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Addressing Gaps in Supply Chain Technology for Global OMNI Channel Retailers

CAPSTONE REPORT

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Abstract

This annotated bibliography examines literature published between 2010 and 2017 that addresses technology gaps in supply chains for global OMNI channel retailers for cross channel engagements to help drive profits and better serve the consumer. It provides information to cross functional business leaders about: (a) business strategy descriptions for OMNI channel retailers, (b) supply chain challenges for OMNI channel retailers, (c) and best practices for integrated technology for OMNI channel supply chains.

Keywords: OMNI channel, supply chain, supply chain management, supply chain technology, global retailer, e-commerce, distribution

Table of Contents

Introduction to the Annotated Bibliography

Problem

Consumers today are opting to use multiple channels to make purchases, including brick and mortar (B&M) stores, the web, mobile devices, and social media (Paul & Hogan, 2015). Many consumers no longer differentiate between buying in a retail store versus completing an E-commerce transaction; 40 percent of retail purchases involve market channel crossing, or using more than one channel (Douglas, 2014). E-commerce transactions are surging; Yadoo (2017) estimated that E-commerce accounted for 8.4% of total retail sales for the third quarter of 2016. With the advent of technology and E-commerce, consumers are shifting away from strictly engaging in on premise shopping to OMNI channel engagements (Anderson, 2016). OMNI channel is defined as "the seamless integration of a retailer's sales channels, which may comprise of B&M stores, online stores (websites, mobile apps), etc." (Govindarajan, Sinha, & Uichanco, 2017, p. 2). This shift has allowed retailers to create customized shopping experiences "by providing the same information in the same style and tone across the channels" (Shankar, Inman, Mantrala, Kelley, & Rizley, 2011, p. S33).

With this change in the shopping experience, consumer behavior has added complexity in retailers' supply chains (Adams, Alldredge, Mueller, & Whitmore, 2016). "The supply chain comprises the sequence of companies that contribute to the creation and delivery of a good or service to end customers. This goes from the point of origin of raw materials and subcomponents all the way to the point of consumption" (Prater & Whitehead, 2013, p. 8). Retailers who support multiple channels face particular challenges with logistics, defined as "that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of

goods, services, and related information from the point-of-origin to the point-of-consumption in order to meet customers' requirements" (Enarsson, 2009, p. 1).

The supply chain process historically has been a centralized model where distribution warehouses service the physical retail B&M locations; however, the supply chain is shifting to accommodate direct-to-consumer (DTC) distribution models (Hopwood, 2016). Retailers benefit from direct distribution because "DTC allows companies to control their brand's story and relay their messaging directly to the consumers" (Hopwood, 2016, p. 1).

The addition of online consumer purchases, a key element of DTC, has greatly complicated Supply Chain Management (SCM), which is described as "the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customer and other stakeholders" (Chan & Qi, 2003, p. 211). SCM requires the seamless integration of processes across marketing channels, logistics, purchasing, and operations (Kozlenkova, Hult, Lund, Mena, & Kekec, 2015). Henderson (2012) notes that "the growth in direct-to-consumer distribution is adding to the complexity and flexibility of supply chains, introducing unique challenges to a process that has been lean for a long time" (p. 1).

While SCM previously utilized a supplier-to-warehouse-to-store model, the need for DTC distribution has rendered this former model obsolete (Douglas, 2014). Because consumers can easily shop for brand alternatives from multiple retailers, a retailer's supply chain must provide exceptional service (Muzumdar & Zinzuwadia, 2015). Muzumdar and Zinzuwadia (2015) suggest that for retailers to stay competitive, they must shorten time from order to fulfillment to delivery, which is a critical path for companies dealing with the challenges of the global economy. Supply chains are the foundation of today's global economy; they empower

international trade flow that makes global E-commerce possible (Miller, 2015). Global OMNI channel retailers face particular SCM challenges that require supply chain structures that are able to support a global footprint (Cheng, 2017). "While consumers accept a delay in receiving their orders placed online in exchange for not having to physically enter a retail outlet, they do not tolerate goods arriving late or being damaged, being misplaced or receiving the wrong product shipped in error" (Chakraborty & Chung, 2014, p. 387). In global supply chain ecosystems, SCM technology needs to continually adopt the latest technological advancements to reduce the transactional costs when fulfilling online orders (Miller, 2015).

Marinagi, Trivellas, and Sakas (2014) assert that information technology (IT) systems for global SCM can, not only provide efficiencies in business processes, improved decision making, and increased productivity, but can also provide competitive advantage. SCM has the potential to accommodate the complexity of global OMNI channel supply, including the accommodation of DTC, by leveraging technology to ensure dynamic fulfillment capabilities are established and integrated across all channels (Gibson, Defee, & Ishfaq, 2015). The resulting need is to invest in technology to service the consumer rather than to service the channels (Cheng, 2017). Successfully aligning technology to include sophisticated enterprise resource planning (ERP), customer resource management (CRM), order delivery, and fulfillment systems will require agility and flexibility across the SCM system for global OMNI channel retailers to be effective (Trowbridge, 2016).

Purpose

This Capstone research study presents literature on the challenges global OMNI channel retailers face in fulfilling orders in a timely and accurate manner when their SCM processes have grown increasingly complex. The study includes literature on best practices in optimizing

technology to account for supply chain complexities experienced by global OMNI channel businesses. Select literature describes the benefits technology tools can provide in streamlining OMNI channel supply chains and enabling comprehensive analysis of data across multiple channels. Finally, literature is included that describes how to employ technology in global OMNI channel supply chains to drive profits and to better serve the consumer.

Research Question

What are the best practices for a global OMNI channel retailer to optimize its supply chain technology to enable the fulfillment of orders in a timely and accurate manner?

Audience

Today's global retail executives face a myriad of challenges (Kimball & Muthusrinivasan, 2015). "Increased complexity in the marketplace, data overload, fluctuating demand, trust issues, and competitive threats are just a few of the challenges retailers, manufacturers and distributors are facing" (Kimball & Muthusrinivasan, 2015, p. 1). The primary audience members for this study are executive leaders who are responsible for OMNI channel business units and who understand the importance of optimizing the strategic value of the supply chain. These key stakeholders are influencers of business strategy and include executive leaders, chief operating officers (COOs), chief information officers (CIOs), chief digital officers (CDOs), department presidents, vice presidents, directors, senior managers, and technology product owners. These leaders have cross functional capabilities and are responsible for the OMNI channel strategy for the entire business enterprise (Hansen & Siew Kien, 2015).

> A key reason why supply chain management (SCM) has a seat at the strategic planning table is that it is positioned squarely at the crossroads of OMNI channel retailing success. Revenue growth is largely being driven by e-commerce sales, and flawless e-commerce

> execution requires exceptional supply chain capabilities" (Ishfaq, Gibson, & Defee, 2016, p. 1).

These stakeholders can use this study as a guide in solving the complex integration of the many OMNI channel technology endpoints in the supply chain for engaging with consumers. Optimizing the supply chain is a business strategy goal and the audience targets are agents of change who are developing technology roadmaps (McMillan, 2003).

Search Report

Search Strategy. The search strategy began with an article published in an industry magazine called *Supply Chain Quarterly* by Ishfaq, Gibson, and Defee (2016) in which the authors presented an overview of how retailers are preparing for the OMNI channel world. This article was selected because the authors are professors of supply chain management at Auburn University. Key search words abstracted from the article were used to create a key word list for this study.

There is an abundance of material on the topics of retail, supply chain, and technology. The strategy for this annotated bibliography search evolved into three parts: (a) find relevant articles that are in the 2010 to 2017 period and that are from peer-reviewed journals or full-text literature that emphasize OMNI channel retail; (b) find articles that are current in supply chain technology; and (c) find articles that offer successful OMNI channel implementation strategies. Searches of literature and scholarly journals were conducted in the following areas: (a) OMNI channel; (b) supply chain; (c) supply chain management, (d) retail, and (e) technology. Published articles were collected using the University of Oregon Libraries' online resources.

There are very few peer-reviewed scholarly journals and not much literature on global OMNI channel supply chain technology. This could be a direct result of the fact that the retail

industry is still adopting technology across all channels for global use, causing a delay in the creation of peer-reviewed literature on the topic. Most articles focused on the specific topic of OMNI channel, supply chain, or technology rather than the intersection of all three topics.

Key words. The following key words were used to retrieve relevant articles:

- OMNI Channel.
- Supply Chain.
- Supply Chain Management.
- Technology.
- E-Commerce.
- Global Retail.
- Integration.
- Sales Channel.
- Digital Marketplace.
- Multi Channel.
- Channel Strategy.
- Customer Experience.
- Distribution.
- Online Shopping.
- Interconnected Economy.
- The Last Mile.

Search engines and databases. The search of literature involved the use of the University of Oregon Libraries' article and title search feature, which includes databases of

business-based and technical sources. Google Scholar's search engine was used as a tool to find industry groups, technology journals, and articles that provided a great source of information. The University of Oregon Libraries' databases that were used in the search for sources included the following:

- ACM Digital.
- Business Economics Theory.
- Business Source Complete.
- Regional Business News.
- CiteSeer.
- Computer Source.
- Google Scholar.
- JSTOR.

Documentation Method

Documentation approach. References are tracked and documented by downloading a PDF copy of the article to a local systems folder. The content of each PDF was reviewed and filed in a new folder that matched one of three categories: (a) retail OMNI channel model descriptions, (b) OMNI channel supply chain challenges, and (c) best practices for integrated technology for OMNI channel supply chains. The article's information, abstract, citation, and source link were logged into Apple Notes for easy reference and retrieval. The Notes program allows for easy article searching, provides a basic editor for citation creation, and includes the ability to add personal notes about the article. The program is saved locally and backed up automatically in the cloud.

Reference Evaluation

Reference evaluation criteria. Reference sources were evaluated using the five criteria from the Center for Public Issues Education's *Evaluating Information Sources* (n.d.) document. The first criterion is authority, or the degree to which the producers of the information are qualified to present the information. Reference searches focused on peer reviewed journals and academic literature. Authors were selected who had professional qualifications, specifically educational background and experience in supply chain management and/or global OMNI channel retailing. The second criterion is timeliness; technology that supports global OMNI channel retailers' supply chain is a relatively new concept, so sources for this paper were limited to the past seven years, or 2010 to 2017. Limiting the period allows for current trends, technology, and best practice solutions. The third criterion is quality; sources were selected that were free of grammar, spelling, and punctuation errors and where the flow and structure of the information were well organized. The fourth criterion is relevancy; sources were selected that described some aspect of global OMNI channel retailers' supply chains and the technology that supports these supply chains. Finally, the last criterion is bias; the reference sources selected offer professional perspectives in solving technology issues in supply chain management and covered multiple viewpoints. Sources from organizations that sell products or services were avoided.

Annotated Bibliography

The references selected for this annotated bibliography are 15 articles organized into three categories. Each category is associated with this study's research question: What are the best practices for a global OMNI channel retailer to optimize its supply chain technology to enable the fulfillment of orders in a timely and accurate manner? The first category contains references that describe the business strategy of multiple channel retailing and the value that OMNI channel brings to the overall business plan. The second category contains references on the challenges found in the complexity of the OMNI channel supply chain, including why retailers have chosen to distribute products through multiple marketing channels. Finally, the last category contains references for best practices for integrating technology in the supply chain to support retail's complex OMNI channel logistics. The annotations contain three elements: (a) the complete bibliographic citation, (b) the published abstract of the article, and (c) a summary describing the relevance to this study. The abstracts are complete as published, with some modified abstracts shortened for content significance. The summaries identify the content within each article that explores the ideas posed in the research question.

OMNI Channel Business Strategy

Ailawadi, K. L., & Farris, P. W. (2017). Managing multi- and omni-channel distribution: Metrics and research directions. *Journal of Retailing, 93*(1), 120-135. https://doi.org/10.1016/j.jretai.2016.12.003

Abstract. The increase in the variety of channel formats, and the progression from single, to multi-, then to omni-channel marketing has made shopping and buying more convenient for consumers, but trickier to manage for marketers—both upstream suppliers and downstream retailers. The first step in managing multi- and omni-channel distribution is to find the specific

metrics that will facilitate reliable analysis of the relationship between distribution and marketing objectives. That is our primary goal in this article—to present the metrics, both old and new, that marketers, both suppliers and retailers, need to monitor, and that academic researchers, both theoretical and empirical, should incorporate in their models. We present a basic framework for managing distribution, and summarize the metrics that are relevant to each element of the framework. Then, we lay out what we believe are important questions that multi- and omni-channel marketers are grappling with, refer the reader to what existing academic research has to say about them, and suggest how future research can build off our framework and metrics to supplement what is known and address what is not.

Summary. This article is important for this study because it focuses on managing and optimizing the performance of the OMNI channel by identifying the distribution demand and provides suggested metrics for supply chain efficiency that retailers will need to be successful. The article presents a framework for measuring and managing distributions by matching demand with actual metrics that can be measured and used by retailers. The authors also suggest that online and offline distribution have specific metrics that are used to support the path to purchase and assert that there are three fundamental measures for assessing distribution that are relevant to both: numeric, all commodity volume (ACV), and product category volume (PCV). The numeric measure simply indicates how many outlets stock the supplier's brand. The ACV measure describes the total annual sales volume of retailers that can be aggregated from individual store level up to larger geographical level. The PCV measure is defined as the weighted measure of distribution based on store sales within a product category. These metrics help reflect how distribution is being managed and effective performance for all three is critical for OMNI channel retailers to increase customer lifetime value (CLV). The authors conclude that

management's use of dashboards is useful in simplifying data for managing the many retail OMNI channel metrics.

Geyskens, I., Gielens, K., & Dekimpe, M. G. (2002, April). The market valuation of Internet channel additions. *Journal of Marketing, 66*(2), 102-119. Retrieved from http://www.jstor.org/stable/3203417

Abstract. The emergence of the Internet has pushed many established companies to explore this radically new distribution channel. Like all market discontinuities, the Internet creates opportunities as well as threats—it can be performance-enhancing as readily as it can be performance-destroying. Making use of event-study methodology, the authors assess the net impact of adding an Internet channel on a firm's stock market return, a measure of the change in expected future cash flows. The authors find that, on average, Internet channel investments are positive net-present-value investments. The authors then identify firm, introduction strategy, and marketplace characteristics that influence the direction and magnitude of the stock market reaction. The results indicate that powerful firms with a few direct channels are expected to achieve greater gains in financial performance than are less powerful firms with a broader direct channel offering. In terms of order of entry, early followers have a competitive advantage over both innovators and later followers, even when time of entry is controlled for. The authors also find that Internet channel additions that are supported by more publicity are perceived as having a higher performance potential.

Summary. In this article, the authors explore the strategy of new OMNI channels for market valuation. The authors examine how supplementing existing marketing channels with an Internet channel can enhance a retail firm's expected performance on net-present value investments by reviewing demand-side versus supply-side management of the supply chain.

Demand side SCM allows retailers to increase sales in three ways: market expansion, brand switching, and relationship building. Demand side SCM also includes disadvantages, such as the threat of current customers moving from one channel without creating lift towards new sales and the erosion of profits from lower prices that occur with the cost of promotional marketing. Supply side SCM advantages are reduced production and transaction costs for retailers. However, supply chain SCM includes disadvantages such as higher physical distribution costs for retailers. The authors conclude by suggesting that while adding an Internet channel can cost money and market growth may never materialize, the value outweighs the present and expected costs of not adding a channel. While the authors only studied one industry in Europe, their findings hold promise for other retail industries and countries.

Verhoef, P., Kannan, P., & Inman, J. (2015, March). From multi-channel retailing to omni-channel retailing: Introduction to the special issue on multi-channel retailing. *Journal of Retailing, 91*(2), 174-181. http://doi.org/10.1016/j.jretai.2015.02.005

Abstract. The world of retailing has changed dramatically in the past decade. The advent of the online channel and new additional digital channels such as mobile channels and social media have changed retail business models, the execution of the retail mix, and shopper behavior. Whereas multi-channel was in vogue in the last decade in retailing, we now observe a move to so-called omni-channel retailing. Omni-channel retailing is taking a broader perspective on channels and how shoppers are influenced and move through channels in their search and buying process. We discuss this development conceptually and subsequently discuss existing research in this multi-channel retailing. We also introduce the articles in this special issue on multi-channel retailing and position these articles in the new omni-channel movement. We end with putting forward a research agenda to further guide future research in this area.

Summary. In this article, the authors explore how the introduction of OMNI channel retailing has been disruptive to traditional retailers' business model and is causing their customers' behaviors to change. The result has caused retailers to move from multi-channel to OMNI channel sales strategies. The authors define multi-channel management as the practice by which retailers interact with customers by direct and indirect methods to sell them goods and services. The authors define OMNI channel management as the practice by which retailers create a seamless shopping experience, whether the consumer is shopping online (from a desktop or mobile device), by telephone, or at a brick and mortar location. The authors review three major research streams on how multi-channel and OMNI channel management are different: (a) impact of channels on performance, (b) shopper behavior, and (c) retail mix across channels. The authors point out that consumers are frequently searching for information in the store and simultaneously searching on a mobile device to find more attractive prices. This allows retailers the opportunity to engage with consumers by creating additional touchpoints, branded applications, creating an OMNI channel presence. The authors introduce OMNI channel management to manage the numerous available channels and customer touchpoints.

Webb, K. (2002, February). Managing channels of distribution in the age of electronic commerce. *Industrial Marketing Management, 31*(2), 95-102. https://doi.org/10.1016/S0019-8501(01)00181-X

Abstract. The emergence of electronic commerce (e-commerce) has created a new business paradigm, one that presents marketers with noteworthy opportunities and challenges. Perhaps the greatest impact is in the area of channel management. The top issue for many business-to-business (B2B) firms today is channel conflict. In this paper, we investigate the effect of introducing the Internet channel into an already complex, multichannel distribution

system from the perspective of the supplier firm. We describe strategies for proactively managing conflict, both externally with channel partners and internally among the subunits responsible for managing the channels. Twelve propositions for research are developed; eight relate directly to the marketing mix and four focus on channel communication and coordination. All of the research propositions offered are mechanisms by which suppliers can influence the level of channel conflict they experience. Dedicated channel management groups, documentation of channel strategies, and superordinate goals are identified as strategies for minimizing unwanted conflict.

Summary. In this article, the author explores the emergence of E-commerce within business-to-business (B2B) distribution and how it has created a new model that affects all aspects of the retail marketing mix. The author defines E-commerce as the strategic deployment of computer-mediated tools and information technology to help satisfy business objects while simplifying the supply chain process. With the introduction of E-commerce in B2B transactions, businesses are reconstructing the supply chain to make the process more efficient for their online and E-commerce objectives. Traditional B2B distribution supply channels are threatened by online E-commerce because online orders have multiple shipping endpoints.

The article consists of an introduction to electronic marketing channels in the context of complex distributed systems. Next, the author examines the impact that various marketing channels have on E-commerce in a B2B setting and examines the conflict within the business organization. Finally, the author presents management strategies for avoiding channel conflict by understanding what customers value in each channel. Key recommendations for retail managers include understanding the order of entry, defined as the channel's impact on market expansion, brand watching on social media, deepening customer relationships, and managing the price

points of the channel partners. The author also recommend that retail managers understand the level of publicity, defined as the media attention given to the introduction of the market expansion. This article is important to this study because it enables a better understanding of how B2B companies avoid conflict with their supply chain customers and can positively impact their reseller relationships to be successful in implementing an OMNI channel model.

OMNI Channel Supply Chain Challenges

Wang, W., Li, G., & Cheng, T. C. E. (2016, March). Channel selection in a supply chain with a multi-channel retailer: The role of channel operating costs. *International Journal of Production Economics, 173*, 54-65. http://doi.org/10.1016/j.ijpe.2015.12.004

Abstract. In this paper, we establish a linear demand model to explore the channel selection and pricing strategy in a supply chain that comprises a dominant multi-channel retailer, and a manufacturer that sells two horizontally differentiated products through its own direct channel and the retail channel, respectively. We find that the gap between the online and offline channels′ operating costs is critical to the retailer choice of its channel selection strategy. Multi-channel selling is the best choice for the retailer only when the cost-gap is narrow enough. Conversely, the retailer should only select the low-cost channel if the cost-gap is too large. In addition, we find that small product differentiation is more favorable to the manufacturer in a retailer-led supply chain as the retailer is forced to reduce its margin and retail price. Meanwhile, the manufacturer can benefit from a rise in the wholesale price and increasing demand in the retail channel. Finally, we consider the case where the manufacturer, instead of the retailer, acts as the decision maker for channel selection. We find that in theory the manufacturer will adopt the same channel selection strategy as the retailer in this case.

Summary. This article is important for this study because the authors provide the history of how traditional brick and mortar retailers built their marketing channels, evolving into large OMNI channel retailers today. This article also reviews how OMNI channel retailers have transformed themselves by building their own physical stores or working with other brick and mortar retailers. The authors present several models for channel competition and selection, which shows the importance of information and market coverage in channel competition. The authors conclude that market channels that include multi-channel selling are optimal only when the gap between the operating costs of the online and offline channels is narrow. The authors predict that OMNI channel retailers will play an increasingly important role in supply chains and note that OMNI channel retailing can cover a larger market, which will improve the retailer competiveness and drive additional profits.

Yang, Y., Wang, L., Wang, Y., Bi, Z., Xu, Y., & Pan, S. (2014, February). Modeling and optimization of two-stage procurement in dual-channel supply chain. *Spring Science + Business Media, 15*(2), 109-118. http://doi.org/10.1007/s10799-014-0176-2

Abstract. An online marketing platform should be designed to fairly take the benefits of buyers and suppliers into consideration based on their risk preferences and business strategies. In this paper, the dual-channel supply chain models are developed to implement the risk-averse strategy for buyers and risk-neutral strategy for suppliers, respectively. The buyers under the consideration are the manufacturers who acquire raw materials, parts, or components to make their final products. The major factors in the developed models include the risk preferences of buyers and suppliers, random price fluctuations of goods, and varying demands of final products. To reflect the purchasing practice of a manufacturer, (1) a supply chain is considered to have two supply channels, i.e., contract-based purchase with a lead-time before the goods are used and a

direct purchase from online spot markets when the goods are used; (2) the time factor on decision making is specially taken into account, and the procurements are divided into the contract stage of purchase and online stage of purchase. Gaming analysis is conducted to develop the supply chain models for manufactures and suppliers to implement their purchasing or pricing strategies. The simulation is conducted and the result has shown that two-stage purchases in a dual-channel supply chain have improved the performances of suppliers and manufacturers in terms of the profits they can make, their supply–demand relations, and their adjustability to uncertainties in globalized and segmented markets. The proposed model has its significance for manufacturers to better control the price risk of goods and the demand risk of final products; on the other hand, suppliers can benefit from adjusting dynamic sales using online spot markets.

Summary. In this article, the authors explore literature in modeling a dual channel supply chain and simulate how the proposed model affects the manufacturer and supplier. The authors posit that in dual channel supply, the manufacturers' demands at a certain time are formed by: (1) the purchase based on the contract with a lead time; and/or (2) online purchase from the online channel without a lead time. Besides making purchases via traditional procurement contracts, manufacturers and suppliers can also buy or sell goods via E-commerce over the Internet. Online channel markets benefit both suppliers and manufacturers. Suppliers can benefit from selling spare products over the Internet and allocating a portion of their products for online businesses where they can take advantage of price increases and obtain extra profits. Manufacturers can benefit by reducing the out-of-stock rate and increasing the level of customer satisfaction via online purchases. The models for manufacturers can be applied to control the price and demand risks, thus decreasing the purchase cost. The models for suppliers can be applied by them to increase sales using channel markets.

This article is important because it helps develop a distributed decision-making environment when the suppliers and manufactures have different priorities.

Yu, D., Cheong, T., & Sun, D. (2017, June). Impact of supply chain power and drop-shipping on a manufacturer's optimal distribution channel strategy. *European Journal of Operational Research, 259*(2), 554-563. https://doi.org/10.1016/j.ejor.2016.11.025

Abstract. With the expansion of the Internet and the proliferation of e-businesses, many manufacturers have chosen to distribute products through online retail channels in addition to brick-and-mortar retail channels. In this paper, we consider a dual-channel supply chain in which a manufacturer considers selling a product through a conventional retail channel and an online channel. Considering two common procurement and order fulfillment policies for online retailers (etailers), conventional batch ordering and drop-shipping, we investigate the impact of supply chain power structure in terms of market power and retail channel dominance on a manufacturer's optimal distribution channel strategy. We analyze and compare the two procurement models with respect to the etailer's order fulfillment policies. We find that a manufacturer never prefers a drop-shipping etailer as the first mover in a sequential pricing game with a batch ordering traditional retailer. The manufacturer prefers to award the power of retail channel dominance to a batch ordering retailer with relatively high market power even if the etailer also follows a batch ordering policy. Drop-shipping benefits both the manufacturer and the etailer when the etailer has relatively low market power.

Summary. This article is important because the authors examine a manufacturer's distribution channel strategy when it considers selling a product through both a traditional brick and mortar store front and an E-commence channel. The authors present two shipping models: (a) drop shipping and (b) batch ordering. Drop shipping is defined as the process of shipping

from the manufacturer directly to the consumer. Batch ordering is defined as a model where the retailer determines the order quantity it receives from the manufacturer and delivers the product to the consumer at the time of purchase. The authors note that drop shipping has gained in popularity as an order fulfillment process. Retailers use drop shipping as their primary order fulfillment process when they have lower volumes through their online channels. As the retailer grows and gains market share, batch ordering becomes a more favorable choice, even in supplier-driven supply chains where suppliers can strategically sell products through multiple channels.

This article is important because it helps define shipping models that enable a global OMNI channel retailer in the first step to understanding strategic choices when creating a fulfillment policy.

Zhang, S., Lee, C. K. M., Wu, K., & Choy, K. (2016, December). Multi-objective optimization for sustainable supply chain network design considering multiple distribution channels. *Expert Systems with Applications*, *65*, 87-99. http://doi.org/10.1016/j.eswa.2016.08.037

Abstract. The emergence of Omni-channel has affected the practical design of the supply chain network (SCN) with the purpose of providing better products and services for customers. In contrast to the conventional SCN, a new strategic model for designing SCN with multiple distribution channels (MDCSCN) is introduced in this research. The MDCSCN model benefits customers by providing direct products and services from available facilities instead of the conventional flow of products and services. Sustainable objectives, i.e., reducing economic cost, enlarging customer coverage and weakening environmental influences, are involved in designing the MDCSN. A modified multi-objective artificial bee colony (MOABC) algorithm is introduced to solve the MDCSCN model, which integrates the priority-based encoding mechanism, the

Pareto optimality, and the swarm intelligence of the bee colony. The effect of the MDCSCN model are examined and validated through numerical experiment. The MDCSCN model is innovative and pioneering as it meets the latest requirements and outperforms the conventional SCN. More importantly, it builds the foundation for an intelligent customer order assign ment system. The effectiveness and efficiency of the MOABC algorithm is evaluated in comparison with the other popular multi-objective meta-heuristic algorithms with promising results.

Summary. This article is important to this study because the authors review the challenges OMNI channel retail has created for the supply chains and provide recommendations for addressing the complexities. The authors examine the elements of a well-designed supply chain network by first recommending design considerations for the supply chain and secondly identifying how the supply chain can be designed to be sustainable and flexible. The authors recommend keeping a simplified distribution channel, as large numbers of facilities reduce efficiency when serving customers. Finally, this article includes a description of a scalable system platform that can support future OMNI channel operations and activities. The authors include numerical analysis to compare the performance of conventional supply chain networks (SCNs) and SCNs with multiple distribution channels (MDCSCNs), finding that the MDCSCN model significantly exceeds the performance of a conventional SCN. MDCSCNs are more flexible than SCNs because they enable a customer's order to be fulfilled by a manufacturer, central distribution center, regional distribution center, or retailer, a much more complex configuration than that of SCNs.

Best Practices for Integrated Technology for OMNI Channel Supply Chains

Beck, N., & Rygl, D. (2015, November). Categorization of multiple channel retailing in multi-, cross-, and omni-channel retailing for retailers and retailing. *Journal of Retailing and Consumer Services, 27*, 170-178. http://doi.org/10.1016/j.jretconser.2015.08.001

Abstract. Business experts have enthusiastically projected a seamless, retail world where customers can shop across channels, anywhere and at any time. This type of multiple channel retailing is often referred to as Omni-Channel Retailing. Within academia, by contrast, there have been proportionately fewer attempts to systematically categorize the diversity of multiple channel retailing that currently exists. Hence, the concepts Multi-, Cross-, and Omni-Channel are used indistinctly. This article proposes a categorization of Multi-, Cross-, and Omni-Channel Retailing for retailers and retailing by means of a literature review, a taxonomy of multiple channel retailing, a literature classification table, and by way of illustration, a mobile Click and Collect shop.

Summary. This article is important for this study because the authors review the impact of growing multi-channel availability for retailers, which allows consumers to shop using various devices. The authors point out that a seamless purchase decision process across multiple channels remains a future goal rather than a current reality as retailers are faced with channel technology integration constraints. A well-integrated multiple channel strategy will include integrated information systems that include product pricing, product availability, customer data, and processes for in-store pick up from the online catalog and will not be limited to across channel promotions. The authors identify five challenges for multi-channel retailers: difficulty in integrating the data across channels, understanding customer behavior in a multi-channel environment, channel evaluation, allocating resources across channels, and coordination of

channel strategies. The authors note that diversity of multiple channel retailing depends on how supply chain processes and consumer engagements are integrated to enable retailers to be successful in OMNI channeling retailing.

Fairchild, A. M. (2014). Extending the network: Defining product delivery partnering preferences for omni-channel commerce. *Procedia Technology, 16,* 447-451. http://doi.org/10.1016/j.protcy.2014.10.111

Abstract. Omni-channel commerce involves combining traditional commerce with online commerce by integrating processes in a harmonious and complementary way throughout the organizational and IT chain, and includes external logistics partners in these processes. The objective of this research is to aid retailers in the decision on these third-party logistics (3PL) partners for product delivery. The intended methodology is to develop a logistics capability framework for 3PL channel partner assessment. Based on a SERVQUAL methodology and gap analysis, a partner preference model is developed.

Summary. This article is important because the author reviews the complexity of logistics decisions for OMNI channel retailers compared to traditional brick and mortar stores. The author suggests that OMNI channel commerce logistics need to be designed to satisfy demand at any time and to enable global delivery. The author notes that OMNI channel consumers expect all products to be available and expect the overall brand experience to be seamless, overall market channels. The author asserts that logistics creates customer value through three generic ways: how quickly the products can be delivered, how accurate the order fulfillment is, and how often orders are placed. The author recommends the use of a third-party logistics provider to reduce investment costs or to avoid establishing an internal supply chain

process. Finally, the author proposes the study of consumer expectations and perceptions to help identify logistics gaps within the OMNI channel retailer.

Hansen, R., & Siew Kien, S. (2015). Hummel's digital transformation toward omni-channel retailing: Key lessons learned. *MIS Quarterly Executive, 14*(2), 51-66.

Abstract. With the phenomenal growth of mobile and social media, many organizations are realizing they need an online presence to reach out to digitally savvy customers. But delivering a seamless customer experience across various online and offline channels is increasingly challenging. This article describes how Hummel, a European sports fashion company, overcame the challenges and successfully transitioned toward omni-channel retailing. Based on this case, we provide insights to guide organizations with similar ambitions, and the implications for their CIOs.

Summary. In their study, the authors examine the transformation of Hummel, a European sports and sports fashion products company, to OMNI channel retailing. The authors presented four recommendations from their study for organizations with OMNI channel objectives. The first recommendation is to include channel partners in the OMNI channel strategy. The second recommendation is for retailers to recognize that a successful OMNI channel strategy requires change in the organization. The third recommendation is to leverage the strategic role of the chief digital officer by converting traditional analog businesses process to digital ones. The final recommendation is to evolve the role of the chief information officer in enabling an OMNI channel strategy by giving the CIO responsibility for the entire technology platform strategy.

This article is important because it provides Hummel's OMNI channel strategy, which focused on changing the organization, enhancing digital support for its business-to-business

partners, and integrating various technology platforms into one seamless enterprise resource platform.

Kumar, S., Tiffany, M., & Vaidya, S. (2014, December 17). Supply chain analysis of e-tailing versus retailing operation–a case study. *Enterprise Information Systems, 10*(6), 639-665. http://doi.org/10.1080/17517575.2014.986218

Abstract. The swift growth of e-commerce or e-tailing as a consumer retail channel has made it a serious competitor to traditional retail channels and is changing consumers' purchasing behavior. The purpose of this case study, based on Target and Amazon.com, is to analyze the attributes of traditional retailing, e-tailing, and hybrid supply chain models to form conclusions about the feasibility of an idealized supply chain model for the future. An integrated and generalized modelling framework is used that incorporates Six Sigma – define, measure, analyze, improve, control methodology leveraging various tools, including process flow maps, cause and effect diagram, performance efficiency metrics, failure mode and effects analysis (FMEA), and Monte Carlo simulation. Based on this analysis and research, the conclusion is that the idealized supply chain of the future may evolve into a hybrid supply chain, which includes both e-tail and retail channels. The main recommendations from this study include assessing the risks of migrating to such a hybrid supply chain and to leverage the recommended actions provided in the hybrid FMEA. To facilitate more effective and mature processes, this study can guide researchers in exhaustive empirical evaluations of hybrid supply chains, gather experiences and lessons learned for practitioners.

Summary. The authors present an analysis of the attributes of traditional retailing, e-tailing, and supply chain models by reviewing the supply chains of Target and Amazon.com. The authors studied the supply chain solutions of these two retailers because of the diversity of their

product offerings and business segmentation. The authors also present a brief discussion of a Six Sigma based methodology using define, measure, analyze, improve, and control to help create a framework for fact-based, data-driven improvements in the supply chain process. The authors summarize their analysis of performance efficiency metrics and describe how to interpret results. This study provides information on incorporating performance metrics into the management of the supply chain. Key findings include that customer order fulfillment cycle time is generally used as an indicator of supply chain costs and is directly tied to the customer's service levels and the need for OMNI channel retailers to evolve to a hybrid supply chain to service customers.

Marinagi, C., Trivellas, P., & Sakas, D. (2014, August 25). The impact of information technology on the development of supply chain competitive advantage. Social and Behavioral Sciences, 147, 586-591. https://doi.org/10.1016/j.sbspro.2014.07.161

Abstract. This paper explores the impact of Information Technology (IT) practices on building competitive advantage throughout the supply chain. A competitive advantage is based on capabilities that provide the necessary grounds of an organization to differentiate itself from its competitors. The majority of the relevant empirical literature identified price/cost, quality, delivery dependability, product innovation, and time to market as the most decisive sources of competitive advantage. As far as the standards in the economic environment are changing and global competition is fiercer, organizations realize that they have to re-evaluate their enterprise business model in order to gain supply chain efficiencies. To meet these challenges and improve their competitive advantage, companies need to both support their internal functions and exchange information with supply chain partners in an effective way. Therefore, companies must exploit IT including enterprise applications such as ERP and CRM, as well as e-procurement and e-commerce. The empirical findings from a survey of 76 manufacturing firms in Greece

confirmed the crucial role of IT practices and techniques on the establishment of a sustainable competitive advantage based on Supply Chain Management. Managerial implications are discussed.

Summary. The authors focus on the impact of information technology on the development of competitive advantage through the supply chain. This article notes that an organization can secure a competitive advantage through a differentiation strategy by enabling technology innovation. The authors posit that increasing the information technology investments could lead firms to higher profitability and effectiveness. The authors note that retailers that want to take advantage of the technology applications in their supply chain must understand the designs and implementations of their own systems, ensure that their systems are compatible with those of their supply chain partners, and ensure that the level of automation between partners is synchronized. This article is important because it provides specific recommendations in the application of technology to the supply chain and notes that the successful application of technology to the supply chain can provide a competitive advantage.

Pantano, E. (2014, September). Innovation management in retailing: From consumer perspective to corporate strategy. *Journal of Retailing and Consumer Services, 21*(5), 825-826. http://doi.org/10.1016/j.jretconser.2014.02.017

Abstract. This special issue of the *Journal of Retailing and Consumer Services* on innovation management in retailing from a consumer and corporate perspective includes seven papers. The papers cover a variety of interesting topics focusing on consumers ′viewpoints and corporate strategies towards new advanced systems introduced at the points of sale. The issue is organized into two sections: (i) impact of new technologies on consumer behavior (which includes new approaches for managing shopping experience), and (ii) corporate strategies (which

includes retailers' actions and strategies). This introduction summarizes the papers and identifies some empirical insights and contributions to the growing body of knowledge on innovation management that has appeared in the recent retailing literature.

Summary. In this article, the author discusses how software applications and communication technologies push retailers to identify new business strategies in response to resulting changes in the market conditions and technology options. The author examines two aspects of innovation management in retailing: (a) the impact of new technologies on consumer behavior and (b) the impact of new technologies on retail strategies. Retailers can benefit from the implementation of new technologies through better management of information, cost reduction, or through improved consumer service. New retail technology strategies allow the same consumer to visit a retailer through different channels for different purposes. This article is important because although retailers have understood the potential benefits of these systems, retailers have not yet applied best practices for successfully managing innovation through the entire channel.

Saghiri, S., Wilding, R., Mena, C., & Bourlakis, M. (2017, August). Toward a three-dimensional framework for omni-channel. *Journal of Business Research*, *77*, 53-67. http://doi.org/10.1016/j.jbusres.2017.03.025

Abstract. The omni-channel, as an emerging trend in retail, aims to coordinate processes and technologies across supply and sales channels. The evolution of this concept is still nascent. This paper develops a conceptual framework for omni-channel systems, configured by three dimensions of channel stage, channel type and channel agent. Integration and visibility are also explored and discussed as the main enablers, which support the implementation of omni-channel framework. This research is built upon the empirical and secondary data. Multiple case studies

and expert interview methods are employed for data collection to validate the recommended framework and to explore its applicability. The framework proposed, along with the key integration and visibility enablers identified for the omni-channel, can be applied to a wide range of retail supply chains. It helps managers to develop, run, and monitor omni-channel systems; it may also serve as a stepping-stone for development of the literature on omni-channel systems.

Summary. This article is important because the authors aim to develop a conceptual framework for OMNI channel systems. The authors note that a holistic framework system needs to be designed for OMNI channel systems. The authors propose a framework that starts from the sales function and continues through the network work processes to include product data management, transaction management, product delivery, and returns. The authors review the enablers of the OMNI channel framework, including broadband Internet accessibility, well designed distribution centers, efficient and extensive logistics networks, cross channel integration, robust customer analytics, channel visibility to customers, and product digitization, defined as the process of converting product information into a digital format.

The configured framework is three-dimensional and includes channel stage, channel type, and channel agent. Channel stage refers to the value-added journey (pre-purchase, payment, delivery, and return). Channel type is defined as the various ways available in the journey to provide the product or service and related information, which includes stores, websites, social media, emails, ads, catalogs, and coupons. Channel agent is the entity or business unit that manages the channel type in each channel stage and includes brick and mortar locations, logistics, websites, and manufacturers. Key findings include that creating a three-dimensional framework for OMNI channel systems can bring a value-added journey for consumers by maintaining connectivity and interaction through all the complexsystems.

Conclusion

The global OMNI channel retailer faces an increasingly complex supply chain process needed to fulfill orders for consumers in a timely and accurate manner (Douglas, 2014). The 15 references selected for this annotated bibliography examine the best practices for a global OMNI channel retailer to optimize its supply chain technology to enable the efficient and accurate fulfillment of orders. Literature that describes the challenges facing OMNI channel retailers are presented, and best practices are identified for multiple supply chain business models. The references are organized into three categories: (a) business strategy descriptions for OMNI channel retailers, (b) supply chain challenges for OMNI channel retailers, and (c) best practices for integrated technology for OMNI channel supply chains.

OMNI Channel Business Strategy

The world of retailing has changed dramatically with the introduction of E-commerce, additional digital channels, and social media, creating various multi-channel business strategies (Verhoef, Kannan, & Inman, 2015) to enable consumers to buy products. OMNI channel allows "[c]onsumers [to] have significant choices on how they buy products whether it be in person or via other means" (Fairchild, 2014). Geyskens, Gielens, and Dekimpe (2002) suggest that a retailer's value can increase by supplementing existing multiple channel business with an Internet channel, creating an OMNI channel model, particularly those who choose to adopt the channel early but are not the first in the market to do so. However, Hansen and Siew Kien (2015) note that retailers that want to implement a successful OMNI channel strategy need to recognize that change in the organization will be required.

All business models must perform three fundamental tasks: the exchange of information, the exchange of money, and the exchange of goods (Webb, 2002). The most prevalent strategy in

OMNI channel retailing is to create a seamless shopping experience for consumers while innovating business processes and corporate strategies (Pantano, 2014). Because of the complexity in logistics posed by an OMNI channel retailing strategy, retailers who pursue this strategy must also include the retailer's supply chain in the strategic planning process (Ailawadi & Farris, 2017). Hansen and Siew Kien (2015) recommend that retailers pursuing an OMNI channel supply chain strategy involve their channel partners in the strategic planning.

OMNI Channel Supply Chain Challenges

OMNI channel supply chains pose challenges for the technology that is employed for supply chain management, which includes "the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized" (Verhoef, Kannan, & Inman, 2015, p. 176). Yu, Cheong, and Sun (2017) investigated different distribution channel structures using either drop shipping or distributed fulfillment in the supply chain, and discovered retailers preferred the use of drop-shipping as their primary order fulfillment process when they have lower market share. As the retailer gains market share and increases OMNI channels, batch ordering becomes a more favorable choice. Suppliers prefer retailers who have adopted the traditional batch ordering fulfillment model rather than the more complicated drop-ship fulfillment model for OMNI channel order fulfillment (Yu, Cheong, & Sun, 2017).

Zhang, Lee, Wu, and Choy (2016) compared the performance of conventional supply chain networks (SCNs) and SCNs with multiple distribution channels (MDCSCNs), finding that the MDCSCN model significantly exceeds in performance compared to a conventional SCN. MDCSCNs are more adaptable than SCNs because they enable a customer's order to be fulfilled by either a manufacturer, central distribution center, regional distribution center, or a brick and

mortar location. Customers' orders can be serviced from any available facility when being fulfilled by MDCSCNs. However, the MDCSCN model is significantly more complex than the traditional SCN model, leading to a loss of control over brand identity and increased administrative cost once implemented.

Yang et al. (2014) noted the special case of supply chains for manufacturers who buy raw materials, parts or components with either contract-based purchases that have long lead times or online purchases. Yang et al. (2014) identified the challenges posed by the competing priorities of the manufacturers, who want to minimize risk, and the suppliers, who are risk neutral, in an OMNI channel marketplace. Wang, Li, and Cheng (2016) noted that the OMNI channel supply chain platform must be scalable and capable of supporting future OMNI channel operations and activities to allow a customer's order to be fulfilled by a manufacturer, central distribution center, regional distribution center, or retailer, a much more complex framework configuration than traditional supply chains.

Best Practices for Integrated Technology for OMNI Channel Supply Chains

When analyzing the technology for OMNI channel supply chains the framework needs to adhere to best practices (Marinagi, Trivellas, & Sakas, 2014). In particular, Marinagi, Trivellas, and Sakas (2014) note that retailers that want to take advantage of the technology applications in their supply chain must understand the designs and implementations of their own systems, ensure that their systems are compatible with those of their supply chain partners, and ensure that the level of automation between partners is synchronized. The focus should be expanded from the sales function to the network-wide processes that include product management, transaction management, product delivery, and returns (Hansen & Siew Kien, 2015).

Kumar, Tiffany, and Vaidya (2014) suggested that OMNI channel retailers adopt a supply chain hybrid model that includes both E-commerce and retail channels by integrating performance metrics to manage the customer order fulfillment cycle. A key performance metric they identified is inventory turnover, which is defined as the number of times inventory is sold or used in a time period (Kumar, Tiffany, and Vaidya, 2014). This metric allows retailers, suppliers, and manufactures to manage performance for optimal efficiency. Yang et al. (2014) propose a hybrid model that enables distributed decision making, as the suppliers and manufactures are assumed to have different priorities regarding uncertainty and risk.

Saghiri, Wilding, Mena, and Bourlakis (2017) defined a three-dimensional framework for OMNI channel systems that includes the dimensions of channel stage, channel type, and channel agent. "The high level of connectivity leads to interdependence, which make the omni-channel system considerably more complex" (Saghiri, Wilding, Mena, & Bourlakis, 2017, p. 63). An effective OMNI channel supply chain will allow a seamless customer experience and retailers who simplify the complexity of the integrated technology can deliver superior shopper experiences (Beck & Rygl, 2015). The use of best practices to simplify the OMNI channel technology can cut costs and make shopping more exciting for consumers (Yang et al., 2014).

Finally, organizations that want to implement an OMNI channel strategy will need to revisit the roles of their IT leaders (Hansen & Siew Kien, 2015). The strategic role of the chief digital officer should be leveraged by converting traditional analog businesses processes to digital ones (Hansen & Siew Kien, 2015). The role of the chief information officer must evolve to include responsibility for the entire technology platform strategy to enable an OMNI channel strategy (Hansen & Siew Kien, 2015).

Summary

Today's consumer behavior has changed with the advent of OMNI channel retailers and the expanded reach of the global economy (Verhoef et al., 2015). However, retailers have not fully embraced an OMNI channel strategy; Hansen & Siew Kien (2015) note that by 2015 only a third of retailers offered basic OMNI channel capabilities. As retailers face the challenges posed by a global economy, a thorough understanding of technology gaps in the OMNI channel supply chain process and best practices to address the gaps will enable retailers to create a seamless transaction process for cross channel engagement to drive profits and better serve the consumer.

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