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Postponement and logistics flexibility in retailing: a multiple case study from Sweden

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Abstract

Purpose – The purpose of this paper is to explore how postponement is applied in retailing and how such application is connected to logistics flexibility.

Design/methodology/approach – An overview of the established typological classifications of postponement and logistics flexibility is presented followed by empirical results from three case studies of retailers of electronics, furniture, and grocery in Sweden. The study relies on primary qualitative data gathered on the retailers as well as secondary material on some suppliers including logistics providers for further insight.

Findings – The results of the study show that retailers have different practices when it comes to postponement and speculation; however, there is a growing tendency toward postponement among retailers by exploring new means of applying postponement. The results reveal that retailers that have higher application of postponement seem to be more flexible in their logistics operations.

Research limitations/implications – The paper provides direction for further empirical research of the topic, by indicating the application of postponement is not constrained to the point of purchase and could be extended by involving consumers as well as capitalizing on suppliers' competences and capabilities. Especially, sales services, software, and upgrades could provide opportunity for further expanding the concept.

Originality/value – The paper contributes to the existing literature on logistics practices of postponement and speculation, as well as logistics flexibility by focussing on retail firms in Sweden. Most of the prior scholarly work on postponement and flexibility is on the manufacturing context.

Keywords Sweden, Retailing, Postponement, Logistics flexibility

Paper type Case study

1. Introduction

Extremely demanding customer requirements on availability and variety, combined with ever-increasing competition in the market are widely considered as the challenges of supply chains (see, e.g. Hilletofth, 2012). The increasing demand for adapting to diverse customer requirements, as well as increasing market volatility and uncertainty, are among the important drivers of flexibility in the supply chain (Tachizawa and Thomsen, 2007).

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Logistics flexibility corresponds to the ability to respond quickly and efficiently to changing customer needs in inbound and outbound delivery, support, and services (Zhang *et al.*, 2005). Products not in their final state (regarding form or place utilities) offer more flexibility in the presence of demand uncertainty since they can be transformed into many final products (Graman and Magazine, 2006), and thus avoid incurring high finished-goods inventory carrying costs or stock-outs. A proven appealing option for tackling uncertainty is to delay, or postpone, the point of product differentiation (Boone *et al.*, 2007; van Hoek *et al.*, 1999; Hilletofth, 2009), or to consider a base level of predictable demand for products – that can be planned for – and to postpone the production or distribution of the demand above the base level ("surge") (Christopher and Holweg, 2011).

Much of the popularity of postponement has been due to the augmented interest in being as close as possible to final consumers (Appelqvist and Gubi, 2005; Gregory and David, 2005; Haug *et al.*, 2009), and e-commerce (Grewal and Levy, 2009; Yang *et al.*, 2004). As the final loop in supply chains, retailers are at the interface with consumers (Ganesan *et al.*, 2009) and have shifted from being passive recipients of products that were allocated to the stores by manufacturers in anticipation of demand, to being dynamic designers, producers, and controllers of products (Fernie and Sparks, 2004). With the increased scope of the retailers' role in supply chains, it becomes more evident that their logistical flexibility can affect various supply chain members. However, similar to flexibility, the current general perception appears to be that postponement is primarily associated with manufacturing environments (Feitzinger and Lee, 1997). Therefore, such deployment in retailing seems to have been a missing link in the literature. This is despite retail business models of postponement having been suggested as valuable sources of leaning on how to increase postponement and flexibility (Catalan and Kotzab, 2003).

The question arises whether or not it is possible for retailers to benefit from the best of both worlds; i.e., whether they can delay final adjustments of the products and/or shipping them, and at the same time be logistically flexible to respond quickly to demand changes (e.g. by fast and more frequent shipping rather than bulk shipping and hence avoiding incurring high inventory carrying costs). As a result, it seems appealing to investigate such application in retailing.

This study addresses this paucity of research by exploring how postponement is applied in retailing and how such application could be connected to logistics flexibility. It starts off by a review of the existing literature on postponement and logistics flexibility and presents the results of three empirical cases studies in the Swedish retailing industry. The paper reports an exploratory qualitative case study research which is the much called-for study design in postponement and flexibility research, as well as studies focussing on channel issues in retailing (see Brown and Dant, 2008; Boone *et al.*, 2007; van Hoek, 2001). Sweden is an interesting and dynamic retail marketplace, in which, the retail sector has experienced significant growth for 17 years outperforming most other Western European countries (Hultman and Elg, 2013). The retail trade had a total turnover of 67 billion Euro in 2013 employing 280,000 individuals (HUI Research, 2014). The focus here is not to provide a cross-case analysis comparing the retailers; but rather, to dig into their logistics processes to understand how they actually apply the principle of postponement and to evaluate their flexibility in relation to applying postponement. The study is carried out at the firm level; however, secondary material regarding relevant suppliers and third-party logistics (TPLs) providers is also included in the study to gain a deeper insight. The empirical study is followed by a discussion on the findings that shed light on the relationship between postponement and logistics flexibility.

2. Literature review

2.1 Postponement

Postponement was originally applied in the distribution channel, involving the delay of the forward movement of inventories (Yang *et al.*, 2004). Postponement could be seen as an organizational concept whereby some of the activities in the supply chain are not performed until customer orders are received (van Hoek, 2001). Several definitions of postponement tend to focus more on the manufacturing activities such as modularity (Christopher, 2000) or assembly (Graman and Bukovinsky, 2005), while others have stressed the logistics activities (Bailey and Rabinovich, 2006; Hilletofth, 2009). Either way, it is obvious that the concept has evolved since its introduction to cover more areas (Boone *et al.*, 2007) while it has kept its nature to mitigate risks and uncertainty at acceptable response times. Waller *et al.* (2000) contend that postponement allows a company to be flexible in developing different versions of a products as needed, to meet changing customer needs, and to differentiate a product or modify a demand function. They look at it as a "market oriented" supply chain strategy. Cvsa and Gilbert (2002) discuss that by postponing its ordering decision, a downstream firm retains operational flexibility to respond to demand information.

Alderson's (1950) conceptualization considers three types of postponement: form, identity, and place. In marketing terms, identity could be viewed as the meaning put forward by the interrelated value network flows (Aaker and Joachimsthaler, 2009). Later studies have expanded Alderson's framework to include more types of postponement. Zinn and Bowersox (1988) suggest five types; namely, labeling, packaging, assembly, manufacturing, and time. Many other scholars have emphasized the location aspect of delaying activities in supply chains and, hence, have counted place as another type of postponement (Cooper, 1993; Goodrich, 2007). Place postponement refers to the positioning of inventories upstream in centralized manufacturing or distribution points to delay the forward or downstream movement of goods (van Hoek, 1999; Wong and Hvolby, 2007) such as the broader "customer pull" system in retailing in which individual stores place their orders on the basis of store-movement data (Day, 1994). Still others have emphasized applying postponement in setting prices (Graman and Bukovinsky, 2005; van Mieghem and Dada, 1999). In several cases, much of postponement activities are outsourced as some sort of service to TPLs. Meanwhile, several attempts have been made to thematically cluster the various types of postponement mainly into logistical and manufacturing (Battezzati and Magnani, 2000; Pagh and Cooper, 1998; van Hoek *et al.*, 1999; Zinn and Bowersox, 1988).

2.2 Logistics flexibility

Flexibility, in general, reflects the ability of a system to change or react with little penalty of time, effort, cost or performance (Upton, 1994) and is often regarded as the ready capability to encounter, resolve, adapt to and even exploit on new, different, unexpected, or changing requirements (Fisher *et al.*, 1994; Skipper and Hanna, 2009). Flexibility is often considered to be one of the fundamental factors for successful implementation of SCM initiatives (Tummala *et al.*, 2006) despite being a complex, multidimensional, and hard-to-capture concept, both theoretically and empirically (Sethi and Sethi, 1990). Supply chain flexibility has emerged from the manufacturing flexibility literature and hence is criticized for being largely confined to a manufacturing context and thus neglecting the role of other functions (Stevenson and Spring, 2007; Yu *et al.*, 2012).

As one of the most important dimensions of supply chain flexibility (Fantazy *et al.*, 2009; Fantazy *et al.*, 2012), logistics flexibility could be a significant capability for increasing performance in today's time-based competitive environment (Closs *et al.*, 2005). A major stream of literature dichotomizes flexibility into competence and capability, or alternatively, primary and secondary (Stalk *et al.*, 1992; Watts *et al.*, 1993). According to Zhang *et al.* (2002), flexible competences, which are internally focussed, provide the processes and infrastructure that enable firms to achieve the desired levels of flexible capabilities. On the other hand, as Watts *et al.* (1993) highlight, flexible capabilities, which are externally focussed, can be viewed as a linkage among corporate, marketing, and manufacturing strategy.

Based on Day (1994) and drawing on the resource-based view of the firm, Zhang *et al.* (2005, 2002), categorize logistics flexibility consists of four sub-constructs. This categorization conforms to the view of Cooper *et al.* (1997) and Ballou (2007) where the authors contend the major activities within logistics management to be purchasing and physical distribution management:

- Physical supply flexibility is the ability to provide a variety of inbound transportation, warehousing, and material inventory quickly and accurately. It enables firms to coordinate the delivery of incoming goods (Zhang *et al.*, 2002).
- Purchasing flexibility is the ability to provide the variety of materials and supplies quickly and performance-effectively through cooperative relationships with suppliers (Zhang *et al.*, 2005). It reflects the ease with which the firm can exercise its procurement options (Swafford *et al.*, 2006).
- Physical distribution flexibility is the ability to adjust inventory, packaging, warehousing, and transportation of physical products quickly to meet customer needs (Zhang *et al.*, 2005). This type of flexibility is referred to by Porter (1985) as outbound logistics flexibility, which deals with delivering the finished product to customers reliably and efficiently.
- Demand management flexibility is the ability to respond quickly and performance-effectively to the variety of customer needs in terms of order-taking, delivery scheduling, installation, repair, training, and product maintenance (Zhang *et al.*, 2005).

3. Methodology and study design

It is increasingly becoming accepted that exploratory studies entailing "why" and "how" research questions can be approached effectively using a case study method (Eisenhardt, 1989; Yin, 2014). The case study method enables researchers to develop a better insight into a complex and relatively unexplored phenomenon, which is being implemented only recently and is expected to increase rapidly in use (Ellram, 1996). In line with our purpose, our case study is exploratory; however, some descriptive information is provided in our empirical study as well. Such approach helps to "identify the appropriate explanation to be analyzed" (Yin, 2014, p. 140).

Logistics research deals with practical-oriented problems and is best dealt with by using multi-disciplinary and cross-functional approaches such as case studies (Näslund, 2002). More specifically, Brown and Dant (2008) discuss that the retail supply channel research could "take on a new life" by using different inferential tools than has been traditionally employed, and hence, call for applying qualitative research to study

retail supply chains to uncover new problems. Therefore, in this study qualitative case studies were deemed to be relevant to fulfill the purpose of the paper.

In this study, "purposeful sampling" and "convenience sampling" was used (Patton, 1990) to select the retailers active in Sweden. In this regard, "extreme/deviant," "crucial cases," "maximum variation," and "critical" have been widely regarded as useful criteria (Flyvbjerg, 2006; George and Bennett, 2005). Also, based on the earlier acquaintance with the decision makers in one of the firms, as well as geographical reach and proximity, the case companies were selected. Following this framework, the cases chosen for this study were selected mainly regarding their different product type, range and categories, retail format, integration and ownership, and uncertainty. The case companies selected, namely, Media Markt, Jysk, and Lidl carry different product categories in consumer electronics, home furniture, and grocery, respectively. All three retailers are Europe based and are widely active in Scandinavia. Regarding their types and product ranges, they could be classified as "general merchandise retailers" (and possibly category killers), and "food retailers – limited-assortment supermarkets" with respective Swedish Industry Classification codes of 474, 475, and 472. In contrast with retail firms typically exemplifying postponement practices, these firms are all significantly more "mass market" oriented and price focussed. Media Markt to a great extent operates locally and Lidl, on the other hand, operates rather centrally and regionally. Jysk is however in between.

All retailers are large in terms of size (number of employees and annual turnover) based on the definition provided by the European Commission (2005). Choosing multiple cases, represents replications that allows for the development of a rich theoretical framework (Ellram, 1996). Yin (2014) also contends that with having multiple cases the findings are likely to be more robust than having only a single case.

Data were collected through interviews with decision makers within logistics, purchasing, warehousing and IT, and store managers. A total of 12 interviews were carried out over a period of two years from 2010 to 2012. A key informant approach was used to select suitable respondents. By means of "snowballing," the interviewees were asked to possibly recommend informant colleagues for further interviews. Also, archival material including financial reports, white papers, and internal reports were used as secondary data. Moreover, direct observations and filed visits of operations and practices at distribution centers were done in order to gain perspective on the flow of goods, assortment, and the existing operating structure. Table I shows the primary data collection on the retailers.

Although the focus of the study is on the firm level, some other upstream actors were considered to gain more insight on logistics processes. One key supplier was

Retailer	Number of employees	Operating revenue (×1,000€)	Stores		Private labels (of total)	Data collection method	
			Physical	Online		Interviews	Site visits
Media Markt	2,000	600,000[a]	29	Yes	< 15%	4	2
Jysk	1,250	300,000	124	Yes	> 90%	3	2
Lidl	2,800	850,000	169	No	> 60%	5	2

Note: [a]Based on revenues of all stores in Sweden from Amadeus

Table I. Overview of case companies and primary data collection

introduced by Media Markt for further reference and the Scandinavian Supply Chain Director was interviewed. Also, data collected from four main TPLs and carriers serving these retailers (including Schenker, Aditro, Bring, and PostNord) were included. A total of 11 interviews with these TPLs were considered as secondary data to complement the primary data collected from the retailers. These interviews were carried out in 2009-2012 mainly for a project regarding customer value creation and innovation. The interviewees within these TPLs held positions such as key account manager, sales and marketing manager, and operations and logistics manager. All interviews were semi-structured and an interview guide was sent to the interviewees before the meeting. Each meeting took about one hour. Follow-up questions as well as interview transcriptions were e-mailed to the respondents later for comments, corrections, and approval. The empirical data gathering was done in Sweden and partly in Denmark.

In order to ensure quality of study, this research followed the guidelines of Lincoln and Guba (1985) in validity, transferability, dependability, and confirmability. To ensure validity, first of all, the questions used in the interviews were grounded in the literature. Also, Nvivo 10 was used to systematically code and catrgorize the transcripts, and match patterns (Gibbert *et al.*, 2008). Purposeful presentation of the cases which enables critical understanding ensures transferability (Halldórsson and Aastrup, 2003). Communicative validation and credibility was ensured by giving access to the interview material to the respondents throughout the study, as suggested by Seuring (2008). Furthermore, triangulation of data, which ensures dependability, was applied by drawing on various data sources (e.g. interview data, archival data, and secondary interview material).

4. Empirical study

4.1 Jysk

Background. The Danish firm Jysk, one of the major European home products retailers, was established in 1979 and now has over 1,600 stores in 34 countries and has expanded drastically in the past few years with a turnover of €2.2bn. It is currently the fifth largest European retailer in terms of revenue. Jysk Nordic will soon have 130 stores in Sweden and has distribution centers in Nässjö, Sweden, Radomsko, Poland, and in Uldum Denmark (Northern Europe's largest warehouse) where around 70 percent of the operations are automated. Its products, almost all private labels, range from furniture and home accessories to bedding, mattresses, outdoor, and garden items.

Postponement. A large proportion of the products in various categories either need full assembly by customers or are semi-assembled. In this way, the final formation of the product is postponed up to or even after the point of purchase. In some product categories by applying modular design principles, some components are shared by multiple products. Therefore, not only the final assembly but also customization takes place after the customer order is placed. The idea started with realizing the consumer preferences and the complexity of inventory holding. For instance, Jysk has recently introduced the "Build Your Own Wardrobe" and "Build Your Own Sofa" programs where customers can choose between various pre-made modules to design their own wardrobes or sofas. As a result, several standard back parts and side parts are available and customers can choose if they want their sofa to have two or three seats, be right-sided or left-sided, or be corner-type or not. This helps in avoiding stockpiles in the storage by using stores as showrooms for bulkier items.

Shoppers can also customize the colors in stores or online, where samples are available. The products can be ready for delivery in two or three working days. Similarly, customers can specify the size and interior design of wardrobes from a variety of modules. Also blinders could be tailor-designed and made to individual customer specifications with a short lead-time. The same goes for tailor-made beds with special interior and cushioning, with the possibility of installing adjustable and electronically foldable solutions based on consumer preferences. In this way, Jysk extends the options and variations of classically functional products to turn them into innovative items.

In a broad scale, labeling and packaging postponement is applied to meet different national specifications and standards. For instance, in different regions, various language requirements exist for the labels, CE-marking, FEC-certifying, or TÜV-testing. Such activities are often postponed to the distribution centers, and some are carried out by TPLs. Since most of the products at Jysk are private-label products, some labeling process on the generic products purchased from the suppliers, as well as bubble-wrapping based on individual store requirements is postponed until they reach the warehouses.

Place postponement is applied at both outbound and inbound levels. Delivery of some purchased items from the suppliers in China to Jysk is postponed with a delayed schedule until orders are placed at a regional level. In this way, inventory costs could be diminished to a great extent. Also, in case of downstream logistics, forwarding some products from the distribution centers is dependent on reaching an acceptable level of SKU in order to avoid incurring higher transportation costs. In 2007 Jysk tested central ordering and replenishment from the main distribution centers (rather than individual stores) for garden furniture, which resulted in an increase in turnover and profit by 25 and 35 percent, respectively. It is interesting to note that Jysk is moving away from pure forecast-based inventory planning due to the general uncertainty in downstream demand. Therefore, they keep a minimum safety stock and postpone shipment.

Such structure is based on the principles of ABC planning using an estimation of the expected gross margin. In this way, Jysk marks certain products with "never-out-of-stock" for which it carries more safety to increase its flexibility to meet demand fluctuations. Jysk tends to retain products as long as possible at two major distributions centers in Scandinavia to enable just-in-time and frequent forwarding (hence, logistics postponement).

As a result, the distribution center inventory turns have increased from three to four within one year. With logistics postponement, over time, they have been able to "save in terms of inventory write-downs, margin loss, and over congestion." Financial and pricing postponement is applied in relation with suppliers and customers. A more realistic retail price in several categories is determined and adjusted after product launch for having a more accurate knowledge about the market demand in different countries. Also, yield management is practiced for various seasonal categories such as Christmas ornaments and garden equipment.

Logistics flexibility. In general, Jysk has a high level of logistics flexibility. In terms of physical supply flexibility, by using automated truck tracking systems at their warehouses, they ensure speed and accuracy of the shipments to the warehouses. The distribution center in Sweden has a pallet capacity of 90,000 which will receive an expansion investment of over €135m together with the warehouse in Ulm in Germany.

They apply cross-docking to minimize storing costs. Also, via efficient inbound transportation, the delivery of variety of shipments on time and to the right location is actualized.

As for purchasing flexibility, filling multiple requests is done rather quickly. However, for some product categories, the planning for purchasing is done six months in advance. From the 50 percent of its merchandise, which is supplied from China, Jysk has a set of suppliers in Asia with whom it has long-term partnerships. With a moderate level of integration of inventory systems with the suppliers, ordering, execution, and receiving is relatively smooth for most product categories. Jysk uses a KSD-developed system for efficient customs handling. They are rolling out an automated ordering and replenishment system to increase efficiency and purchasing flexibility.

By using sophisticated automated order-picking systems at their warehouses, they ensure speed and accuracy in picking multiple orders. Driverless automatically guided vehicles and lift-trucks enable order-picking from upper floors in the warehouse. Labeling and wrapping of products to be allocated to individual stores is done semi-automatically in the warehouses after breaking bulks. With the integrated warehouse management systems – Ant & SattStore – accurate information regarding quantity and location of inventory is realized. Meanwhile, they have precise record of quantities and locations of products in the stores.

In terms of demand management, Jysk has developed their in-house system for ensuing on-shelf availability by allocating products to the stores. The Point-of-Sale system is integrated with the back-office system, as well as with their demand management system. In this way, the warehouses will have real-time information about the inventory levels at stores. Their documented "Customer Values" maintains that the product should always be available and the prices should be clear. Providing an easy shopping experience is one of their main values. They also have an established function for after-sales (e.g. repair, installation, and maintenance). Their customer service deals with the feedback from the customers online or in every store and guarantees a response in less than a day.

4.2 Lidl

Background. Lidl's history goes back to the 1930s, when the company was founded in Germany as a grocery wholesaler. The first Lidl stores were opened in 1973 and today Lidl stores can be found in nearly every country in Europe. Lidl could be categorized as a "limited assortment" supermarket and with their strong price focus, may be described as "hard discounter." The first Nordic stores were opened in Finland in 2002, and the first Swedish store opened in 2003. Today, Lidl has about 170 stores in Sweden. The chain is represented all over the country, with an emphasis on the southern, more populated parts. Two central warehouses located in the southern part of the country serve these stores.

Lidl's product range may be divided into two main parts – food and non-food. The supply chains, and the potential and use of postponement are different for the two types of goods. A hybrid strategy is applied for physical distribution where items are either pushed to the store centrally from warehouses or pulled by stores just-in-time. The non-food sector is structured around weekly campaigns where the products may range from hardware goods to bedding, from car supplies to pots and pans, and everything in between. All in all, the assortment is typically 1,100-1,500 SKUs in Lidl on a European level, with Swedish stores offering around 1,300 items. The majority of items carried by Lidl are private labels.

Postponement. In the non-food segment there is limited evidence of postponement practices. On the contrary, the organization of the non-food supply chain is very clearly geared toward realizing speculation benefits. Suggestions for the non-food assortment are shown at regular intervals in meetings held centrally for the entire European organization. Here, the national store organization registers interest in their respective selection among the proposed products, after which demand from all of the national companies is combined to allow maximum negotiating benefit for the central procurement organization. The lead-time from order to advent of the campaign is typically around one year. The design of the products is usually not tailored to individual national markets and most manufacturing steps, including packaging and labeling, are performed further upstream either by the manufacturers or by TPLs upon Lidl's request. Offering upgrades could be construed as a form of postponement, but all aspects of after-sales service are generally outsourced.

In the food segment, the degree of manufacturing postponement is also limited. The assortment is the same in all stores within one country, and many products are available in many national markets. With the exception of unpacking and shelving, there is no change in the form of the products from the time they leave the manufacturer or packaging plant to the time a customer takes it out of the store. For those items that are not shipped from Lidl-operated warehouses, TPL facilities are used.

In international own-brand products, some adaptation may occur in order to accommodate differences in national taste and color schemes, but that is mainly in the realm of packaging, which is even done at the manufacturing level. For instance, addressing the Swedish shopper behavior that tends to shop more infrequently, Lidl offers larger package sizes for some items (such as ground meat).

Logistics is the main area where postponement does take place in the Lidl's supply chain. On a daily basis, Lidl receives up to 1,500 pallets of goods of which 70 percent come from mainland Europe and 30 percent from Sweden, and around 50 trucks leave its warehouse to deliver goods to the stores. The postponement effort in logistics is especially focussed on fresh foods and several "in and out" items. For fresh meat, the postponement is driven the furthest. Meat orders are placed with suppliers only after orders from the outlets have been entered. The meat is then delivered to the central warehouse within hours, and further to the stores in the next daily shipment. This can lead to higher flexibility in meeting the demand. In 2014, Lidl won the PostNord Logistics Award for effectiveness and innovation.

All other fresh food and perishables are ordered for quick next day delivery, and in some cases even delivered during the night. The frequent delivery schedule and the short lead-time from order to delivery allows the stores to avoid having any stocks on hand at the stores, outside of what is shelved and displayed in the store. Furthermore, it lowers the requirements on the physical environment in the store as concerns fruits and vegetables. With the aim of only having enough until the next day's delivery in the store, the stores can do without humidification or temperature equipment. Efforts are made to limit inventory at the central warehouse as well where produce is delivered during the morning and sorted for shipping during the afternoon and shipped to the stores during the night. However, at the central warehouse level, there is equipment to maintain fruits and vegetables at conditions that allow longer storage time. Produce is bought from independent wholesalers in Sweden or Europe which themselves buy at European auctions. From Lidl's perspective, this organization allows the procurement decision regarding produce to be postponed until relatively late, and hence, increasing

flexibility. In case of bread, due to the inconsistent production rate of bakeries, Lidl keeps a limited buffer stock but still that is kept to a minimum due to the sensitivity of consumers regarding short expiry dates. Generally, it is ensured that the lead-times for staples are kept at two days after the stores place orders.

For the non-food campaigns there exists some logistics postponement, mainly in the form of inventory centralization. International non-food items are normally delivered to a regional warehouse in Lubeck, Poland, where demand for all of the Nordic market is consolidated. Campaign goods are then scheduled to arrive in the national central warehouses one to two weeks before the start of a campaign, for delivery to the outlets three to four days in advance. Non-food campaign items may also be delivered to stores speculatively even earlier, using these products to increase the fill rate of the trucks delivering other goods to the stores.

Although not much publicized, the generous returns and refund policy includes both food and non-food products. Also price reductions based on real-time sales information is practiced in order to stimulate demand for fresh food products or campaign goods where demand was initially overestimated. Store operations are highly standardized; however, due to weekly campaigns for food items (e.g. Italian cuisine theme), quick and efficient layout rearrangement allows for tailoring in-store merchandising. There is also some indication that goods for which long-term demand forecasts are very difficult to make, such as computers, are avoided in the non-food campaigns.

Logistics flexibility. Lidl's logistics varies for different product categories. The delayed supply of fresh meat and private-label items to the stores is where the highest flexibility exists in both purchasing and physical supply, with ordering from suppliers done only after store orders have been placed. High logistics flexibility, on both upstream and downstream, is thanks to Lidl's long-term relationship with its key suppliers as well as its competence in private labels. In few products, such as private-labeled canned items, flexibility is limited due to the suppliers' routinized processes.

Among other fresh goods deliveries, such as fruit and vegetables, a high degree of logistics flexibility is also achieved, partly as a result of the absence of cooling and humidifiers in the outlets. In this case, it is more the low cost orientation of the chain, as manifested in simple outfitting of the stores, which drives the need for logistics flexibility. As for products that are generally shipped directly from suppliers' warehouses or plants to the stores on a routine basis (such as dairy products), flexible logistics capability is achieved by capitalizing on the suppliers' or TPL's competence in quick and accurate adaptability. Lidl uses its TPLs for product bundling in campaigns.

Finally, in the case of non-food campaign goods, which are invariably speculation oriented due to the routine predictable demand, logistics flexibility competence is relatively low. Lidl often schedules deliveries of these products from warehouse to store over a number of days, in order to even out variance and increase truck fill rates in deliveries of other product categories. That way, these goods reduce the cost of maintaining high frequency in delivery of fresh goods and other products where more flexibility is demanded. All in all, flexibility of the logistics system is medium, especially in terms of physical supply and purchasing.

4.3 Media markt

Background. Media Markt is a German home and consumer electronics retailer and is a part of the Media-Saturn Group that was founded in 1979. Media Markt carries a wide range of products at consistently low prices rather than one-off special offers.

The range covers an average of 45,000 different products including computers, hi-fi, video, satellite, CD, DVD, and household appliances, with a limited proportion of private labels. As of 2014, it has over 750 stores in 14 countries. Media Markt entered the Swedish market in 2006 and has opened 28 other stores all over the country in addition to the recent debut of their online store.

Media Markt applies a decentralized organizational structure whereby store managers are entrepreneurs who own 10 percent of the local business and are responsible for local merchandising, pricing, personnel planning and marketing. Generally, the headquarters in Germany or Sweden help the stores with customer relations and supplier selection; however, it will be up to the stores to decide the assortment based on their local demand, Furthermore, Media Markt stores in Sweden practice store-in-store concepts with partners and suppliers such as Apple.

Postponement. The way Media Markt operates with different product categories – except for the private brands – follows a similar pattern. Inventory is purchased locally for each and every store from individual or local suppliers. The reason why Media Markt carries a minority of private labels in Scandinavia is due to the shoppers' preferences in global brands, according to the Director of Supply Chain. Therefore, most of the goods are in the finished state and are delivered to the stores in a short time frame. Therefore, through this decentralized system, only a few instances of manufacturing postponement could be found at the store level. The annual assortment planning is done together with major suppliers, such as Sony and Samsung, whereby a rough estimate of the items in each category are identified. This could be a special practice of category management, which involves a hybrid postponement/speculation strategy. However, minor labeling postponement for local requirements could be identified for some of the private labels, which is usually carried out by the suppliers. Here, except for market differentiation, postponement helps with avoiding gray importing.

Recently, Media Markt introduced the possibility for customers to buy complete Noblessa kitchens. In this way, kitchen solutions, equipment, and design could be delivered to customers based on tailored preferences. Also, regional tailoring of certain products such as TV receiver boxes is done at the distribution centers of suppliers. These boxes could be further personalized by consumers with downloading certain apps at home. Meanwhile, for some products, such as computers, adding components such as memory and hard disks, GPS configuration and updating, PC backup, or any type of hardware and software installation is provided in the stores. Some other quality testing or packaging is outsourced to TPLs.

In multichannel, especially with the recent trend of free shipping and returns in which shoppers order several items and end up keeping only the one they prefer, the retailer faces major challenges due to its decentralized system. In order to facilitate returns as well as shopping experience for consumers, Media Markt utilizes its stores as meeting points. Consumers can place orders online and pick their products at their nearest stores. They can also use local stores to return purchased products from any other channel. This complicates the logistics flows as well as the associated paperwork. PostNord is looking into labeling postponement for returns. This not only saves costs and helps updating the retailer's inventory levels right from the service points, but also helps avoiding the burden to deal with holding returns inventory in stores.

The stores deploy a speculation-based system for fast moving products usually with a forecast horizon of two to three months in local stores. Each store typically carries around 45,000 SKUs from over 250 suppliers. In this system, on a daily basis, the

inventory level is checked against a preset "stock-reach" which is adjusted through forecasting. For some bulkier items, inventory is held at the suppliers' regional distribution centers and is pulled by customer orders. One local store manager stated that their general approach to excess inventory is "markdowns at any price" which reflects the sensitivity of inventory planning. Some of the key suppliers help local stores with promotional markdowns or shipping the unsold items back to their own warehouses.

Soon after launching their stores in Sweden, Media Markt realized that their totally decentralized system of local buying, which is rather effective in mainland Europe, would lead to high levels of inventory in Scandinavia. Together with its key suppliers and partners it is looking into means to implement logistics postponement, especially for products like TVs with lifecycles as low as four months. Its key suppliers have recently shifted from having major manufacturing in the far East and having several local warehouses to brining final manufacturing closer to the Nordic region and establishing central distribution centers, in plant concepts labeled "factory distribution centers."

Media Markt stores provide financial postponement services to customer by means of credit facilities as well as a 30-day open purchase offer. Furthermore, free delivery is offered within a certain geographical area for many product categories, which are held in and distributed from store warehouses or even directly from distribution centers of suppliers, especially in case of bulky products. Marketing activities at Media Markt are completely managed by the stores. This leaves the door open for region-specific campaigns and pricing. In early 2014, Media Markt initiated installing digital price tags developed by Pricer in their select stores which enables adjusting prices in real-time as well as yield management based on demand or in campaign occasions; a shelf-labeling solution system that Pricer calls "flexible pricing." Also, a generous returns policy is applied at Media Markt where customers are given the chance to return the purchased products providing they find a lower price at other stores in the region. Moreover, a specific department at each store is dedicated to after-sales services. Most of the repair and upgrades are done in these departments, and in extreme cases of defects or returns, the products are shipped back to the suppliers' warehouses. Recently, multichannel price matching is practiced where quick price adjustments are made in reaction to local competition.

Logistics flexibility. Media Markt in general has high level of logistics flexibility. This is mainly thanks to close partnerships with its key suppliers. The decentralized organization at Media Markt allows it to shift the warehousing duties to its partners. In this way, the regional distribution centers of the suppliers are used to serve several Media Markt stores in an area. Interestingly, this in turn, results in higher flexibility for the suppliers. Buying locally is a contributing factor to ensuring shorter lead-times and on-shelf availability for some stores.

In some of the contract terms, the suppliers are also responsible for the ownership of products until they are sold. In case, the stores witness low sales rate, together with the suppliers, the products are marked down or are shipped back to the supplier warehouses with the empty returning trucks, and are allocated to other stores with higher sales potential. This arrangement resembles that of consignment (pay from scan) that reduces the risks for the seasonal or products with short lifecycle (especially consumer electronics goods). Such a structure helps Media Markt reach higher flexibility in physical supply and purchasing.

Moreover, much of the physical distribution activities would be more accurately carried out by the partner suppliers. In terms of demand management, Media Markt recently introduced the stock availability and pricing system for the individual stores that are publically available online. Media Markt carries broad assortments within the variety of the merchandise mix. The priority is to ensure on-shelf availability of any item, or at least, to carry a relatively equivalent alternative product. They also have a well-established after-sales service dealing with maintenance, delivery, installation, and updates. Returned products are inspected in the service departments of the local stores for failures and are then either marked down (in case of minor failure or repair) or are consolidated and shipped to suppliers three times a week. The supplier compensates the stores with new items in the next delivery. With the help of their partners, they incorporate consumer feedback form focus groups to capture changes in regional preference quickly. According to their decentralized policy, they guarantee unrivaled prices for their assortment in stores' trading areas. The recent introduction of their online store added to the complexity of their operation. Due to the decentralized nature of their brick-and-mortar business different stores could potentially have different pricing and even assortment while their multichannel policy calls for similar pricing and multiple delivery options (e.g. nearest store pick-up or home delivery).

5. Discussion

This study explored the instance of applying postponement in retailing along with reflecting on logistics flexibility of the firms. It is interesting to note the range of postponement types applied by the three price-oriented retailers. As shown in Table II, all of the case companies appear to have different practices in terms of postponement and speculation.

5.1 Postponement and increased logistics flexibility

Jysk postponement activities entail different types and happen at different stages in their supply chains. At Jysk, the various types of postponement are implemented in both manufacturing and logistics, including the build your own sofa concept in which postponement improves the flexibility to offer customization. At Lidl, there is clearly a stronger emphasis on speculation-oriented strategies in comparison with Jysk. Lidl seems to focus primarily on speculation for both food and non-food categories, while implementing logistics postponement mainly in fresh goods. This seems to be supported by a strategic orientation of the assortment in the non-food sector, avoiding products that are incompatible with the chosen orientation. Speculation has long been the prevalent approach in retailing (Bailey and Rabinovich, 2006). Specifically, in grocery retailing, Paché (1995) found that retailers tend to buy in large quantities to benefit from the promotional or quantity discounts offered by supplying manufacturers. Lidl's approach to ensuring on-shelf availability could be linked to its central planning and forecasting. This is in line with the findings of Aastrup and Kotzab (2009) showing that the out-of-stock rates in the centrally organized grocery stores in Denmark was significantly lower than that of independent grocers.

Although both Jysk and Lidl have own brands, and thus are involved in organizing manufacturing, it is only Jysk that practice manufacturing postponement. Media Markt, although not organizing pre-sale manufacturing, does apply a certain degree of manufacturing postponement in the form of applications and other post sale finalizing of products. Meanwhile, Media Markt offers various upgrading and after-sales services

Table II.
Postponement and logistics flexibility in the empirical cases

	Product type	Uncertainty	Postponement: Assembly and process	Postponement: Labeling and packaging	Postponement: Design	Postponement: Time and place	Postponement: Purchasing	Postponement: Transportation mode	Postponement: Pricing	Logistics flexibility
Jysk	Innovative/ functional	Medium	✓	✓	✓	✓	✓	✓	✓	High
Lidl	Functional	Low				✓				Medium
Media Markt	Innovative	High	~		~	✓		✓	✓	Medium

Notes: ✓, currently used; ~, future activity

and is exploring new means of applying postponement in different categories such the recently introduced tailored kitchen solutions. Their made-to-order kitchen packages as well as digital price tagging enables higher flexibility in logistics in upstream and downstream, as well as store operations.

In the case of Jysk, regarding the wide variety of combinations, postponement enables customization and facilitates higher flexibility by eliminating the need to carrying high levels of inventory. The automated distribution centers at Jysk can handle more products and accommodate the demands for service and fast delivery and hence increase logistics flexibility. Lidl that applies postponement to a low/medium level and is rather speculation oriented, appears to have medium to low logistics flexibility. Therefore, it seems that the retailers that apply postponement to a higher degree have higher logistics flexibility.

The trade-off between postponement and speculation has long been an area of debate among scholars. Several factors and contingencies impact decision making when it comes to such strategies. Wallin *et al.* (2006) discuss customer demand or usage requirements (including lead-times, demand predictability, and stability), nature of supply line (including reliability of suppliers, and their performance), and bargaining power (including number of available suppliers, and uniqueness of the purchased item) to be the main determinants and drivers. As illustrated in Table II, based on the categorization of products suggested by Fisher (1997), one can relate the nature of uncertainty and product types to the approach of retailers. Grocery retailing has long been associated with greater stability in demand in which based on general historical shopper purchasing behavior of functional products (including staples and produce), forecasting is more routinized. However, much uncertainty could be pointed out in case of electronics retailing. Except for promotional peak demand or seasonal sales, predicting buying behavior becomes a daunting task, especially, in an environment in which shoppers are becoming more technology savvy (see also Ettouzani *et al.*, 2012).

Due to the innovative nature of products and ever-low lifecycles due to technological breakthroughs relying purely on speculation does not seem to be a reasonable choice. As a result, except for demand uncertainty, there are several other contingencies (including technology, supplier, and competition), which make electronics retailing a risky business. Several major electronics retailers in Sweden filed for bankruptcy in the past couple of years.

The focus of firms in terms of customer orientation is evident in shaping the degree of postponement or speculation. At Jysk, the launch of the build your own sofa is an example of a marketing initiative aimed at addressing the demand for more customization through manufacturing postponement. At Lidl, it is interesting to note how the speculative purchasing patterns of the Swedish consumers is translated into the Swedish Lidl stores offering bigger package sizes in a number of food groups, than what is customary in other national Lidl outlets. At Media Markt, the wide application of refund due to competitors' pricing, or customized upgrades and installations are a move toward consumer orientation.

The results point to further extension of the principle of postponement to include different actors along supply chains as well as new points of differentiation. Since retailers are in the forefront of meeting consumers, a natural extension of delaying value-adding activities further downstream or to a later point would be to involve consumers. At Jysk, for instance, customer involvement in design of wardrobes as well as the product modularity, make it possible to apply postponement to a higher degree,

and as a result flexibility increases in enabling customization. Postponement decisions may not be necessarily made at the retail firm level but nevertheless retailers play an active role in facilitating postponement or information provision to shoppers. Technology grows to become a contributing factor in enabling postponement. Upgradeable and programmable consumer electronics such as laptops, or smart TVs allow delayed personalization. Consumers can actively engage in these processes by simply downloading apps on their cellphones. This is in line with the findings of Brown *et al.* (2000) at Xilinx where with the help of software, product differentiation could be delayed until after the point of purchase by consumers.

On the upstream side, from the results it could be noted that the role of TPLs in outsourcing postponement activities is increasing in retailing. Prior research has extensively documented the benefits of outsourcing logistics functions including higher customer service levels and cost reductions (Rabinovich *et al.*, 1999). TPLs are the link between retailers and their upstream suppliers. Therefore, much of their value-adding activities benefit both retailers and suppliers, which are ideally two sides of the same coin. Their facilities, infrastructure, know-how, and competency come into picture in decoupling logistics flows.

6. Closing remarks

6.1 Conclusions and implications

This study contributed to a much needed topic within the area of retail logistics by exploring how postponement is applied in the context of Swedish retailing and how its application could be connected to logistics flexibility of the firms. By presenting three case studies, the results of this study showed that retailer apply postponement and speculation to various degrees. However, retailers are increasingly considering the application of postponement. Although price-oriented retail formats are traditionally conceived to be associated with a strong focus on speculation strategies, the cases reveal that several instances of applying postponement are notable. This confirms the anticipation of Morehouse and Bowersox (1995) regarding the increase in application of postponement. As opposed to typical manufacturing firms which generally opt for classic form postponement, retailers engage in other types of postponement due to the nature of their operations. With the exception for the case of Jysk, which has more vertical integration and hence control over upstream activities, logistics postponement seems to be the prevalent type applied by the retailer; however, the case companies showed interest in exploring other types of postponement as well. The emerging types of postponement are a result of involving consumers into value-creation processes as well as utilizing the competencies of TPLs and other upstream suppliers. The use of technology, software, and services appear to be the enablers of further development of the principle of postponement to even after the point of purchase.

The study found that generally higher application of postponement could be associated with higher logistics flexibility. Despite this connection, postponement does not seem to be the only determinant of logistics flexibility, and firms having a speculative approach could also achieve logistics flexibility. Future studies could shed light on the extent of this relationship by considering other study designs or including other possible logistics concepts and resources. Also, the myriad of practices and combinations regarding postponement and flexibility and the overview on the performance of the case companies, calls for further exploration of different logistics configurations and their performance.

From a managerial standpoint, our study provides insights on how different levels of postponement or speculation could be applied at the retail level. Also, from a practical perspective, our study could indicate how involving consumers or suppliers and TPLs could facilitate application of postponement as well as increase flexibility and responsiveness.

6.2 Limitations and further research

Although this study relied on multiple means of data relating to three retail firms, it is not without limitations, and the study did not intend to generalize its results to the whole retail industry. Future studies could include more cases from various retail classes and formats or countries to see if the results of this study hold true. Also, although our study sheds light on the potential uniqueness of retailers in applying postponement and their logistics flexibility, the intrinsic differences between various supply chain actors calls for further research to compare different contexts including manufacturing, wholesaling, and retailing. Moreover, further studies could be carried out by focussing on specific product categories and exploring various contingencies that retail firms are exposed to. Perhaps, comprehensive surveys could be carried out in order to investigate the possible causal relationship including various determining components such as logistics integration, and contingency variables while controlling for firm size or ownership.

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