



DESIGNING REVERSE LOGISTICS NETWORK IN AN OMNI-CHANNEL ENVIRONMENT IN ASIA

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ABSTRACT. Background: Omni-channel retailers have been growing globally to connect with customers anywhere and thus blurring the line between online web store and the physical store to deliver a seamless customer experience. The complexities of reverse logistics in Omni-channel firms due to multiple product return options would require these firms to integrate their reverse logistics network in order to reduce the complexities. This forms the basis of this research and two Omni-channel companies' in Asia are examined in this research. A four-staged framework for the reverse logistics management is being proposed and further developed through these real-life case studies.

Methods: We conduct interviews with the staffs from two Omni-channel retailers with operations in Asia to verify their return policies and collect additional information from their websites and customers. We focused on reverse logistics, network design, Omni-channel and the interface between them. We identify a few key factors that influence decision in network design. From there, we propose a conceptual framework and applying it to the Omni-channel retailers to determine, if it is suitable and beneficial to the Omni-channel environment.

Results: From the two company findings, it was understood from both of the cases that speed and efficiency is not only essential from the operations point of view, but also the total customer experience from the Omni-channel engagement. Another observation is that a company that makes their own products tend to centralize their reverse logistics operations for economics of scale, while those that rely on suppliers tend to decentralize their reverse logistics operations to leverage on their supplier's distribution network so as to keep costs low.

Conclusions: In this research, we have illustrated how our conceptual framework can be used in Omni-channel companies and how it could help companies design a more responsive and efficient reverse logistics network.

Key words: Omni-channel, Reverse Logistics, Supply chain management, Retail industry, e-commerce.

INTRODUCTION

The rise in the convergence of store and online retailing has resulted in many retailers moving towards Omni-channel retailing in order to provide customers with a seamless shopping experience for all its sales channels. This seamless approach has brought new challenges involving handling returns, since Omni-channel involves integration of process, information flow, inventory and measurement systems, which are taking care separately by individual departments [Hübner, Johannes and Andreas, 2016]. With customers turning towards electronic purchases using their smart

phones, tablets and laptops, it has become quintessential for retailers to use these channels to grow their sales and this has resulted in providing various return options via different channels such as retail store, drop off point and postal service [Barki, Edgard and Parente, 2014].

Designing a reverse logistics network for Omni-channel is a complex problem involving the determination of the optimal sites and capacities of collection centers, inspection centers, remanufacturing facilities, and/or recycling plants [Blackburn et al., 2004]. With growing online sales, the retail sector may have to upgrade their physical stores and to put

new distribution systems in place. This calls for a distribution system that can provide serve all the sales channels effectively in order fulfilment and reverse logistics. This has complicated the forward distribution and logistics involving receiving order, processing order, delivery process and the backward distribution and logistics involving product return request, processing the return request and the remaining steps involved in product return management.

The key research question in this study is concerned about how return process should be designed in order to support online and offline sales. We need a decision making framework [Tan and Kumar, 2006] that allows the retailer to decide on the most efficient Omni-channel network.

Section 2 presents an overview of Omni-channel development, and in Section 3 we propose a framework for designing reverse logistics network in Omni-channel environment. Empirical part continues in Section 4, and it presents the research process we employed for the two Omni-channel companies. Sections 5 to 6 present the findings, compare the similarities and differences between the two companies. In Section 7, we summarize the findings, relate them to the literature and discuss further areas for research and development.

OMNI-CHANNEL ENVIRONMENT

Omni-channel retailer's face a common issue of handling product returns as their customers have more options to return the products, if they do not like what they ordered. Handling return products are crucial to achieve customer satisfaction, especially in case of fashion retail where up to 40-50% of the return rate is possible. A study on 1000 web stores in Germany reveals that all the sales channels in these stores are ready to integrate the information flow of product and logistics system [Hübner et al., 2016].

One of the main problems in Omni-channel lies in the inventory management as they need to make sure, where the inventory will come

from and if returned where it will be returned, whether in the store or in the warehouse or in the e-commerce distribution center or in the physical store's distribution center. This has led the Omni-channel retailers to strategically review their complete supply chain [Baird, and Kilcourse, 2011, Cyplik, Uberman 2017] and to reengineer their process to connected information across all channels.

Before the introduction of Omni-channel business, Brick & Mortar retailers had processes in place for the collection of faulty or rejected goods. The faulty goods will be sent back to the outlet, where they have been purchased. The requisites for the return processes are inequitably complex within the Omni-Channel business [Hübner et al., 2016]. Returning the goods through CEP (Courier express parcel) delivery is the standard mode. This method reduces the integration and process challenges across the channels for the vendors.

The channels for product return can also be chosen by the Omni-Channel customers. This will not be the standard way for all customer, as the Omni-Channel retailers allow return by CEP, while only half of the Omni-Channel retailers agreed to allow returns for products bought through distance channel at their outlets. The retailers hesitate to accept returns due to the difficulties faced at the outlets in terms of IT requirements [Nunen, Zuidwijn, 2004] and refunding problems. Multi-returning process for clients requires firms to have proper ERP application for cross-channel communications.

While there exist a vast amount of research on the return policy on online retailing discussing about minimizing product returns and estimation of returns, very few articles discuss the reverse logistics process involved in handling customer returns [Griffis et al., 2012] in an Omni-channel environment [Bernon et al., 2016]. A few researches have shown the reverse logistics process as an individual function and haven't considered the various implications in return management within an Omni-channel concept, where customers have multiple ways in which a product return can be initiated [Hübner et al., 2016]. Therefore, our research is to understand

the decision making factors at each stage of reverse logistics for Omni-channel and develop a decision making framework [Toffel, 2004]. Furthermore, the reverse logistics network design should be consistent with the business strategy [Barker and Zabinsky, 2008].

FRAMEWORK FOR DESIGNING REVERSE LOGISTICS NETWORK

It is important to consider the following questions, before designing the reverse logistics network for Omni-channel environment. They are as follows:

1. Which reverse logistics activities and processes are critical to support Omni-channel?
2. Which parties and channel are responsible for the reverse logistics activities?
3. Where should the reverse logistics activities be performed?

In reverse logistics, there are four fundamental stages of flow: (1) collection, (2) sort-test, (3) processing and (4) storage that we need to pay attention in design the reverse flow. We proposed a product recovery flow diagram showing the four stages as shown in Table 1. From Table 1, past researchers have analyzed the reverse logistics issues at various stages in the reverse logistics.

Table 1. Stages in Reverse Logistics Operations

Stages of Reverse Logistics	Past Research at Each Stage of Reverse Logistics
1. Collection and Inspection	Fleischmann et. al. (2000). Fleischmann, M., Nunen, J. V., Gräve, B. and Gapp, R. (2004). Kroon, L. and Vrijens, G. (1995).
2. Sorting and Testing	Barros, A.I., Dekker, R. and Scholten, V. (1998). Realf, M.J., Ammons, J. C. and Newton, D. (2000). Kleineidam, U., Lambert, A.J.D., Blainsjaar, J., Kok, J.J. and van Heijningen, R.J.J. (2000). Krikke, H.R., van Harten, A., and Schuur, P.C., (1999).
3. Processing	Krikke, H.R. et al (1999). Realf, M.J. et al (2000). Tan Albert and Kumar Arun (2008).
4. Storage	Fleischmann et. al. (2000). Hübner (2016). Tan W K Albert, Yu W Shin, Kumar Arun (2003)

Source: own work

Stage 1: Inspection and Collection

Collection systems are either proprietary (company-specific), in which a company collects only its own products for recovery, or industry-wide, in which the same type of product from multiple producers is collected within the system. For proprietary collection systems, producers can use proprietary routing, in which the producer uses its own transportation system for collection, or they can outsource collection to a third-party logistics provider [Fleischmann et al., 2000].

A proprietary collection system is particularly beneficial, when the company has a strong direct relationship with its customer, such as a lease-return relationship, or when

there is high customer trade-in behavior, such as there is in the business computer market [Fleischmann et al., 2004]. The proprietary collection system tends to strengthen those customer relationships, enhancing marketing and sales efforts. However, transportation costs may be higher than in an industry-wide collection system, because proprietary collection cannot take advantage of economies of scale available to higher volumes that an industry-wide system would handle.

Within a proprietary collection system, the company may either do its own collection using company trucks or freight providers, or it may outsource to a third party to pick up its products for processing. Collecting with company trucks or freight is an attractive choice, when a company wishes to protect

intellectual and proprietary information. It can be desirable for integrating forward and reverse flows, such as for drop-off and pickup of reusable containers [Kroon and Vrijens, 1995]. This system is also beneficial, when there are relatively few customer sites. One drawback is potentially higher costs, as proprietary routing may be more expensive than outsourcing the collection system.

Stage 2: Sort and Test

Sorting and testing can be performed either at a centralized site, or at distributed locations. A centralized site is common for a commodity-type product, such as construction sand recycling [Barros, Dekker and Scholten, 1998] or carpet recycling [Realff, Ammons and Newton, 2000] owing to efficiencies from higher volumes. But a centralized site is also desirable for high cost testing procedures, because it minimizes costs of testing equipment and specialized labour. One drawback to centralized sorting and testing is the risk of higher transportation costs for shipping scrap to the testing facility first, rather than directly to waste disposal.

Distributed sort-test sites are often used, if low-cost testing procedures are available, such as for paper recycling [Kleineidam et al., 2000], machine refurbishing [Krikke and Schuur, 1999] or reusable containers and equipment [Kroon and Vrijens, 1995]. Scrap can be identified early and shipped for disposal, reducing transportation costs. However, testing procedures must be consistent and reliable, and the network may be more complicated because scrap and usable return product are shipped in separate streams.

Stage 3: Processing

Once the type of recovery process is determined (recycling, reprocessing raw material, remanufacturing and spare parts recovery, or reuse), the key decision is whether to reprocess at the original facility [Tan and Kumar, 2008], which is the method used for copiers industry [Krikke et al., 1999] or at

a secondary facility, which is the method use for carpet industry [Realff et al., 2000].

There are generally five categories of remanufacture and refurbishment [Thierry et al., 1995]. These five categories are repair, refurbishing, remanufacturing, cannibalization, and recycling. The first three categories: repair, refurbishing, and remanufacturing, involve product recondition and upgrade. Cannibalization is simply the recovery of a restricted set of reusable parts from used products. Recycling is the reuse of materials that were part of another product or subassembly.

Processing at the original facility provides increased efficiency from use of original facility equipment and processes, and it is often used for machine remanufacturing or spare parts recovery processing. However, there may be a need for increased processing capacity, which would be a drawback.

In zero return programs, the manufacturer or distributor does not permit products to come back through the return channel. Instead, they give the retailer or other downstream entity a return allowance, and develop rules and guidelines for acceptable disposition of the product. The zero return policy often tends to have a negative effect in customer satisfaction and affect its brand.

Stage 4: Storage

Once the products have been processed, they are sent for storage either centrally or back to the source of returns [Fleischmann et al., 2000]. Some products that are slow moving are stored centrally as there is no market demand, while those products in high demands are distributed to the locations nearer to the customers [Tan, Yu and Kumar, 2003].

In summary, Figure 1 describes the flow actives in Reverse Logistics; after collection activities converge until stage 4.

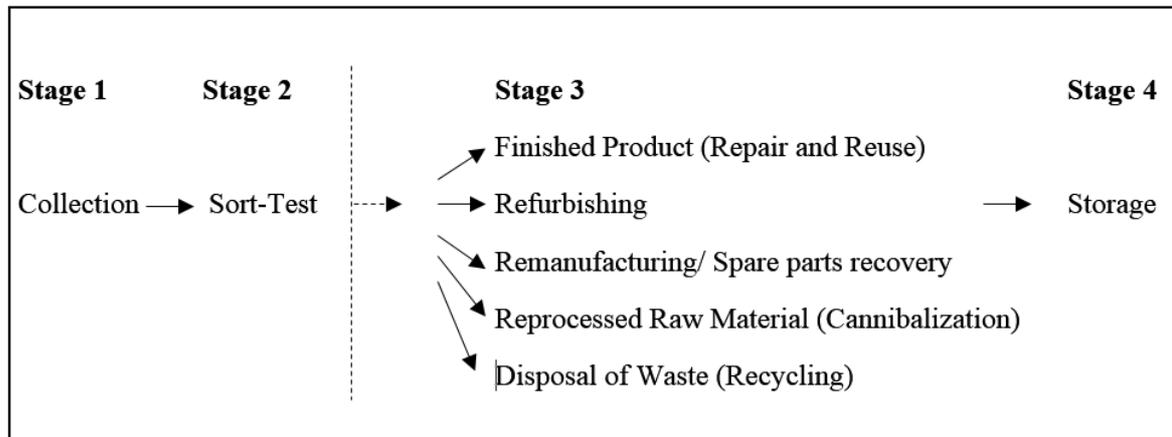


Fig. 1. Stages in Reverse Logistics Processes

KEY FACTORS TO CONSIDER IN REVERSE LOGISTICS AT EACH STAGE OF THE OPERATION

Centralized versus decentralized processing

The network model in Reverse Logistics that a manufacturer chooses will depend on industry and geographic considerations. The first decision is between a centralized and a decentralized approach.

In-house vs. third party logistics providers (3PL)

The second network decision is to choose between insourcing and outsourcing of reverse logistics operations. For insourcing, the company is responsible for the entire reverse logistics process, including reuse of the recovered material. In the case of outsourcing, the third party provider is partly or totally in charge of the reverse logistics process.

Companies prefer to outsource their reverse logistics processes, if they do not have enough resources or it is not part of their core competencies. Depending on existing personnel skills, the maturity of the reverse logistics process, and cost, organizations may choose to outsource to third-party logistics (3PL) providers – either the complete process or selected segments (for example, transportation or sorting). Examples of successful 3PL's performing reverse logistics

include FedEx, Genco and ASTAR [Mazahir et al., 2011].

An outsourced model would require careful selection of the 3PL partner based on capabilities, proven track record, and alignment of services with the outsourcing company's objectives and strategies [Ene and Nursel, 2012]. The challenge for 3PL providers is designing a logistics network that adapts to all requirements and demands of their several clients. However, an efficient network will enable 3PLs to consolidate volumes and shipments and benefit from economies of scale and scope [Fong, 2005].

Open Loop versus Close Loop Supply Chain Network

Open loop Supply Chain: Traditional or open loop supply chain is a "system whose constituent parts include material suppliers, production facilities, distribution services and customers linked together by the feed forward flow of materials and feedback flow of information" [Stevens, 1989]. It is characterized by a supply chain in which there is no flow back from the customer is referred to as an 'open loop supply chain'.

Close loop Supply Chain: Closed-loop supply chains (CLSC) are supply chain networks that "include the returns processes and the manufacturer has the intent of capturing additional value and further integrating all supply chain activities" [Wassenhove, 2009].

The main difference between open loop and closed loop in reverse logistics is in deciding the final storage for the recovered products. In a closed loop reverse supply chain, recovered products are generally returned to original source or producer. But in an open loop reverse supply chain, recovered products are not returned to original source, but stored in a different location [Ene et al., 2012].

RESEARCH METHOD

The aim of this research project was to provide a decision making framework for organizations or companies to design an appropriate network for their reverse logistics in Omni-channel environment to achieve their organizational objectives. In order to make these recommendations, key factors related to network design decision were identified and their impacts being evaluated. To achieve this, we test the proposed framework on two Omni-channel retailers with operations in Asia. We conduct interviews with some of the staffs from the two companies to verify their return policies and collect additional information from their websites and their customers.

The reason we choose case study as our research design is, because it enables us to understand the complex issues in more in-depth. Case studies have been widely used to examine contemporary real-life situations and provide the basis for the application of ideas

and extension of method. The case study research method is suitable, since we are investigating a phenomenon within its real life context when the boundaries between phenomenon and context are not clearly evident or in which multiple sources of evidence are used [Yin, 2014].

A focused literature review is conducted as a necessary step in structuring a research field. We focused mainly on reverse logistics, network design, Omni-channel and the interface between them. We identify a few key factors that influence decision in network design. From there, we propose a conceptual framework and applying it to the Omni-channel retailers to determine, if it is suitable and beneficial to the Omni-channel environment.

APPLYING THE FRAMEWORK INTO TWO OMNI-CHANNEL RETAILERS OPERATING IN ASIA

In this section, we propose a conceptual framework for designing reverse logistics network. The framework is shown in Table 2 and it is developed based on the literature review and secondary data from company websites. The framework involves four stages in selecting their mode of reverse logistics operations: (1) Collection and Inspection, (2) Sorting and testing, (3) Processing and (4) Storing.

Table 2. Conceptual Framework for Designing Reverse Logistics Network

	1. Collection and Inspection		2. Sorting and Testing		3. Processing		4. Storage
	In-House	Outsource	In-House	Outsource	In-House	Outsource	Central warehouse or nearby store
Centralized							
Decentralized							

Source: own work

There are two dimensions to consider at each stage in designing the reverse logistics network, namely: Internal processing versus outsourcing, and centralizing versus decentralizing of operations. Using the framework, we examine two Omni-channel retailers operating in Asia at each stage of the

reverse logistics for comparison. The reason for selecting these two Omni channel is, because they have being operating the Omni-channels for many years and thus, their current practices are refined over the years. The following describes the process by each Omni-channel companies in managing their reverse

logistics. Data was obtained from their websites and from interviews with their key staffs, especially with reference to their product return policy and customers' shopping experiences.

Case Study 1: Courts Singapore, Malaysia and Indonesia

Courts sells its products through traditional brick and mortar store as well as through the web store from websites such as www.courts.com.sg, www.courts.com.my and www.courts.co.id. In case of purchase made through the physical store, customers can pick the merchandises from the store or have them delivered to their home after purchasing the merchandises in the store. Whereas in case of online purchase Courts offer two types of delivery options namely: Collect the order from any Courts store or pay a small fee to deliver to their homes.

Stage 1 of Reverse Logistics: Collection and Inspection

When the customer is not happy with the product(s) they have purchased and wishes to return the product back they can choose the return process based on the mode of purchase. If the customer had purchased the product by visiting the store, he/she must visit the store again to return the product(s) along with the original packing, box, any gift card or gifts received as a part of that particular purchase, guarantee card and purchase receipt within 30 days from the original date of purchase, if the packaging has not been opened. If the packaging has been opened, it must be returned back to the store within 14 days from the original date of purchase.

If the customer had purchased through Courts online store, the product can be returned by contacting Courts, in case the delivery was fulfilled by Courts or by contacting the supplier as if a supplier in Courts online platform fulfilled the order. A return or exchange can be arranged within 30 days from the date of purchase, if the packaging has not been opened from their original packing and the seal still remains intact. In case the packaging has been opened,

it is still eligible for return within 14 days from the date of purchase.

The next step is the authorization by Courts for the product return. In case of returning the product directly to the store, a member from the Exchange, Refunds and Cancellation team will verify the return request and make sure that the product(s) are eligible for exchange, refund or cancellation. In case of exchange, the product must not fall under the category of products that cannot be exchanged that is displayed in the Courts store as well as their website, which include a variety of product categories that do not qualify for exchange or replacement or refund. For example, headsets and earphones are not permitted for exchange and need to be sent back to the manufacturer's authorized office for replacement.

In case the customer purchased online and would like to exchange, return or refund the product they must contact Courts head office. If the product that the customer chooses to refund does not qualify for exchange or replacement, the sales order can be cancelled and a full refund is provided to the customer in form of the same mode of payment made for the purchase. The delivery charges collected may or may not be excluded, while refunding depending on the initial delivery mode. In the event of which the return process does not proceed, it is terminated at this point.

Once the return has been authorized, and in case of the product(s) being returned in the store, the customer can choose to buy a new product directly at the shop or have it delivered to their home. The delivery charge for this order is at the discretion of the seller.

Whereas in case the customer wishes to get the product(s) collected at the convenience of your home or any other place of preference, Courts team will arrange the collection and the customer must return the product in its original packing, box, gift card or free gifts received on purchase of product(s), if any, including guarantee card and purchase invoice. The normal processing time for refund requests is four to six weeks from date of request.

Stage 2 of Reverse Logistics: Sort and Test

Once the product has been cleared for exchange, replacement or refund the returned product is reviewed based on the customer feedback and product testing is carried out, if required before it is sent back to for reuse, repair, refurbishment or disposal. The sorting process is classified according to the following procedure and suitable decision is made as follows:

- In case the product was returned in a good condition, with all the packaging, free gifts if any, guarantee card and invoice and the seal remaining unbroken, the product is return to its shelf or return to its original location, where it was stored prior to delivery.
- In case the product is being cleared for refund due to the product faulty or damaged, the product is sent for repair or refurbishment.
- In case the product is being cleared for refund due to the product faulty or damaged and is beyond repair, it will be sent for disposal.

Stage 3 of Reverse Logistics: Processing

Once the product is sorted for repair, it is collected by a collection agent from a service center authorized by the manufacturer or supplier. It will be repaired by them and return to Courts for sale as refurbished goods or sold under special discounts. This is partly due to the short product life cycle for electronic

products. In most of the cases, the product is sent back to the manufacturer, when the product defect is easily repairable. This process involves repair service centers outsourced either by the manufacturer or is authorized by the manufacturer. The service centers could be centralized as well as decentralized based on volume of product returns and the type of product. In the case of products with high sales volume, a decentralized chain of authorized service centers can help manage the repairs, and in some cases factory owned service center with a centralized facility can also manage the entire repair requests.

Stage 4 of Reverse Logistics: Storage

This step is performed in house by Courts in case the order was received or collected at the respective store where the product was originally purchased, the product is returned to the store, where it came from. In case of an online order fulfilled by a supplier, the return collection process is also handled by the supplier and the products are sent back to their respective inventory. It follows a separate stream of process analogous to an online order fulfilled by Courts, where the products are collected from the customer and returned back to the sorting department. Product is being analyzed based on the customer feedback and sent back to shelf, if the returned goods are intact and remains unboxed with the seal remaining unbroken or the product is tested and found to be fit for sale.

Table 3. Summary of Courts Reverse Logistics Process

	1. Collection and Inspection		2. Sorting and Testing		3. Processing		4. Storage
	In-House	Outsource	In-House	Outsource	In-House	Outsource	Central warehouse or nearby store
Centralized						✓	✓
Decentralized	✓		✓		✓	✓	

Source: own work

For product disposal, it is sent back upstream through various tiers of the supply chain, until it reaches the original producer, who will decide on utilizing the usable parts and functions of the product prior to remanufacturing or disposal. This is an

example of a closed loop supply chain, where the product deemed for disposal is sent back to the manufacturer (source/origin) by Courts in order to claim refund or replacement subjected to guarantee, warranty and other terms and

conditions based on the contract with Courts supplier.

Table 3 summarizes the design of reverse logistics network for Courts in supporting their Omni-channel retailing operations. Generally, most of the operations are performed in-house by their retail stores, while the inventories are kept centrally.

Case Study 2: Charles and Keith

Established in 1996, Charles and Keith is renowned for providing fashionable footwear tailored to the taste and sizes of Asian women. Their product offerings have branched into bags, accessories and designer jewellery over the years. They have 29 stores set up all over Singapore located in almost every famous mall in the island and almost over 500 stores in Asia Pacific, Europe and the Middle East. They have also established a dominant Omni-channel presence across major fashion cities such as Seoul, Shanghai and Dubai.

They became the first footwear retailer in Singapore to go online in 2004 by introducing e-commerce site www.charleskeith.com. This helped them to provide a seamless shopping experience for their customers both offline and online. This e-commerce initiative was mainly due to their outreach for customers globally and making their presence felt in overseas markets. Charles and Keith now ships to more than 70 countries worldwide from Singapore and this process is taken care by the e-commerce operations team in Singapore, who manage from order confirmation to packaging customer orders and shipping them on time.

Stage 1 of Reverse Logistics: Collection and Inspection

The return and exchange process is considered as a critical customer experience factor for Charles and Keith as it strives to be most considerate and customer friendly company in terms of offering trials, product returns and accepting exchanges and providing refunds. The return and exchange process is similar for both online and store customers. They just need to pack the return goods into

the original packaging and send them to their mailing address.

Charles & Keith offer their customers with options to get refunded in the form of store credits or in form of the original payment method used to purchase the product. Customer may choose to be refunded via store credit or via their original payment method. Once the refund is approved, it may take up to 14 days from the date of approval to process the refund and the refund amount will include shipping and handling charges incurred in the order initially.

Charles & Keith offer their customers with the option to track their return status of their products through their webstore. Customers can login to their website and check their return status. If the product returned, upon inspection has failed to qualify for return or exchange, the cost of shipping and handling is borne by the customer. Refund is made with respect to the value of the goods printed in the invoice. Products used or modified in a manner not contemplated by Charles and Keith, will not be covered for warranty.

Stage 2 of Reverse Logistics: Sort and Test

Once the products are collected and delivered to the sorting facility, they are checked for defects (if any) and sent off to repair center. This operation is managed in house and if successful, it is sent back to the inventory and then decided by the management to put it for refurbished sale or clearance. If the product was returned as the customer did not like the product, it is returned back to the inventory or to the shelf, where the product was originally located. In case of online purchase, the product is returned to the warehouse, where it will be added to the inventory and visible for their online customers. In case the product was damaged beyond repair, it will be disposed and a third party agent sells this off.

Stage 3 of Reverse Logistics: Processing

If the products returned were faulty, they are checked once again and verified whether a repair is possible or not. If the product is fit

for repair, it is sent for repair and then back to the central warehouse, which will take care of locating and storing the product at its appropriate location. If the product is found to be damaged beyond repair, or the fault has a high chance of recurring, the product is sent for recycling/disposal.

Stage 4 of Reverse Logistics: Storage

Once the returned products are dispatched to the central warehouse, the product is collected, repacked and tagged again using the old tags by the customer. This is then returned to the distribution center and then delivered to

the customer or added back to the stock list in the inventory. This process will make sure that the product is visible to the online customers immediately in the web store. This process is performed in-house in a centralized warehouse for the goods sold via web store.

Table 4 summarizes the design of reverse logistics network for Charles and Keith in supporting their Omni-channel retailing operations. In this case, most of the operations are performed in-house centrally and inventories are kept centrally too.

Table 4. Summary of Charles and Keith Reverse Logistics Process

	1. Collection and Inspection		2. Sorting and Testing		3. Processing		4. Storage
	In-House	Outsource	In-House	Outsource	In-House	Outsource	Central warehouse or nearby store
Centralized	✓		✓		✓		✓
Decentralized					✓		

Source: own work

DISCUSSION

From the two company findings, we have deeper understanding of the reverse logistics process of the Omni-channel firms. Thus, it helps us to identify and formulate a decision making framework in Omni-channel for reverse logistics by dissecting the process into four stages of return management and analyzing every stage with some key factors.

It was understood from both of the cases that speed and efficiency is not only essential from the operations point of view, but also the total customer experience from the Omni-channel engagement. This can be clearly seen from the competitor's tendency to compete with other players in terms of speed of delivery by offering their customers with one-day delivery options and even shorter delivery time promises offered by retailers from different industries. Similarly, the customers expect shorter returns processing time, be it returning the product, collecting the returns, authorizing

the returns, delivery of replacement or be it processing the refund. This is particularly true for the case of retailers on the context that the product is sent back shortly and be put back on sale in the least amount of time possible, in the case of Charles and Keith, which sells fast fashion goods with seasonal demand pattern.

Another observation is that company such as Charles and Keith, which makes their own products tend to centralize their reverse logistics operations for economics of scales, while Courts is a retailer, which rely on their suppliers, tend to decentralize their reverse logistics operations to leverage on their supplier's distribution network to keep costs low.

The similarities and differences based on the various reverse logistics stages are presented in Table 5. As there exist differences between the two cases, and process in each stage is a mix of in-house operations and also outsourced services.

Table 5. Differences and Similarities between the Two Omni-Channel Retailers

Stages in Reverse Logistics	Similarities	Dissimilarities
Stage 1: Collection and Inspection	In both cases, there is provision to request pick-up service for returning products purchased online. Both companies have their own in house authorization for qualifying or rejecting the products sent for return and in house collection team.	Courts charges a nominal fee for pick-up service, while Charles and Keith offers free collection.
Stage 2: Sorting and Testing	Product returns for online purchase are sorted in centralized facilities in both cases.	Charles and Keith perform the return logistics process both in house and also via service provider, whereas Courts perform this service in-house.
Stage 3: Processing	Both the firms have outsourced the disposal or recycling services for their products that cannot be repaired or damaged beyond repair.	Courts Singapore has outsourced the repair/refurbishment process, while Charles & Keith performs repairs in-house mainly due to the fact that they made their own products.
Stage 4: Storage	Inventory is kept in central warehouse by both the firms.	

Source: own work

CONCLUSIONS

The main objective of this study is to help Omni-channel companies to minimize complexities in the reverse logistics process by proposing a decision making framework that can help them to achieve flexible service to the customer and also reduce their supply chain costs. This eases the companies to decide on the most optimal choice for any individual reverse logistics function proposed in the framework such as customer return request, authorization and return logistics, sorting, inventory management, repair/refurbishment and recycling/disposal. In this research, each key factor is evaluated and a decision making framework was proposed, which will help the companies in deciding whether they should centralize or decentralize the particular reverse logistics operation and also in deciding whether it is optimal to in source or outsource that specific function.

We have illustrated how the conceptual framework can be used in Omni-channel companies and how it could help companies to align their supply chain strategy, whether they would to design a responsive or efficient reverse logistics network. This will in term lead to making decision on centralizing or decentralizing the network, outsource or in-house any of the four stages of reverse logistics process (collection, sorting and testing, processing and storing), and to align with their

company objectives and the shopping experience for both online and physical store.

Since there are few researches discussing in detail about the reverse logistics functions in an Omni-channel environment, there lies a high scope for future research in this area to uncover more strategies and innovations that may help develop a stronger and more efficient framework and result in an effective reverse logistics network design.

This framework can be incorporated in different industries and this would help in finding new possibilities for designing a more responsive reverse logistics network by aligning the supply chain to support the individual functions of product return management. In addition, technological developments in multi-channel environments applying sensor technology and Internet of things should be further tested and changes being incorporated in the proposed framework.

The current study only focuses on these two retail cases that are most suitable to same type of Omni-channel firms or closely related companies offering similar type of products. In order to generalize the concepts of the framework to make it suitable for other industries to use the same, we could apply the framework in similar or related industries to expand the functions in order to understand them and use it for different industries, thus

gradually improving the suitability of the framework.

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Self-Funded Research.

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PROJEKTOWANIE LOGISTYKI ZWROTNEJ DLA WIELOKANAŁOWEGO SYSTEMU SPRZEDAŻY W AZJI

STRESZCZENIE. Wstęp: W ostatnim czasie następuje istotny przyrost ilości firm sprzedażowych oferujących swoje towary poprzez wiele kanałów sprzedaży w celu lepszego dotarcia do klienta, zacierając przez to podziały pomiędzy sklepem on-line a tradycyjnym sklepem istniejącym fizycznie. Złożoność logistyki zwrotnej firm wielokanałowych związanej w wielością opcji zwrotu towaru wymaga od firm integracji logistyki zwrotnej w celu redukcji tej złożoności. W pracy zaprezentowano wyniki analizy na podstawie dwóch wielokanałowych firm, działających na terenie Azji. Zapropozowano czterostopniowy schemat zarządzania logistyką zwrotną.

Metody: Przeprowadzono wywiady z zatrudnionymi w dwóch wielokanałowych firmach sprzedażowych, działających na terenie Azji w celu oceny ich polityki dotyczącej zwrotów oraz zebrano dodatkowe informacje na temat tych firm z dostępnych stron internetowych oraz od ich klientów. Głównymi elementami poddanymi ocenie była logistyka zwrotów, projekt sieci, kanałów oraz relacje między nimi. Zidentyfikowano kluczowe czynniki wpływające na kształt zaprojektowanej sieci. Na podstawie zebranych danych stworzono koncepcję, którą przedstawiono wielokanałowym firmom sprzedażowym w celu oceny jej przydatności.

Wyniki: Na podstawie danych uzyskanych z analizowanych firm stwierdzono, że kluczowym jest szybkość i efektywność zarówno z punktu widzenia dokonywanych operacji jak i wobec oczekiwań klientów. U firmy oferującej produkty własne zaobserwowano tendencję do centralizacji logistyki zwrotów w celu uzyskania ekonomii skali. Natomiast u firmy, opierającej się na dostawcach zaobserwowano tendencję do decentralizacji operacji logistyki zwrotnej poprzez wykorzystanie sieci logistycznej dostawców i dzięki temu na obniżeniu kosztów całkowitych.

Wnioski: W pracy zaprezentowano i zilustrowano koncepcję, mogącą mieć zastosowanie dla wielokanałowych firm, wspomagające je w zaprojektowaniu bardziej efektywnej sieci logistyki zwrotnej.

Słowa kluczowe: wielokanałowość, logistyka zwrotna, zarządzanie łańcuchem dostaw, handel detaliczny, e-handel.

PROJEKTIERUNG DER GESUNDHEITSLOGISTIK FÜR EIN MEHRKANAL-VERTRIEBSSYSTEM IN ASIEN

ZUSAMMENFASSUNG. Einleitung: In der letzten Zeit erfolgt ein wesentlicher Zuwachs von Vertriebsfirmen, die ihre Waren über viele Vertriebskanäle zwecks einer besseren Kundennähe anbieten. Dies hat eine Verwischung der Unterscheidung von On-line-Geschäften und den traditionellen, in Wirklichkeit wirkenden Geschäften zu Folge. Die Komplexität der von Mehrkanal-Vertriebsfirmen betriebenen Reverse-Logistik, die mit der Anzahl von Optionen der Rückführung von Waren verbunden ist, erfordert von den daran interessierten Firmen eine Integration der Reverse-Logistik zwecks einer Reduzierung dieser Komplexität. In der vorliegenden Arbeit wurden die Ergebnisse einer anhand zweier, in Asien tätiger Mehrkanal-Vertriebsfirmen durchgeführten Analyse dargestellt. Es wurde ein vierstufiges Schema für das Management der Reverse-Logistik vorgeschlagen.

Methoden: Es wurden Interviews mit den in zwei asiatischen Mehrkanal-Vertriebsfirmen eingestellten Mitarbeitern zwecks der Beurteilung der die Waren-Rückführung anbetreffenden Politik durchgeführt und zusätzliche Informationen über diese Firmen anhand der Angaben vom Internet und der von ihren Kunden gewonnenen Aussagen erfasst. Die Hauptelemente, die dabei einer Beurteilung unterzogen wurden, waren: die Reverse-Logistik, das Projekt eines Vertriebsnetzes und der Vertriebskanäle darin, sowie die Zusammenhänge zwischen ihnen. Es wurden schlüsselhafte Einflussfaktoren, die einen Einfluss auf die Ausgestaltung des projektierten Vertriebsnetzes ausüben, identifiziert. Anhand der gewonnenen Daten wurde ein Konzept ausgearbeitet, welches man den Mehrkanal-Vertriebsfirmen zwecks der Beurteilung dessen Brauchbarkeit vorgestellt hat.

Ergebnisse: Aufgrund der in den analysierten Firmen gewonnenen Daten stellte man fest, dass zwei Schlüsselemente: die operative Geschwindigkeit und Effektivität wirksam seien, sowohl aus dem Gesichtspunkt der betätigten Operationen als auch angesichts der betreffenden Kundenerwartungen. Bei einer ihre eigenen Produkte anbietenden Firma beobachtete man eine Tendenz zur Zentralisierung der Reverse-Logistik zwecks der Erzielung eines wirtschaftlichen Skala-Effektes. Dagegen bei den Firmen, die ihre Lieferanten in Anspruch nehmen, wurde eine Tendenz zur Dezentralisierung der operativen Reverse-Logistik durch die Inanspruchnahme des lieferanteneigenen Logistiknetzes und dank dessen die weitgehende Reduzierung von Gesamtkosten wahrgenommen.

Fazit: In der vorliegenden Arbeit wurde ein Konzept, das für die Mehrkanal-Vertriebsfirmen brauchbar sein kann, indem es sie bei der Ausgestaltung eines mehr effizienten Netzes für die Reverse-Logistik unterstützt, projiziert und abgebildet.

Codewörter: Mehrkanal-Vertriebsprinzip, Reverse-Logistik, Lieferkettenmanagement, Einzelhandel, E-Handel

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