

E- COMMERCE AND SUPPLY CHAIN MANAGEMENT

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ABSTRACT

Current technologies have revolutionized the manner in which retailers operate. The early stages of the dot com era allowed businesses to experiment with different business models. On-line retailers focused on front-end systems, overlooking the importance of back-end operations such as supply chain management. Retailers have the option to distribute their products via the traditional method, drop-shipping, or a mix of traditional and drop-shipping strategies also known as the hybrid technique. Retailers have to account for stockouts and act accordingly to not lose sales or customers. This paper revisits current trends in inventory management covered in a paper by Snyder and Hamdan (2009)

INTRODUCTION

The emergence of the Internet has been the greatest technological advancement since industrial age. It is estimated that 44% of US Internet users are using the Internet to pay bills, and 33% of Internet users are purchasing products online. The number is expected to grow from time as the Internet becomes more prevalent and secure. The rise of the Internet created opportunities for entrepreneurs, destroyed many businesses, and most importantly changed the business structure of e-commerce. The dot com era was a time period where entrepreneurs experimented with new business models (O'Brien, 2008).

Globalization has accelerated commerce and the Internet is the driving force for an interconnected supply chain. This is a complex process that involves coordination between entities (Lankford, 2004). Supply chains encompass interconnected activities where suppliers, manufacturers, distributors, and retailers collaborate. Supply chain management was at the forefront of importance in managing the flow of products and services. A supply chain is designed to deliver products and services to customers in an efficient manner (Leonard, 2003). Consumers demand an error-free supply chain, which increases the pressure of managing demand and supply. Incorporating lower inventory processes lowers total costs for retailers. Electronic retailers tend to carry lower inventories than brick-and-mortar retailers (Bhargava, 2006).

A supply chain includes the parties involved, directly or indirectly in completing a customer request. The supply chain includes the manufacturer and suppliers and transporters, warehouses, retailers, and customers themselves. Within each organization the supply chain includes all functions involved in receiving and filling a customer request. This includes new product development, marketing, operations, distribution, finance, and customer service (Chopra, Sunil and Peter Meindl, 2004; Laudon & Laudon, 2012).

According to Laudon and Laudon (2012) information from supply chain management systems help firms to:

- Decide when and what to produce, store and move
- Rapidly communicate orders

- Track the status of orders
- Check inventory availability and monitor inventory levels
- Reduce inventory, transportation and warehousing costs
- Track shipments
- Plan production based on actual customer demand
- Rapidly communicate changes in product design

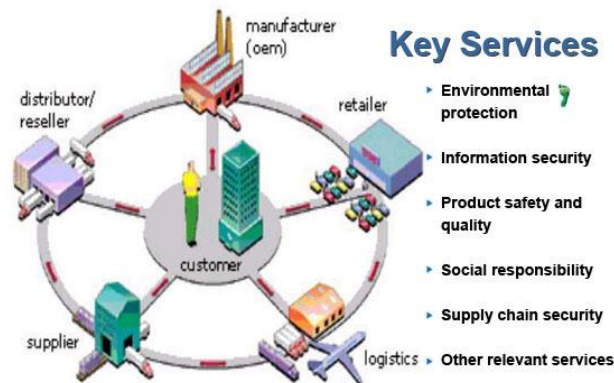


Figure 1 Supply Chain Management (JIFNET, 2012)

There are more and more companies offering automated supply chain solutions. An example is Netsuite (2012) with the goal of Eliminating IT costs and concerns associated with maintaining and upgrading separate applications. Offering real-time inventory visibility, advanced inventory and order fulfillment for distributors and complete procure to pay purchasing.

New Internet retailers are not storing inventory, but relying on a third-party to manage the inventory process, struggled in the dot com era. Consequently, brick and mortar retailers realize the benefits of establishing an online presence after learning from the mistakes of first movers (Steinfeld, 2005).

According to Invatol (2012) despite advances in technology such as Internet access “Inventory Management and Inventory Control must be designed to meet the dictates of the marketplace and support the company’s strategic plan. The many changes in market demand, new opportunities due to worldwide marketing, global sourcing of materials, and new manufacturing technology, means many companies need to change their Inventory Management approach and change the process for Inventory Control.”

Corporations that can achieve seamless, real-time supply chain integration will gain a competitive advantage over their competitors. To achieve real-time efficiency, e-commerce applications have to be multi-layered and full of rapid decision-making capabilities (Tam, 2003). Furthermore, flexible systems that are high in service levels will achieve the full connectivity to the global supply chain.

First movers that failed in the dot com era did not focus on the supply chain, but utilized scarce resources on front-end activities such as website appeal. Many businesses that improved the infrastructure of inventory management systems succeeded, while businesses that focused on web development failed (Tam, 2003). Supply chain management operations are known as back-end

activities, and for this reason businesses underestimated the value of improving back-end operations (O'Brien, 2008) (Tam, 2003).

Achieving competitive advantage is difficult because internal efficiencies and quality management practices are becoming more transparent. Furthermore, additional cost reduction and quality improvements offer slight competitive advantage. However, increasing the speed of the supply chain could be the answer to reduce costs, become more efficient, decrease order cycle time, and gain profits. Supply chain management can account for 75% of operating expenses, making it of utmost importance to focus on supply chain efficiencies (Lankford, 2004).

Managing inventory to create higher inventory turnover and just in time delivery practices is one of the most important processes for retailers. Flexible systems that respond to customer demand and inventory uncertainties are of the almost importance in e-commerce (Lankford, 2004).

INVENTORY MANAGEMENT

Customers and Internet customers in particular expect the prompt delivery of services and products. Retailers are also challenged by demand fluctuations. Businesses have to account for demand fluctuations caused by seasonality and product popularity. Reverse logistics is one of the greatest challenges that Internet retailers have to perfect. Reverse logistics is a process in which a producer, supplier, or retailer methodically manages product returns for possible resale, recycling, remanufacturing, or disposal. Retailers and e-retailers with brick-and-mortar or click and mortar operations have a tremendous advantage over e-retailers that use third party distribution methods, also known as drop-shipping, in reverse logistics. Online retailers experience more product returns than brick-and-mortar retailers. Because of this challenge of high product returns, the management of reverse logistics is crucial for survival.

CUSTOMER SATISFACTION

Internet customers want fast and reliable service. Internet application management, enterprise resource planning, order management, automated material flow systems, and supply chain management must be able to enhance the customer experience. Transportation management systems should also be sophisticated enough to manage the shipping process in a cost effective and route efficient manner.

In the traditional method retailers make inventory decisions that will benefit themselves (Netessine, 2006). The traditional method is defined in this paper from a retailer's perspective. The traditional method is when retailers store inventory in their own warehouse and directly sell to customers.

Many e-commerce businesses tried to take advantage of maintaining no inventory by outsourcing their inventory management processes and focusing on front-end activities. This strategy benefits the supply chain because wholesalers serve multiple retailers by storing inventory in one central location. This process is also known as risk pooling. Wholesalers can charge a higher wholesale price because of the risk incurred from holding inventory, and wholesalers benefit from a wider customer base by serving multiple retailers. Furthermore, wholesalers make the inventory decisions that will maximize their profit.

Even though the whole supply chain benefits from risk pooling when wholesalers serve multiple retailers with drop-shipping, every firm acts upon its own interest in a non-cooperative manner. This non-cooperative manner is proven by the fact that only 23% to 33% of Internet retailers adopted drop-shipping as their primary mode of order fulfillment. Businesses have experienced

success and failure in both order fulfillment strategies: drop-shipping or the traditional method (Randall, 2006) (Netessine, 2006).

RETAILER CHARACTERISTICS

Businesses that choose the drop-shipping method tend to be older entities selling smaller, high-margin products. Furthermore, these firms have low product variety and face lower demand uncertainty. On the other hand, businesses that choose the click and mortar method are young in age, maintain larger yet low-margin products, hold a variety of products, and experience higher demand uncertainty (Steinfeld, 2005). Past studies have addressed the issues of pricing, customer acquisition, and the distribution of information goods on the Internet. Few studies have researched the fulfillment or inventory ownership angles of e-commerce (Randall, 2006).

There are benefits to both strategies, drop-shipping and inventory ownership. Internet retailers that utilize drop-shipping benefit from having a wide variety of products for customers to choose from. Drop-shipping retailers experience more demand uncertainty than traditional Retailers. The greater the amount of retailers available, the more likely retailers use the drop-shipping method. Large firms are more inclined to own their inventory due to their vast amounts of financial resources (Randall, 2006) (Netessine, 2006).

Small firms do not usually have the capital to own their inventory because of high fixed costs. Backend software for e-commerce applications are also costly to integrate with front-end applications making it more difficult for small firms to carry inventory. Product size also contributes to the decision making process of which strategy to utilize. The larger and heavier the product, the greater the inventory costs. Large, heavy products take up a lot of space and are more costly to hold and distribute. Therefore, the larger and heavier the products, the more retailers are inclined to utilize the drop-shipping strategy (Steinfeld, 2005) (Randall, 2006).

A product's lifecycle needs to also be taken into consideration. Retailers holding products that are more inclined to become obsolete would rather drop-ship their products to customers because of the increased risk of holding those products. The phenomenon described above places inventory ownership as the dependent variable, and firm age, firm revenues, product variety, product size/weight, product obsolescence, and cost of capital as independent variables.

Randall (2006) found significance in the following independent variables: product variety, demand uncertainty, relative gross margin, firm age, the ratio of retailers to wholesalers, and product size/weight. All these variables affected the decision of Internet retailers to adopt drop-shipping or inventory ownership strategies. The firm's sales had no significance to inventory ownership (Randall, 2006).

HYBRID STRATEGY

In reality, retailers have the third option of using the hybrid strategy of drop shipping and inventory ownership simultaneously. The ideal situation for retailers is to always use the hybrid strategy because of the risk reduction that occurs by having a safety stock at another location. In terms of stocking inventory, the hybrid strategy forces the wholesaler to carry lower amounts of inventory since retailers do not solely rely on drop-shipping. Furthermore, both the retailer and wholesaler will carry fewer inventories in combination with the hybrid strategy as opposed to when the retailer uses either the drop-shipping or traditional channel.

By increasing the number of retailers in the supply chain the wholesaler benefits from risk pooling and economies of scale. If more retailers enter the supply chain, retailers will find drop-shipping and hybrid strategies more attractive than the traditional channel. However, there comes

a point where the number of retailers added to the supply chain does not affect inventory levels in all three strategies, and this number is 10. In real life situations the number of retailers usually exceeds 10.

Wholesale price does not influence the decision of retailers to switch strategies for inventory ownership. Higher transportation costs encourages retailers to drop-ship and utilize the hybrid strategy. The wholesaler benefits from lower transportation costs because retailers are more inclined to purchase greater amounts of inventory through the traditional channel. Wholesalers profit more from the traditional channel than drop-shipping so they would favor lower transportation costs. Many factors affect channel choice, but results indicate that transportation cost differential and drop-shipping markup are the main factors that influence channel decisions (Netessine, 2006).

In terms of profits, the addition of retailers in the drop-shipping channel benefits all players in the supply chain. The addition of retailers in the hybrid channel is different because the wholesaler loses profits as the number of retailers increase. Increasing the number of retailers motivates Internet retailers to adopt drop-shipping and hybrid strategies (Netessine, 2006).

The hybrid strategy is not always the desired choice. The following situations deter retailers from pursuing the hybrid strategy: when the retailer receives higher margins than the wholesaler, when there is little benefit to risk pooling depending on the products, and when the transportation cost structure favors the traditional strategy (Netessine, 2006).

Retailers are more inclined to stock less and the wholesaler to stock more when retail margins decline and the wholesalers margin increases.

STOCKOUTS

The benefits of carrying lower inventories are widely acknowledged, however the risk of stockouts increases. Stockouts can negatively affect retailers in many ways. Retailers who experience stockouts face declining sales, customer satisfaction, customers switching to competitors, and more back-end costs. Retailers have to make quick, microeconomic decisions when they experience stockouts. They could either rely on drop-shipping, reduce the price of items that are out of stock (stockout compensation), or keep prices constant (Bhargava, 2006).

Relying on a third-party to ship products for a business has its risks. Research indicates reducing the price of out of stock items may have a positive effect on customer satisfaction. Additionally, stockout compensation has been known to improve a company's bottom line because of the increased customer demand for out of stock products. Some retailers purposefully plan for stockout compensation policies to increase the demand for their products, reduce costs, and increase revenues. Conventional strategies oppose this process because conventional thinking believes stockouts disrupt the supply chain making retailers lose sales, hurting retailer reputation, and increasing backorders. However, conventional thinking does not factor in price manipulation practices for in-stock and stockout periods (Bhargava, 2006).

CONCLUSION

As consumers and businesses embrace the Internet, strategies of e-commerce applications and processes need to be constantly reassessed. Many Internet retailers overlooked the importance of supply chain management and managing inventory processes. Large retailers seem to have an advantage over small retailers. Large retailers have more financial resources to implement click and mortar services so they don't always have to rely on a third party to deliver their products. Click and mortar retailers also seem to benefit from synergies developed by being able to sell

from multiple channels. Furthermore, click and mortar retailers can integrate processes such as advertising and logistics through their online and physical channels creating further synergies. Implementing click and mortar strategies provides flexibility for customers, and providing elite customer satisfaction is the goal for all businesses (Steinfeld, 2005). Xu(2011) believes that supply chain quality management success relies on more sophisticated systems than are currently available. As technology advances, the overall quality of supply chain quality management will improve. Supply chain planning systems that create a model of the current supply chain generate demand forecasts for their products and assist them in the creation of optimal sourcing and manufacturing plans (Laudon and Laudon, 2012).

REFERENCES

- Bhargava, H. K., Sun, D., & Xu, S. H. (2006). Stockout Compensation: Joint Inventory and Price Optimization and Electronic Retailing. *INFORMS Journal on Computing*, *18*, 255-272.
- Chopra, Sunil and Peter Meindl. *Supply Chain Management*. 2 ed. Upper Saddle River: Pearson Prentice Hall, 2004
- Invatol (2012) Retrieved from <http://www.invatol.com/>
- JIFNET Integrated Logistics LTD. (2012) *Supply Chain Management* Retrieved from: <http://www.jifnet.com/content/index.php/services/supply-chain-management/>
- Laudon, K. & Laudon, J. (2012) *Management Information Systems: Managing the Digital Firm*. Upper Saddle River, NJ: Prentice Hall
- Leonard, L. N. K., Cronan, T. P. (2003). Website Retailing: Electronic Supply Chain Replenishment. *Journal of End-User Computing*, *15*, 45-55.
- Netessine, S., & Rudi, N. (2006). Supply Chain Choice on the Internet: *Management Science*, *Linthicum*, *52*, 844-864.
- Netsuite (2012) Retrieved from <http://www.netsuite.com/portal/seo-landing-page/accounting-inventory/inventory-a.html>
- O'Brien, J. & Marakas, G. (2008). *Management Information Systems*. New York, NY: McGraw-Hill/Irwin.
- Randall, T., Netessine, S., & Rudi, N. (2006). An Empirical Examination of the Decision to Invest in Fulfillment Capabilities: *Management Science*, *52*, 567-580.
- Snyder, R. and Hamdan, B. (2009). *E-Commerce and Inventory Management*. ASBBS 16th Annual Proceedings, Volume 16 (Number 1): Las Vegas, Nevada. February, 2009.
- Steinfeld, C., Adelaar, T., Liu, F. (2005). Click and Mortar Strategies Viewed from the Web: A Content Analysis of Features Illustrating Integration between Retailers' Online and Offline Presence. *Electronic Markets*, *15*, 199-212.
- Tam, J. M., Razi, M. A., Wen, J. H., Perez Jr., A. A. (2003). E-Fulfillment: The Strategy and Operational Apartments. *Logistics Information Management*, *16*, 350-362.
- Xu, L. D. (2011) Information Architecture for Supply Chain Quality Management. *International Journal of Production Research*. Vol. 49, No. 1, 1 January 2011, 183–198

BIOGRAPHIES

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