

An Exploratory Study of RFID Benefits for Apparel Retailing

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의류소매업에서의 RFID 이점에 대한 탐색적 연구

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Abstract

Relentless advances in information technology are constantly transforming market dynamics of the retail industry. RFID is an emerging innovative technology that can reduce labor costs, improve inventory control and increase sales by effective business processes. Apparel retailers need to recognize the benefits of RFID and identify critical success factors. By focusing on apparel retailers, this study attempts (1) to identify the reality of RFID associated with benefits; and (2) to prospect the implementation of RFID in apparel retailing. We conducted a focus group interview with selected six panels who were experts of retail industry in the United States to obtain data regarding RFID attributes. Content analysis was used to generate related excerpts and classify 31 attributes of RFID benefits from the meaningful 173 responses. For experience of RFID, retailers were familiar with RFID technology and expressed the belief that RFID basically would support an existing retail system for speed to markets. However, retailers addressed the level of experience with RFID technology that they were still in the early adoption stage among few innovative companies. The content analysis identified five dimensions of RFID benefits for apparel retailing: Visibility and Velocity, Revenue Enhancement, Customer Service, Security, and Employee Productivity. This result lends support to the belief that RFID has a significant potential to streamline supply chain management, store operation and customer service for apparel retailing. This study provides intellectual and managerial implications for practitioners and researchers by postulating the effective use of RFID in the apparel retail industry.

Key words: Apparel retailing, Benefit, Information technology, RFID, Supply chain management; 의류 소매업, 이점, 정보기술, RFID, 유통 공급망관리

I. Introduction

During the past two decades, the retailing industry has been streamlining their supply chain and optimizing sales forecasts and distribution(TAGSYS, 2005). Especially, fashion retail industry can create a wealth of opportunities to deliver operational efficiencies, improved customer service, and solid returns on

investment(Juban & Wyld, 2004). Many aspects of retailing have been transformed by information technologies such as barcode, the internet and RFID (Goldsmith, 2004; Philips, 2003). Recently, RFID has gained much attention as a new technology with a significant strategic and innovative potential for apparel retailing.

RFID(Radio Frequency Identification) using a special tag or label embedded with a computer chip and antenna is one of such advances that show the

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potential to transform how business is conducted for sales, distribution, promotions, and customer management (Chen, 2004). However, RFID is far more than an extension of the widely used barcode system because it can store data and even have a processing capability (Arnold & Bures, 2003; Collins, 2005; Hill, 2004). Compared to barcode, major advantages of RFID include accurate data availability without error and its unique capability to read multi items and collect data at some distance with no direct line of sight and without labor (Angels, 2005; Juban & Wyld, 2004; Twist, 2005). The advantages of RFID over barcode are summarized in Table 1. Many leading apparel and textile firms are proactively looking into adopting and managing the technology (TAG-SYS, 2005). According to Kurt Salmon Association (2005), RFID pilot applications can be easily implemented in parallel with existing applications, expecting a positive impact on sales and operating costs.

Several retailers are already taking advantage of RFID to improve the organizational logistics. For instance, *Marks & Spencer* in the U. K. has implemented RFID to tag apparel items and improve in-store inventory and tracking. This ensures that a full range of sizes of any products is always available to customers (Collins, 2005). The Italian clothier *Prada* has put RFID tags on every item in its *New York Epicenter* store to improve customer service in specialty stores (Anonymous, 2002). In case of *Benetton*, labels on its *Sisley* clothing brand have been fitted with RFID-enabled i.code chips to locate a garment in the

inventory process within the company's 5,000 stores (Shim, 2003). These innovative apparel retailers have already begun to consider RFID as a new technology to reinvigorate the trend of "quick-response." They recognize RFID's potential to support the industry's increasing demand for speed, frequent delivery and collaborative planning along the value chain (Kutyla, 2005). It is also predicted that the global RFID market will reach more than \$7 billion by 2008 with a minimum annual growth rate of 23 percent (Chen, 2004; Sullivan, 2005).

Consequently, the RFID technology for apparel retailing can enhance their ability to design, manufacture and stock the latest in disposable chic fashions that change almost weekly (Anonymous, 2003a; Anonymous, 2003b; Kutyla, 2005). Obviously, fashion industry might be quite interested in the RFID technology, which is expected to be optimistic about their investments for RFID applications to apparel retailing. However, apparel retailers are wary of the practicality of the technology benefits and it is unclear how they should go about incorporate the technology in their business practice. Nevertheless, there is little empirical studies to address the perceptions of RFID applicable benefits from retailers' perspective.

This study explores perceived benefits and the reality of RFID for apparel retailing by qualitative approach. Specifically, objectives of this study were (1) to identify the reality of RFID associated with benefits in retail industry; and (2) to prospect the implementation of RFID in apparel retailing. This

Table 1. RFID versus barcode technology

Barcode	RFID Tags
Barcodes require line of sight to be read	RFID tags can be read or updated without line of sight
Barcodes can only be read individually	Multiple RFID tags can be read simultaneously
Barcodes cannot be read if they become dirty or damaged	RFID tags are able to cope with harsh and dirty environments
Barcodes must be visible to be logged	RFID tags are ultra thin, and they can be read even when concealed within an item
Barcodes can only identify the types of item	RFID tags can identify a specific item
Barcode information can not be updated	Electronic information can be over-written repeatedly on RFID tags
Barcodes must be manually tracked for item identification, making human error an issue	RFID tags can be automatically tracked, eliminating human error

Source: Juban & Wyld (2004). Would you like chips with that? p 32.

study will be the underpinning to develop managerial strategies through RFID application in apparel retailing.

II. Literature Reviews

1. Impacts of RFID Technology on Retail Industry

Retail industry is reluctantly facing challenges fueled by increasing global competition, higher market performance expectations by customers, and constantly changing technologies(Lin et al., 2002). Particularly, advances in information technology play a significant role in transforming competitive dynamics including product development, supply chain, controlling quality of product or services and new consumption patterns in retail markets. According to *IDTechEx*, a U.K. analyst firm, it was expected that European retailers spent from \$60million to \$100million on their infrastructures and make similar investments in RFID software and tags in this year (Sullivan, 2006).

Retail industry has adopted “quick-response(QR)” that combines technologies, modular layouts, process reengineering, total quality management, and employee involvement(Ko & Kincade, 1997). QR has been a successful initiative for apparel retail industry to save production cost, hold inventories low and avoid overstocking with electronic data interchange(EDI), barcode system and point-of-sale data capture. Even barcodes have long been the most prevailing technology for QR system, the industry needs a new information technology to sustain and revive its vitality. In that point, RFID technology holds numerous advantages over the use of barcode. Because it can revolutionize the QR system with the broad impact on all aspects of the value chain system, such as real-time tracking, safety monitoring, and overall warehouse operation. Retailers can store and transmit data such as when the product item is manufactured, expiration dates for perishable items, and a record of the temperature at which an item is shipped(Chen 2004; Tracy, 2005).

Retail industry welcomes RFID as a possible solu-

tion to this challenge but it is not clear what this technology entails and how to harness it to maximize its benefits while controlling its risks. It is needed to address and resolve this issues before the retail industry can reap the benefit of this technology.

2. Potential Benefits of RFID in Apparel Retailing

Apparel retailers have already paid a special attention to RFID application, which provided critical benefits to major stakeholders: supply chain, retailer and customers. RFID technology could support the industry’s increasing demand for improving inventory management; reducing costs for logistical operations; improving efficiency of store operations; shorter fashion cycle of designing; and manufacturing and stocking the latest products(TAGSYS, 2005). Specifically, we expect the potential benefits from the RFID technology in supply chain management, retail store operation and customer service management.

1) Supply Chain Management

Retailers must rapidly respond to consumer demand and adapt to current and future trends for faster fashion cycle. One of the important issues on apparel retailing is the supply chain networks, which might be the competitive advantage. RFID application can help retailers manage their supply chain more effectively by controlling their inventory such as preventing overstocking and removing expired perishable item from the shelves.

Especially for apparel retailing, salient benefits of RFID implementation will come from store-level applications such as real-and/or near-real-time inventory linked to stock management systems and store re-stocking processes(TAGSYS, 2005). The RFID can help shops track stock more efficiently by beaming out a product identity code, plus the type, size and color when prompted by a radio signal from a nearby RFID reader(Hogan, 2003). For example, *Benetton* are improving supply chain management system with RFID tags. A box containing clothes of varying style, colors, and size can be scanned, and

the information can be uploaded to *Benetton's* inventory tracking system instead of having to be checked in one piece at a time (Shim, 2003). The *Gap, Inc.* also reported that RFID tagging improved in store inventory accuracy from 85 percent to 99.9 percent after a three month pilot program (TIBCO, 2005). Likewise, improved inventory tracking will lower out of stock shelf fulfillment, which translates into a potential 7% increase in sales.

RFID tagging is revolutionizing supply chain management and data synchronization for suppliers and retailers (Bolan, 2005). Thus, RFID tags will increase revenue and reduce operating costs in the long term, especially for apparel retailers.

2) Retail Store Operation

Apparel retailers with RFID have an opportunity to manage store operation by developing a successful improvement of retail environment (Arnold & Bures, 2003; Richardson, 2004). The RFID system is able to improve efficiency of store operation which identifies and eliminates unnecessary activities for transaction. Also, the RFID technology can be expected to provide numerous benefits including: planning sales floor for desired style, size, and color in a rack of garments in seconds; sales staff on the floor spending more time with the customer and less time with the stock; merging the online and offline channel; and developing virtually digital dressing room on a special website.

Indeed, the salesclerk touches the screen to determine if additional sizes or colors are in stock, so time is not wasted searching for unavailable items (Arnold & Bures, 2003; Shim, 2003). Another important impact is that products are on the right shelf or rack when the customer wants to buy it. Often a customer tries on a pair of jeans or sports jacket and then returns it to the wrong place. The next customer sees no items of that size on the shelf and walks out without purchasing anything, even though the item was in stock (Philps, 2003). *Prada* at New York Epicenter store is implementing RFID technology to support new forms of customer service, merchandising and programming. In dressing rooms, RFID readers identify all merchandise a customer brings inside and displays information on the garment on an interactive video touch-

screen display. The RFID technology can help customer access various product information, and it helps sales personnels offer alternative and complementary items and accessories to their customer (Traiman, 2002).

3) Customer Service Management

Apparel retailing with RFID technology can provide better customer services along with improvements in store layout, adjacencies, fitting rooms, and customer amenities (Leob, 2003). Use of RFID effects not only determines whether a product has been shipped or has arrived at the store, but also matches apparel with accessories (Swedberg, 2005). Even if RFID seems innovative in customer service, RFID readers could be mounted to collect data as customers walk to checkout, which plays an important role in customer relationship management (Tracy, 2005). For instance, *Marks & Spencer* tested the Auto-ID Center's RFID technology in apparel items in order to improve customer service and increase sales. Also, handheld scanners in the store help staff serve customers (Anonymous, 2003c).

In terms of customer service, retailers should consider consumers' shopping benefits by putting RFID labels on each item (Philps, 2003). It is optimistic that apparel retailers with the RFID tags can improve customer services by helping customer save time for checking in and out, get information about pricing, colors and size, push a button and request an item on-time delivery, and finally enhance consumer experience.

III. Methods

Qualitative techniques are adequate for identifying relevant associations in the exploratory study (Supphellen, 2000). Focus group interview was used because it could explore and analyze the reality as to what retailers thought of the RFID by means of information technology, particularly its corresponding category to identify sources of their perception. We conducted the focus group interview with selected six panels from *The Board of Governors for the School of Merchandising* at a university in the metro-

politan city in Texas in the United States. As the representative leaders of retail industry, the Board members advocated for the school and university through participation in curriculum development, recruitment events, and field studies. The participants who had adequate experience with the RFID technology for experiments, or pilot project underway in their organization were voluntarily involved in the focus group interview. One of the authors participated as a moderator.

The moderator followed a structural outline on the basis of developmental research sequence: (1) introduction, (2) general exploratory discussion about level of experience, familiarity and perception of RFID, (3) detailed discussion about intrinsic attribute, perceived benefit and risk for retailing, and implementation in retailing, and (4) closing. According to the guideline, each panel was asked to indicate their perceptions and prospects of RFID, and specific function regarding technology innovation in retail systems such as merchandising, supply chain management, and marketing strategy. The focus group interview was lasted one hour, and the session was audio recorded and additional notes were taken to capture the discussion context. The interview records were transcribed, yielding over the meaningful 178 sentences.

For data analysis, qualitative content analysis was carried out because of scrutinizing significant aspects of text that were not amenable to quantitative technique. Such techniques analyzed patterns of frequency and regularity in a large number of texts (Lewisbeck, 2004). First, we began by searching for emergent themes in the perceptions of RFID attributes for retailing and identified underlying dimensions of perceived RFID benefits which were conceptualized based on the literatures. Secondly, each item from verbatim comments was then trimmed (i.e., sentences synopsized into short statements representing a single and specific facet of RFID). After confirming the significant 173 responses, 150 responses were classified into 31 attributes by dimensions of RFID benefits. Finally, we focused upon developing a managerial understanding of the RFID benefits. Discrepancies in interpretation were discussed and negotiated

between the authors.

IV. Results and Discussions

1. Familiarity of RFID in the retail industry

We projected the RFID technology as a practical substitute for the conventional barcode system. The data that provided the familiarity of RFID were derived from the general exploratory discussion as well as detail discussion session. Overall, retailers were familiar with RFID technology and expressed the belief that RFID basically would support an existing retail system for speed to markets. However, retailers addressed the level of experience with RFID technology that they were still in the early adoption stage among few innovative companies.

"In reality, we still do the old style, but that technology exists."

"Dual systems with a label and a mechanized system are going to work..... to increase the speed and embrace technology."

"We haven't really launched into the apparel tagging too much at this point. But some of the things that I can see some benefits....."

The responses imply that retail industry expects to adopt this technology to evolve the entire method in supply chain of apparel retailing in the near future (Lin et al., 2002; Sullivan, 2006). Especially, it is essential to understand the market drivers of the retail industry to best implement the new technology for supporting the entire supply chain and store operations:

"Ultimately, we would like to have a completely streamliner supply chain to where we could take a day or two days which you know translates to millions and millions of dollars out of the supply chain by being reactant....."

2. Retailers' Perceptions of RFID benefits

Content analysis confirmed five distinctive dimensions of RFID benefits in apparel retailing as follow; (1) Visibility and Velocity, (2) Revenue Enhancement, (3) Customer Service, (4) Security, and (5) Employee Productivity. According to each five

dimension, we classified 31 attributes of RFID from obtained 150 RFID's excerpts. Table 2 presents overall features of content analysis and illustrates the important attributes according to five distinctive benefits' dimensions of RFID.

For the frequency analysis, the visibility and velocity was the highest(27.3%), followed by customer service(24.7%), revenue enhancement(21.3%), security (20.7%), and employee productivity(6%).

1) Visibility and Velocity

The most frequently recognized benefit of RFID was 'Visibility and Velocity' with the following attributes: Capturing data; Track and Trace; Item

tracking; Inventory accuracy; Streamlined supply chain; Demand planning; Reduce product obsolescence; Forecast accuracy; Shrinkage reduction; and Time Definite delivery.

"..... Because we can track it down literally it is in a couple of feet, that we can go and find something within that back room and gosh 'It is a Halloween item that were out on the shelf, but it is in the back room'..... it sends a signal to say hey 'get that stuff out there, the guest is going to miss out on that sale'..... we track it through our network in our distribution center."

The panels recognized the necessity of RFID as it

Table 2. Content analysis results of the RFID benefits for retailing

Dimensions	RFID Benefit Attribute(Frequency)	Total number of items (%)
Visibility and velocity	Capturing data (9) Track and Trace (7) Item tracking (6) Inventory accuracy (4) Streamlined supply chain (4) Demand planning (3) <i>Reduce product obsolescence</i> (2) Forecast accuracy (2) Shrinkage reduction (2) Time Definite delivery (2)	41 (27.3%)
Revenue enhancement	POS accuracy (7) In-stock position (4) Promotion congruence (4) Auto replenishment (4) Cost perspective (4) Value-added (3) Promote sale (3) POS speed (2) In-store item location (1)	32 (21.3%)
Customer service	Improving service & benefit (16) Creating new shopping experience (9) Understanding consumer behavior (7) Educating consumer (5)	37 (24.7%)
Security	Customer's privacy issue (12) Regulation & Standard (8) Brand protection (4) Customer authentication (4) Employee/customer theft (3)	31 (20.7%)
Employee productivity	Internal mentoring (6) Effective labor (2) Cost saving (1)	9 (6%)
Total	31 Attributes	150 (100%)

could provide complete and real time visibility into product lifecycle and support strategic demand driven supply network initiatives. RFID technology is poised to transform the futuristic vision into reality by “tracking and tracing”. Because RFID generates the data across the retail supply chain network and puts it in the context of detailed business process information such as manufacturing and shipping history(TIBCO, 2005). Therefore, it is suggested that RFID plays an important role in improving inventory accuracy as well as reducing warehouse cycle times by checking the contents of cases and pallets without slowing down to locate and scan each individual barcode.

Importantly, the dimension of velocity is related to real time analysis of track and trace consumer data regarding shopping pattern. This supports that RFID data accelerate product velocity by eliminating distribution bottlenecks and improving inefficient business processes(KSA, 2005a). RFID speeds the order and delivery cycle time by providing instant and accurate information about the contents of a shipment, making it possible to quickly ensure correct delivery (KSA, 2005b). With this demand, RFID might drive profound changes in the streamlined supply chain and logistics operations between consumers, suppliers and retailers.

2) Revenue Enhancement

The second benefit that pervaded perceptions of RFID between the panels of retailers was the feasible cost by getting accurate data of customer information and eliminating unnecessary works in store. The dimension of revenue enhancement was consisted of the following attributes: POS accuracy; In-stock position; Promotion congruence; Auto replenishment; Cost perspective; Value-added; Promote sale; POS speed; and In-store item location.

“If they can get that worked out and the cost can drop to less than a penny, than there’s hope for a lot of benefits in retailing.”.....

“There are a lot of efficiency gains which turn into cost, it eventually could reduce.”

In fact, costs for the RFID system include the tags, tag application labor, portable reader labor, mainte-

nance, and training. However, a cost/value analysis should be performed to determine the impact of RFID when it is integrated throughout the supply chain(Hill, 2003). From this approach, it is prospected that investment for RFID adoption increases the potential savings from maximizing order fill rates, reducing cycle times, decreasing inventory and shipping errors, reducing damage/spoilage, minimizing cost per order and cost as a percent of sale.

“When that product moves off the store shelf it is then signaled back to the supplier to say okay wherever that one or two level trigger point is more products coming, to where you never have an empty shelf space.”

Physical product display arrangements with RFID tags play a vital role in merchandising plan and optimizing store revenue(TAGSYS, 2005). Customers who cannot find an item on a shelf are likely to purchase the product from another store. Therefore, retailers should begin to aggressively think about editing assortments in a more rigorous manner to replace low-performing SKUs with new offerings that balance the line, leading to cost reductions for inventory management.

3) Customer Service

We identified that apparel retailers have become aware of potential benefits for customers. Most responses in the customer service dimension included the following attributes; Improving service and benefit; Creating new shopping experience; Understanding consumer behavior; and Educating consumer.

“I can see if you were shopping in a store and were looking at big ticket items, but you didn’t purchase, that that would be an opportunity for a retailer to send a little note to you I see that last weekend you were looking at and now it’s on sale, or we would like to talk to you about making a purchase, let’s make a deal.”

“We’ll send out messages based on your buying pattern, just like Go online and check all the items you want to buy and download it on to your little thing and take it to the store.”

“It would be an innovative, try it out, kind of one time experience that you would want to engage in.”

Unlike a long-established barcode, RFID tags can

improve customer service by saving time for shopping, and creating innovative shopping experience. It supports that the RFID technology can provide better customer service by helping customer save time for shopping (Philps, 2003; Tracy, 2005). Therefore, the success of the RFID technology ultimately depends on expanding the breadth and depth of customer relationships and on translating the resulting loyalty into higher sales of goods and service.

While industry focuses on the issues of low tag cost, industry standards, and business applications, consumer education should not be ignored. While it may be years before fully integrated RFID systems emerge, consumer buy-in is still necessary for widespread adoption of any new technology. The panels indicated a concern if the RFID industry ignores consumer education, consumer advocacy groups may set the tone of the debate.

4) Security

In an ABI Research survey (2003) of RFID users with significant knowledge and experience, only 33 percent of the users perceived RFID to be beneficial to security (Juban & Wyld, 2004). However, our analysis depicted the dimension of security along the following attributes: Customer's privacy issue; Regulation and Standards; Brand protection; Customer authentication; and Employee/customer theft.

"Privacy is a critical issue. RFID is associated with privacy..... There is negative connotation." "You can give people the choice. I think the privacy issue is that is about..... I think with the whole type of piracy is stopping that."

The panel recognized the privacy concern as a critical barrier of RFID diffusion, but they believed that there are various mitigating factors such as generation, gender and cultural difference. Furthermore, they suggested that customers should be given the ultimate choice whether they keep or remove RFID tags. They also recognized regulation and standardization as concerns that could eventually be overcome.

"The second biggest piece is that when you have readers all throughout the store you know what goes into the dumpster that shouldn't and you know what goes out of the store

that shouldn't. So that loss prevention piece is a big one for us because a lot of our theft is internal or its items that don't get scanned."

"We have a high theft on those and they are high retail \$8 or \$9 bucks a pop for a small item, so partnering with a company was much better for us."

Preventing theft is another benefit to the apparel retailer. RFID tags help reduce theft and tampering and decrease costs associated with loss prevention by tracking individual cases of high-value products as they move through the supply chain (TIBCO, 2005).

5) Employee Productivity

With respect to store operations, the panel suggested that RFID played an important role in real-time floor design and employee management. But in reality, employee productivity seemed not the driving force to adopt RFID. Employee productivity dimension included the following attributes; Internal mentoring; Effective labor; Cost saving.

"You need fewer people for managing in store.....Being staffing is one of our biggest issues, so if you can potentially save some labor that way."

"You can optimize your routes, make it the shortest time."

By using RFID tag, it is possible to manage stocks with fewer staff by eliminating unnecessary practice in stores. Where customer-facing staff needs to spend time implementing inventories, it is felt that this time should be freed-up for working with customers (TAGSYS, 2005). Instead, salespeople on the floor would spend more time with their customer, which makes it more cost reduction as well as better service for customers in retail settings.

V. Conclusions and Implications

This study explores the reality and benefits of RFID as a critical factor for successful apparel retailing. It also looks into ways to improve the business model for both marketers and customers in the apparel retail industries. The retail industries are poised to benefit most from the emerging RFID technology and are excited about the potential of the

technology although they are not ready for prime time. To quote one of the responses from the interview:

“RFID increases the speed and embraces technology …… the real potential of RFID technology is when it is combined …… it has the potential to explode ……”

Content analysis of the focus group interview identified five dimensions of RFID benefits for apparel retailing: (1) Visibility and Velocity, (2) Revenue Enhancement, (3) Customer Service, (4) Security, and (5) Employee Productivity. Our analysis lends support to the belief that RFID has a significant potential to streamline supply chain management (Christopher & Gattorna, 2005; Roy, Sivakumar & Wilkinson, 2004). The findings also have important managerial implications for the fashion industry to optimize marketing mix as one participant succinctly stated:

“It is more about making sure the right product’s at the right place at the right time, on the shelf. That’s the part we are really going after.”

With respect to the RFID benefits of visibility and velocity, apparel retailers can have the best opportunity for cost reduction and value improvement by real-time information processing, demanding/Quick Response, and collaborative partnership with suppliers for long terms. For instance, RFID technology helps manufacturer rapidly response to unpredictable demand conditions(e.g., fashionable items, stock-out and urgent delivery items). In the lack of transparency and visibility across supply chains(Zahay & Handfield, 2004), apparel retailers should recognize the integration of all activities(i.e., data mining to flow and transformation of merchandise) by building collaborative relationships between the early RFID adopters in manufacturers and wholesalers. This will be able to give a competitive advantage to apparel retailers for supply chain management and eventually deliver greater value to the end customer(Christopher & Gattorna, 2005).

Apparel retailer also recognized revenue enhancement to meet the needs for accurate data regarding fashion forecasting, inventory, point-of-sales, and in-

store item location. At this viewpoint, the RFID technology is beneficial to provide accurate and speed data for future flexibility of product development including demand merchandising plan(e.g., size, style, and color), total acquisition cost, and quality or quantity assurance(Evans & Bermanna, 2001). In addition, RFID plays an important role in store operation, such as real-time floor design and employee management, that may be able to save time and energy in retail environment. By using the RFID tags, retailers can optimize routes for merchandise assortments that are frequently purchased. It is also possible for fewer staff to manage stocks by eliminating unnecessary works in stores. At the same time, salespeople on the floor could spend more time with their customer, which makes it more cost reduction as well as better service for customers in retail settings.

Another important benefit of RFID is customer service including shopping convenience(e.g., quick and easy shopping), new shopping experience with computer-aid shopping trips, and loyal program with customer authentication for sales promotions. This supports a basis for a service-based pricing strategy that marketers can offer higher price along with value-added service, especially for innovative version of fashion items or prestigious fashion brands.

Otherwise, privacy is concerned on the RFID itemizations from the consumers’ perspective(Hogan 2003; Young 2004). However, it is prospected that RFID tags help retailer not only protect their brand but also prevent consumers’ shoplifting behavior, which might be a guidance to develop educational program for employee and consumer. Still, the adoption of RFID technology is premature in fashion industries, but it is certainly optimistic for marketers to prospect numerous tangible benefits from implementing the RFID.

The findings of this study should be interpreted with caution due to the limitation that the focus depth interview conducted in the study was a single group in the United States. Also this study provides a fundamental flaw for future research in this area of growing importance. Because the present study was an exploratory qualitative analysis in nature, a quan-

titative study should be conducted to assess how marketers' RFID adoptions enhance cost management in apparel retailing over time. It is critical to examine differences in benefits and risks between manufacturer, wholesalers and retailers for developing the integrated supply chain model. Other recommendations for future studies include consumers' perception of privacy issue of RFID tags, profiles of consumer characteristics (e.g., gender, age, and ethnicity) for technology-product segmentation, and global supply chain framework for logistics across cultural settings.

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요 약

최근 정보기술 분야에서 새로이 부상하고 있는 RFID는 기존의 노동비용을 절감하고 재고관리를 개선하며, 또한 효율적인 사업모델 창출을 통해 판매를 증가시킬 수 있는 혁신적인 정보기술로 소개되고 있다. 따라서, 이 새로운 정보기술의 채택이 의류소매업에 가져올 수 있는 이점은 무엇이며, 또한 무엇이 RFID 기술을 실용화하는 데에 성공적 요인이 될 것인지를 생각해 볼 시점이다. 본 연구는 RFID기술에 대한 의류소매업자의 현실적 인식수준과 그들이 예측하는 RFID잠재적 이점을 탐색하고자 하였다. 또한 이를 통해 의류소매업에서 RFID실행가능성을 예측해 보고자 하였다. RFID기술에 대한 경험적 연구가 매우 드문 시점에서, 본 연구는 미국 내 소매업자들을 대상으로 집중집단면접(Focus group interview)를 실시하였다. 질적 내용 분석 결과, 총 150개의 RFID 관련 문항이 도출되었고, 이는 다시 다섯 개의 RFID 이점 차원에 따라 31개의 속성으로 분류되었다. RFID기술과 그의 이점에 대해 소매업자들은 이 기술이 현존하는 유통 공급망 체계를 보다 신속, 효과적으로 만들 것으로 인식하고 있었다. 그러나 실제 이 기술에 대한 채택은 아직까지 소수의 혁신적 기업만이 시도하는 초기 채택단계 이전에 머무르고 있었다. 한편 의류소매업자들이 인식한 중요한 RFID이점은 다섯 차원, 즉 (1) 물류 및 재고관리의 가시성과 가속성, (2) 수익률 향상, (3)고객 서비스, (4) 보안성, (5) 고용생산성으로 밝혀졌다. 이러한 결과는 RFID가 신속하고 효율적인 유통 공급망의 관리, 매장 운영 및 관리의 개선, 그리고 고객서비스 강화에 중요한 잠재력을 지닌다고 제시한 선행연구들의 이론적 가설 및 제언을 지지하였다. 따라서 본 연구는 의류소매업에서 RFID기술에 대한 학문적 연구 및 실무적 접근 방향을 위한 기초자료를 제시하고 있다.