this study suggests that small and medium-sized retailers may learn more from retail giants about new technologies and that technological innovation has always been considered an effective way to enhance strategic advantage.

5.4 Summary of discussion

This chapter discusses all the findings in light of the study questions posed. This chapter provides a detailed analysis and explanation of the results presented in the preceding chapter.

Chapter 6: Conclusion

6.1 Overview

This chapter summarises this research on the problems and solutions for optimising the omnichannel returns process (item-level RFID technology). In addition, the research aims, questions, and conclusions are summarised. Several study limitations and suggestions for further research are summarised in greater detail.

6.2 Research Summary

This study aims to assess the impact of RFID, an advanced item-level identification technology, on retailers' management of returned goods.

By exploring the notion of omnichannel retailing and omnichannel return methods in the examination of relevant literature, this paper establishes that retailers have followed the hot trend of digital shopping, and as Internet sales have risen, so has the return rate. Simultaneously, many online purchases are returned to the store, posing a significant problem for traditional retailers' return systems. This research aims to identify methods for optimising the existing returns process. RFID is a revolutionary item-level identification technology that automatically identifies each product via radio frequency, allowing product tracking throughout the supply chain. Therefore, RFID technology at the item level has significant potential benefits for businesses managing returns.

This study proposes five assumptions based on a historical literature review to comprehend retailers' challenges when employing RFID. A questionnaire was then distributed to retailers to acquire a deeper understanding of their perspectives on RFID deployed. The questionnaire was designed using a stratified random sampling method, dividing retailers into three main categories: Category A retailers who have already implemented RFID technology, Category B retailers who have no plans to implement RFID, and Category C retailers who have plans to implement RFID. Then, three submodels were developed for each category to evaluate the hypotheses stated in the literature study.

The questionnaire survey results and the model validation address the three research issues discussed in this work:

The first research question attempted to determine if retailers were satisfied with RFID technology's enhanced returns management results. 43% of retailers that had adopted RFID were satisfied with the implementation's results, according to the survey.

The second study question sought to determine why the potential benefits of RFID technology are not being realised. The study's results indicated that using RFID at only a few locations in the supply chain makes it impossible to have total product visibility and tracking capabilities.

The third study explores the aspects that may impact retailers' decisions about RFID technology adoption. The results of the study indicated that the amount of awareness of the advantages of RFID technology, as well as the financial and technical investment made by the retailer's organisation, had a significant effect on the retailer's choice to implement it.

6.3 Limitations and future research directions

Despite several interesting discoveries and fresh insights into omnichannel retailing, this study has several limitations.

There are restrictions on the data sample. First, the sample size was insufficient, and most models did not represent the desired audience, i.e., retailers offering omnichannel returns. Second, the sample's scope was inadequate; for instance, most merchants were small and medium-sized businesses, and there was no possibility of obtaining further cutting-edge insights from retail giants.

There are limitations to the survey results. Due to the ongoing development of technology in the retail industry, the survey's results are time-sensitive and only usable for a limited time. Due to time limits, analysing the data from all sides during processing is impossible, which may result in insufficient findings.

To eliminate the limits of this study and increase the impartiality of the findings, we have provided some suggestions for future research in this field. For instance, current research on item-level identification technology is insufficient and will need to be expanded in the future. For example, the word item recognition technology lacks a precise scope delineation in its description. Can item recognition technology apply only to RFID technology, or can it also refer to any technology that detects a unique product ID? In addition, there is a shortage of research on combining RFID and return IT systems, which might hinder the adoption of theory or study findings. Future studies could employ IT systems to develop a more precise method for optimising the returns procedure.

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