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In Search of Excellence in E-Customer Logistics Service

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Abstract

The e-commerce market has been developing very rapidly and changing traditional distribution systems. The development of online channels is matched by a similar evolution of companies' logistics systems. As a consequence, logistics processes management now significantly influences e-customer service quality, which has emerged as a competitive advantage. The main goal of this paper is to identify e-commerce business models, modern distribution channels and management tools that would facilitate a continuous improvement in e-customer logistics service. Based on the literature and interviews with e-commerce services providers, we provide a plethora of good and best practices useful for managers in the rapidly developing and highly competitive e-commerce business.

Key words: e-customer logistics service, multi- and omnichannel distribution, cooperation on the e-market

JEL: L21, L81, M15

Introduction

In an era of technological revolution customers make purchase decisions in new and different ways than they had used in the past and have new expectations when working with traditional and native digital retailers. The change in consumption patterns is intrinsically linked to the rapid development of information technology and the internet [Xiao Yan, Yong, Qinli, Stokes, 2012]. Customers have access to detailed information about products and can instantaneously compare competitive offers. With so much information available, they have never been more demanding and challenging. In response, retailers have been developing new strategies and reconfiguring physical distributions systems on the B2C market to change the way goods are sold, stored and moved through supply chains. E-commerce, as a new distribution channel, creates an opportunity, which revolutionized logistics processes [Żurek, 2014]. Moreover, many retail channels have been integrated in complex distribution systems to simultaneously offer products both online and offline in different types of stores, using internet and mobile technologies. As a consequence, logistics service has become a backbone of competitive advantage in e-commerce and requires continuous improvement.

The goal of this paper is to identify e-commerce business models, modern distribution channels and management tools, focusing on means to continuously improve e-customer logistics service. The main research questions are as follows:

- How has e-commerce changed business models and distribution channels?
- What are the key elements and challenges in e-customer logistics processes management?
- What are the main ideas and tools in searching for excellence in e-customer logistics service?
- How can business processes excellence in e-commerce be measured?

This analysis is relevant from both a practical and theoretical point of view. In theory, the influence of e-commerce technologies and practices on business models is expected to be as important as the impact of other key management techniques, including just-in-time or total quality management [Desruelle, Burgelman, 2001]. In practice, the development of online commerce has to be complemented by the management of a physical logistics system, with the exception of digital products distribution. As Jeff Bezos, founder and CEO of Amazon.com, which offers world's biggest selection of products online, remarked: "Amazon.com is most of all a logistics company" [Stone, 2013].

This paper is based on a theoretical and an empirical investigation. The literature included in this study has been selected to identify different elements of logistics service in e-commerce. Numerous case studies have been written on the basis of the literature reviewed, business reports, websites and interviews with e-commerce services providers. These sources enabled us to discover the main trends in continuous improvement of e-customer logistics service.

The interviews were conducted with e-commerce customer service professionals in August 2015 and all questions dealt with requirements and good practices for improving and measuring e-customer service level from the point of view of business practice.

Business Models in E-Commerce

To understand and present the importance of logistics customer service in e-commerce supply chains, we first define *electronic commerce*. According to the definition of Wigand, electronic commerce is a relatively new concept added to the business vocabulary in the 1970s, and includes any form of economic activity conducted via electronic connections [Wigand, 1997]. It can be defined as conducting the initiation and agreement phase of an economic transaction via electronic networks that allow the automated processing of transaction data [Delfmann, Alberts, Gehring, 2002]. Moreover, it can include online electronic payment systems and techniques as an important condition of smooth e-commerce development [Jing, 2009].

There are external and internal factors that drive companies from different economic sectors to adopt and develop e-commerce. The external drivers in the business environment include for example, globalization, trade liberalization, competitive pressures, technologies or virtual reduction of physical distance – all of which create new challenges and possibilities for companies. Internal drivers motivate companies to reduce costs, increase speed, internally enhance value chain coordination, develop and improve external collaboration, create interdependency, facilitate more added value, better manage relations with customers and, finally, develop competitive advantages [Desruelle, Burgelman, 2001]. In the context of e-commerce, the business process is a set of activities performed and coordinated with information systems to offer products/services to reach defined business goals [Yang, Humphreys, McIvor, 2006].

Generally, the following pure business models have been identified in e-commerce:

- *portals*, which offer information and search services for their customers, e.g. in the pre-transaction stage,
- *market makers*, which enable economic transactions between customers by offering mechanisms for the secure and trustworthy conduct of such transactions,
- *product/service providers*, that present, market, and sell products/services directly via the Internet and ensure the physical or digital delivery of goods and services [Delfmann, Alberts, Gehring, 2002].

Business models determine different strategies, supply chains structures, and challenges for logistics processes management. In this paper we concentrate on the activities of product providers on the B2C e-market, which involve planning, implementation and control of the flow of goods and services and related information between the selling company and the buyer.

Changes in Distribution Channels

The development of e-commerce has created significant changes in retail logistics and physical distribution networks. According to a report published by Jones Lang LaSalle, the evolution of retail logistics has passed through various phases according to the following timeline:

- *In the 1970s*, most retail stores were replenished by direct deliveries from suppliers or wholesalers;
- *In the 1980s*, retailers started to centralize their store deliveries through new distribution centers, which they controlled;
- *In the 1990s*, global sourcing for non-food products began, with many retailers developing import centers to receive and process mostly containerized imports;
- *From around 2000*, e-commerce began to rapidly expand with pure-play, internet-only retailers leading the way in establishing e-fulfilment distribution networks [Jones Lang LaSalle, 2013].

Contemporary companies develop multichannel or omnichannel strategies to achieve potential synergy effects (see Table 1). They combine different approaches to stock-keeping and management, picking and packing orders in warehouses or in stores, and also transporting and delivering products, including home delivery, click and collect at the store, or click and drive at the pick-up point (that is, the so called “drive-in”).

TABLE 1. Synergies between online and offline channels

Objectives and potential advantages	Main function concerned	Actions to be undertaken
Exploiting the capital of the brand for online sales Recruiting new customers Developing the frequency of customer purchases, particularly “mixed” customers Encouraging customer loyalty Increasing purchasing power	Strategy, marketing Direct marketing and customer relations Purchasing and assortment policy Logistics	The use of the same brand for stores and online sales The implementation of an IT system covering all channels Prospecting and communicating online using information from loyalty cards Coordinating buying with store purchasing centers Exploiting customer databases and relationships with listed suppliers Using stores for receiving orders, as pick-up points for online orders, as a logistics platform for managing stock and for home deliveries Developing a dedicated pick-up infrastructure
Optimizing costs and diversifying logistics models		

Source: Colla and Lapoule [2012], p. 849.

In the *multichannel model*, different channels – including store, web or mobile devices – are designed and managed as parallel independent distribution network structures. The multichannel approach evolves to *omnichannel strategies* that offer customers a seamless experience, regardless of how they choose to shop [Jones Lang LaSalle, 2013]. The omnichannel strategy requires the design of new logistics processes and management as well as their integration as dedicated offline and online sales channels. Customers can now, e.g. order online and pick up in a store, visit the store and order online via a kiosk, visit the store and shop the retailer's website via their mobile phones, visit the store and shop on another retailer's website, or visit the store and compare prices via barcode scanner and find the product at another physical store at a lower price [Jones Lang LaSalle, 2012]. The effects of ROPO – *research online, purchase offline* and reverse ROPO – *research offline, purchase online* should ensure that customers can change sales channels effortlessly and conveniently.

Logistics Service as a Source of Competitive Advantage

Customer logistics service is defined as:

- *activities* involved in delivering products/services;
- *performance levels* that meet requirements of customers; and
- *a management philosophy* that distinguishes a company from its competitors [Kempny, 2001].

Companies implement and improve different elements of logistics to fulfil various customer needs, depending on the target market, types of delivered goods, volume, system of deliveries and competitive pressure [Kempny, 2001]. Generally, companies manage three groups of elements collectively, which requires continuous improvement through new and innovative solutions [Kadłubek, Lis, 2013].

- *pre-transaction* elements, like e.g. a written customer service policy, market communication, organization structure, system flexibility, presentations and seminars for customers;
- *transaction* elements, including (among others) the availability of products, time, flexibility, frequency, delivery reliability, order placement possibilities, information flow, and communication;
- *post-transaction* elements, including guarantee procedures, repairs, returns, complaints, and recycling [La Londe, Zinszer, 1976, cited in: Cichosz, 2010; Christopher, 2011].

Logistics has gained a major role in e-commerce development. E-commerce companies have a higher probability of creating a sustainable competitive advantage and improved performance if they have strong logistics capabilities [Cho, Ozment, Sink, 2008]. Logistics service is considered a main business service quality dimension in an

e-commerce environment, along with marketing, operations and collaboration services [Yang, Humphreys, McIvor, 2006]. Logistics service quality is both a critical success factor and a differentiation tool, which influences e-customer satisfaction levels and retention rates [Micu, Aivaz, Capatina, 2013]. Table 2 presents examples of logistics capabilities in the e-commerce market that create service quality.

TABLE 2. Logistics capabilities in the e-commerce market

Capabilities	Definitions
Pre-sale customer service	The ability to service the customer during the purchase decision process (i.e. before the customer buys the product)
Post-sale customer service	The ability to service the customer after the sale of the product to ensure continuing customer satisfaction (i.e. return product handling)
Delivery speed	The ability to reduce the time between order taking and customer delivery
Delivery reliability	The ability to exactly meet quoted or anticipated delivery dates and quantities (i.e. deliver correct orders on time)
Responsiveness to target markets	The ability to respond to the needs and wants of the firm's target markets (i.e. handle small, frequent orders)
Delivery information communication	The ability to communicate shipping and delivery information to and from customers
Web-based order handling	The ability to handle and fill orders using a web-based order handling system. This also includes logistics information sharing with other channel members
Widespread distribution coverage	The ability to effectively provide widespread and/or intensive distribution coverage
Global distribution coverage	The ability to effectively provide global distribution coverage
Selective	The ability to effectively target selective or exclusive distribution outlets
Low total cost distribution	The ability to minimize the total cost of distribution

Source: Cho, Ozment, Sink [2008], p. 343.

All logistics service elements are crucially important to the competitive advantage of e-retailers. First, the internet is a revolutionary pre-transaction tool, which transforms market communication. It is an optimization tool for physical logistics systems, which benefits from speed, interaction and flexibility [Gurău, Ranchhod, Hackney, 2001]. Distribution can be planned, coordinated, monitored and controlled on the internet. Secondly, logistics is responsible for the physical realization of e-orders to achieve a high-quality customer experience. However, some of the new logistics challenges that have emerged include: the need for a more flexible transport system in order to serve fast-changing customers; constantly changing transport relations due to the geographical dispersion of customers; the handling of smaller shipments delivered directly to the customer;

a shift from single-customer towards multi-customer warehousing; different approaches to stock-keeping, picking and packaging; and various models of goods delivery or ensuring carriers' capacity during peak periods [Delfmann, Albers, Gehring, 2002; Colla, Lapoule, 2012]. Logistics transaction services are supported by online applications, e.g. providing real-time information according to product availability, inventory level or shipment status, and technologies such as smart phones, tablets or SMS alerts, e.g. anticipating deliveries. Finally, in the post-transaction phase, the choice of the best logistics strategy is particularly essential in managing returns.

A cross-section of the following elements identify success factors and the key sources of competitive advantage in electronic commerce:

- offering a website experience with high quality design and ergonomics;
- developing diversified, efficient and service-oriented logistics;
- offering a diversified assortment of products and services creating value for the clients and firms, and
- exploiting the advantages of the multichannel approach [Colla, Lapoule, 2012].

Companies use different approaches to logistics management to develop e-commerce activities depending on their size and geographical coverage. Micro- and small local or regional companies can develop their own logistics. Some online stores develop drop-shipping and deliver products directly from the warehouse of an external partner (such as a producer, distributor or specialized company) [Kawa, 2014]. Others turn their attention to one stop e-commerce and outsource in partnership with logistics services providers. Postal, express and parcel services providers are the main contractors in e-commerce logistics. But more and more logistics operators aim to consistently gain business clients in the fast-rising e-commerce sector. They sometimes design specific services and solutions for a particular product segment. According to a report published by Jones Lang LaSalle, e-commerce is considered one of the key drivers of logistics services market in Poland, likely to result in increasing demand for modern warehouse and distribution space through 2020 [Jones Lang LaSalle, 2015].

Significance of Logistics Service on the Polish E-Commerce Market

E-commerce market has been developing very rapidly in Poland. In the last decade, more than 20,000 online stores were established and the value e-market commerce in 2014 was approximately 30 billion PLN in 2014 [Strzelczyk, 2015] or 6% of the value of the Polish retail market [Bałuta, 2015]. Polish e-market is developing at the fastest rate in the European Union, where e-commerce is one of the pillars of the economic growth and increasing employment levels [European Commission, 2012]. In 2015, its value is

expected to reach 32 billion PLN as approximately 17 Mio. (78%) of internet users visit e-commerce services [e-Commerce Polska, 2014]. But the loyalty of e-customers is low; only 16.82% of buyers shop more than once in the same web service [Strzelczyk, 2015].

The most important determinants of e-shopping in Poland are: convenience – because of 24/7 availability, no physical distance, no necessity to visit a store, the possibility to compare competitive offers, and lower prices than in traditional stores (see Figure 1).

FIGURE 1. Sources of motivation for e-shopping in Poland



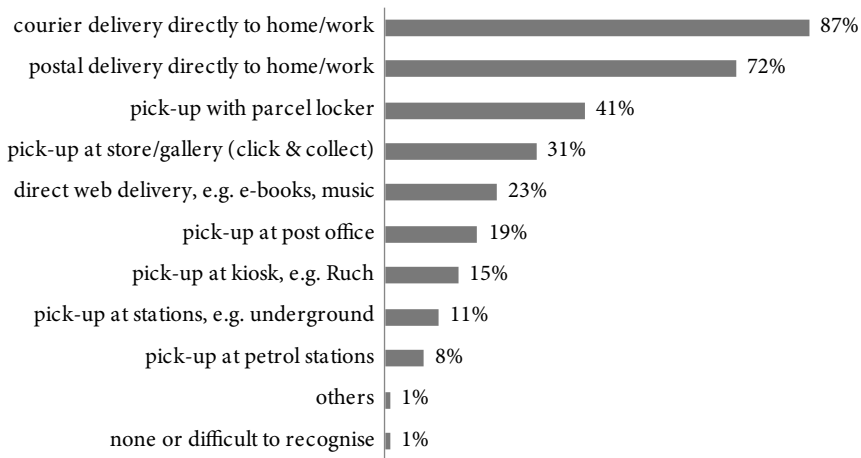
Source: own elaboration based on E-commerce w Polsce [2015], p. 35.

Considering the requirement for availability, it is important to ensure best practices in convenient systems of forward logistics. It should be recognized that certain of them encourage Polish e-customers to shop online, like: courier delivery directly to home or workplace, postal delivery directly to home or workplace, and own pick-up with parcel lockers (compare Figure 2).

According to the research results conducted by Gemius and e-Commerce Polska, e-customers frequently choose services offered by the following courier operators: DHL (13%), Siódemka (10%)³, DPD (10%), UPS (6%), Pocztex (4%), GLS (3%), FedEx (2%) (E-commerce w Polsce, 2015). Lower costs and faster delivery were indicated as among

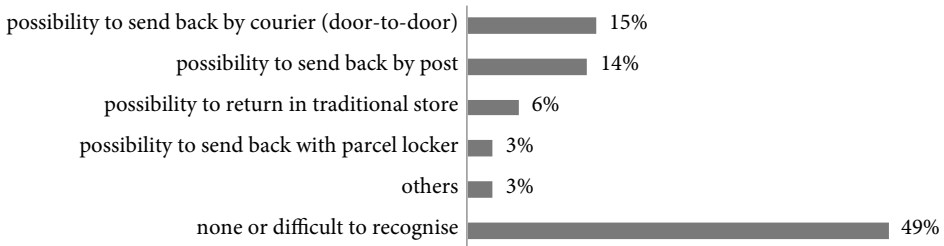
the most important logistics factors influencing the frequency of e-shopping in Poland. Additionally, customers increasingly expect “delivery for free” offers [European Commission, 2012]. The analysis of reasons for e-shoppers complaints highlights that at the core of them are logistics service elements; namely, high costs and long waits for product delivery [E-commerce w Polsce, 2015]. Moreover, 22% of internet users who do not shop online underline a concern for delivery execution. Research results indicate the necessity of business processes improvement in logistics management.

FIGURE 2. Preferable delivery systems in e-commerce



Source: own elaboration based on E-commerce w Polsce [2015], p. 40.

FIGURE 3. Services used most frequently in reverse logistics



Source: own elaboration based on E-commerce w Polsce [2015], p. 58.

On the other hand, reverse logistics systems have a significant role in building customer satisfaction. Because of the value of returned products, reverse logistics is gradually being

paid increasing attention by producers and retailers. It is a main contributors to success and an element of premium logistics service in e-commerce. Returned products mainly refer to new ones rather than end-of-life products. Moreover, products sent back to e-retailers account for 80%, while the rest is sent to producers [Xiao Yan, Yong, Qinli, Stokes, 2012]. Figure 3 shows the preferred logistics services most frequently used in e-commerce reverse logistics.

Logistics Challenges in E-Commerce

Last mile delivery has emerged as the most critical transportation activity and its costs typically represent a high share of total logistics costs [Vanelslander, Deketele, Van Hove, 2013]. There are two main operational models for the storage and preparation of online orders: *store picking*, which means picking orders directly from the store's aisles, and *warehouse picking*, which consists of preparing orders in a dedicated logistics facilities. Last mile logistics in e-commerce may include direct deliveries to customer homes (attended or non-attended) or to pick-up points (at stores, galleries, parcel lockers, petrol stations etc.) and collection by customers. Examples of business practices are presented in Table 3.

TABLE 3. Last mile services in e-commerce logistics

Company	Practice	Influence on logistics e-customer service
Amazon	Prime Air service. Declaration that by 2018 drones will be used in the USA to deliver products (weighing less than 2.3 kg) within 30 minutes of being ordered and within 10 miles of the warehouse.	Delivery guarantees the fastest availability of products.
Amazon, eBay, Google, Uber	Same-day delivery service.	E-shoppers order products online and receive them that same day without leaving home.
Auchan, Carrefour, Intermarché, Leclerc	Click and drive model. Customers order online and collect products at pick-up points (the drive-in). Goods are delivered only half way to customer destinations and the customer has to pick them up within the pick-up time window defined by the service provider.	A new way of rationalizing purchases and freeing customers from the constraints of delivery times which otherwise require them to be at home at a certain time of the day. It avoids delivery costs and frees up time that can be used for other activities. Customers may combine shopping trips with other daily activities such as travel to the workplace.
DHL	Delivery at a neighbor's residence in case of the customer's absence from home. The customer receives delivery confirmation by e-mail or SMS.	Higher flexibility and reliability of e-commerce service.

Company	Practice	Influence on logistics e-customer service
Inpost	Network of parcel lockers ensures fast and convenient shipping and collecting parcels around the clock, 7 days a week, with no queues and at a convenient location.	24/7 availability of the service allows customers to choose time and place of collection during day or night.
Sainsbury	Use of alternative vehicles and optimal routes planning, eco-driving. Changing online grocery delivery fleet to electric vans. Each zero-emission van saves 5 tons of CO ₂ per year. Drivers use GPS to ensure that they take the most efficient route through busy city centers and residential roads.	Reduction of customers' carbon footprint.
Walmart	Organization of pick-up points. The pickup-grocery kiosk looks like a gas station and is a new way to get groceries to customers. A customer places an order online and pulls up to the kiosk at the designated time. A Walmart worker delivers the order to the car and prints off a receipt.	Flexibility in the choice of pick-up time adjusted to daily activities.

Source: Amazon [2014]; Colla, Lapoule [2012], p. 845; DHL [2015]; InPost [2015]; Sainsbury [2007]; Wahba [2015]; Smith [2014].

TABLE 4. Environmental aspects in e-commerce logistics processes

Main areas in e-commerce logistics operations	Negative effects	Positive effects
Transportation planning and management	<ul style="list-style-type: none"> – Increase in the number of inefficient deliveries (e.g. overnight deliveries by air/truck) – Increase in shipping needs in general (e.g. home delivery of chilled products) – Growth of van traffic – Unintended (failed) deliveries and handling of returns – Customers purchasing separate items from different websites, each requiring independent deliveries 	<ul style="list-style-type: none"> – Usage of low-carbon emission vehicles – Travel savings by shopping online instead of traditional in-store shopping
Warehousing (storage, picking and material handling)	<ul style="list-style-type: none"> – Both the large number of small deliveries and the handling of customer returns lead to additional warehousing operations and increased complexity of picking and packaging activities 	<ul style="list-style-type: none"> – Tendency towards large warehouses leads to a reduction in total average inventory levels and, therefore, reduced emissions and environmental impacts

Main areas in e-commerce logistics operations	Negative effects	Positive effects
Packaging	<ul style="list-style-type: none"> – Individual packaging needed to ship a few products directly to customers – Additional protective packaging needed to deliver products by express courier (a notable exception occurs when physical products are replaced by digital downloads) 	<ul style="list-style-type: none"> – Reduced usage of shopping bags by customers in conventional stores
Distribution network design	<ul style="list-style-type: none"> – Orders made up of a very limited number of pieces delivered directly to customers' homes or work – Additional problem of managing missed deliveries if the customer is not at home at the time of delivery 	<ul style="list-style-type: none"> – Large central warehouses preferred over local distribution centers, leading to reduced unit energy consumption and emissions – New delivery options identified and recommended, e.g. pick-up points and parcel lockers – located at junctions or crossing points, allowing customers to collect products previously ordered online, with no need for express couriers to perform multiple deliveries, thus reducing total travel distances

Source: own elaboration based on Mangiaracina, Marchet, Perotti, Tumino [2015], pp. 575–578.

Besides the economic and social aspects of logistics, there are also crucial environmental issues (see Table 4). Environmental corporate social responsibility is one of the elements of e-customer welfare and positively impacts service level as well as customer loyalty [Rashid, Rahman, Khalid, 2013]. Environmental effects may be derived from different factors, such as intense information technology usage, redesign or use of additional packaging, or physical distribution of products (including transportation planning and management, warehousing and distribution network design) [Mangiaracina, Marchet, Perotti, Tumino, 2015].

Improvement of Communication Tools in E-Customer Logistics Service

Support tools in logistics service aim at meeting e-customer requirements, cost-cutting, and increasing efficiency. They refer to the planning and completion phases and

the analysis of communication activities on the e-market. Their implementation results in a variety of benefits and also in certain constraints (see Table 5).

TABLE 5. Advantages and disadvantages of e-customer communication tools

E-customer communication tool	Advantages	Disadvantages
Marketing automation	<ul style="list-style-type: none"> - Increases the number and quality of interactions with the customer by processes automation - Increases service attractiveness and the number of transactions by providing dedicated content and offers to the customer 	<ul style="list-style-type: none"> - Complexity of the events configuration and channels of customer service
E-mail	<ul style="list-style-type: none"> - Wide accessibility - Comfortable service also for non-digitally literate customers - This form of communication is culturally rooted 	<ul style="list-style-type: none"> - Difficulties in the case of plural terminals of customer service – need for configuration and synchronization of e-mails with CRM and ERP systems - Vulnerable to cybercrime
Contact form on a website	<ul style="list-style-type: none"> - Enables receiving a message from the customer at any time (impression of non-stop accessibility) 	<ul style="list-style-type: none"> - Requires a thorough structure and form - If poorly designed, can discourage users or even make them unable to provide essential information (e.g. in the form of graphic attachments)
Live chat	<ul style="list-style-type: none"> - Quick form of contact, joins advantages of synchronized and asynchronous communication - Engages users - Wide scope and potential influence thanks to high popularity 	<ul style="list-style-type: none"> - Requires constant presence of personnel - High costs
Helpline VoIP, videoconference	<ul style="list-style-type: none"> - Quick synchronized contact - Low cost - Voice transmission (including video) provides opportunity for negotiation 	<ul style="list-style-type: none"> - Requires service - In more complex cases requires correspondence with the customer
Integration of communication via social channels	<ul style="list-style-type: none"> - Possibility of meeting dedicated customer expectations - Providing customer data 	<ul style="list-style-type: none"> - Requires improving the process of communication integration from various channels (especially in the case of plural terminals of customer service) - There is a risk of inefficient and negatively assessed customer service due to losing track of customer service history or contradictory messages

Source: own elaboration based on interview with the CEO of digital media agency Eura7.

To improve communication tools in e-customer logistics service it is necessary to consider customer needs and expectations. The CEO and public relations manager of digital media agency Eura7 emphasize the role of real time and current information about the realization of service or order completion and treat them as key competitive elements. E-customers expect that the time of online order completion will be comparable to the time of going to the shop, purchasing and picking up goods. This is the basic condition of the online shopping service quality assessment. The emphasis is placed on on-time order completion. On the other hand, the company digital media agency Eura7 pays attention to the fact that contractors put the greatest pressure on service production costs and time of e-commerce service design, discounting aspects of its effectiveness. It is worth noting that cost and time of improvement through tests and analysis of particular processes are an investment in excellence.

According to our interviews, in business practice in Poland, internet browsers create the basic competitive environment in e-commerce. Consequently, improving both structure and service content should be considered the most important factors for attaining the desired content. Optimization efforts aim at reducing the costs of additional positioning services or purchasing of advertisements in browsers. J. Nielsen pinpointed ten general principles for interaction design:

- visibility of system status by correct and actual information and feedback within a reasonable time;
- match between system and the real world through efficient communication;
- user control and freedom due to functionality, e.g. clearly marked “emergency exit”;
- consistency and standards of platform conventions;
- error prevention and information on potential problems before user actions;
- recognition rather than recall according to platform visibility;
- flexibility and efficiency of use;
- aesthetic and minimalist design focused on easily visible and necessary information;
- assistance for users in recognizing, diagnosing and recovering from errors; and
- maintenance of instantiated documentation [Nielsen, 1995].

Another aspect of improvement involves providing full functionality of www e-commerce service on mobile devices, where interface size is an impediment. Fulfilling this requirement is linked to the necessity of improving programming preparation, design of information architecture and user experience. As mobile devices integrate www service functions with others, such as geolocation and voice calls, it provides additional opportunities of building usability and providing the quality of e-commerce service.

Contractors of e-commerce services often fail to fully exploit the potential of analyzing and optimizing processes on websites. They can employ both analysis of user movements, structure optimization, and data visualization in terms of improving purchases (including purchase decisions) and accelerating uploading and functioning of service. Approximately one quarter of internet users leave websites that take more than 4 seconds to upload, as

page uploading speed significantly influences the level of conversion [Nielsen, 2011]. Bounce rate also plays an important role in the analysis of user behavior. It encourages purchase decisions, e.g. by offering free goods and cost optimization by repeating customer behavior models and correcting the positioning of additional incentives.

Possible Areas to Improve E-Customer Logistics Service

Continuous improvement of e-customer logistics service concerns the different areas presented in Table 6. Conclusions are based on a literature review and our own experience.

TABLE 6. Main areas in searching for excellence in e-commerce logistics service

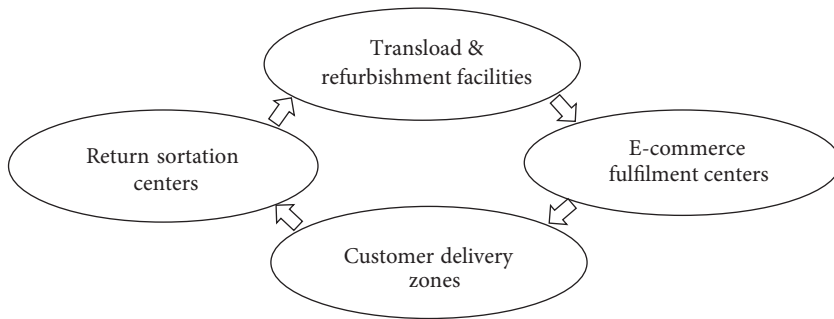
Main logistics operations areas	Possible aspect to improve	Effect of improvement
Transportation planning and management	<ul style="list-style-type: none"> – Consolidation of different shipments – Routing – Forecasting customer deliveries and returns – Reduction of transport cost – Reliability of shipment 	<ul style="list-style-type: none"> – Reduction of inefficient traffic – Optimization of inventory management – Meeting e-customer expectations
Warehousing (storage, picking and material handling)	<ul style="list-style-type: none"> – Accuracy of distribution model in terms of complexity and costs – Picking (automation, costs, efficiency) – Inventory optimization 	<ul style="list-style-type: none"> – Minimization of the total costs of returns management as well as variable and fixed operating costs
Packaging	<ul style="list-style-type: none"> – Box and size of package 	<ul style="list-style-type: none"> – Meeting e-customer expectations – Reduced costs of transport, warehouse cost e.g. storage space
Distribution network design	<ul style="list-style-type: none"> – Challenge of “shipment to door” – Replenishment optimization – Challenge of efficient movement of large volume of goods for a single item 	<ul style="list-style-type: none"> – Meeting e-customer expectations – Optimization of inventory management

Source: own elaboration.

The increasing costs and responsibilities related to dealing with return processes, as well as the significance of return policies to customers, became the basis for the study of a closed-loop distribution model that embraces forward and reverse logistics. The distribution network model designed by Salema, Prova and Novais, integrates both strategic (facilities and location) and tactical (production, storage and distribution) factors [Gessner, Snodgrass, 2015]. The “strategic-location-allocation” model has been proposed based, on the results of studies conducted in Spain and Portugal in 2009. It optimizes profits across

the network, which is presented in Figure 4. Products manufactured in factories can be sorted and then transported to different fulfilment centers. Packaging is very important; its size can be optimized to reduce logistics costs. The perfect location optimizes a storage cost or a unit production cost. Merchandises are then delivered to customers (delivery zones of parcel services) or re-delivered to sortation centers in the case of returns.

FIGURE 4. Distribution network model developed by Salema, Prova and Novais



Source: Gessner and Snodgrass [2015], p. 7.

E-fulfilment services centers seek to optimize value, technology and client satisfaction. Shipwire, an Ingram Micro company, is a leader in the e-commerce technology market and provides e-commerce fulfilment services, shipping software and cloud-based logistics from warehouses in North America, Europe, Asia and Australia [Shipwire, 2014]. Shipwire's industry-leading logistics platform helps to optimize e-customer logistics service by eliminating the hassles of shipping and storage. Online sellers send their products to one of Shipwire's warehouses and instantly connect Shipwire to their online store or marketplace. This web-based logistics platform allows seamless connections with Shipwire facilities in local and international distribution systems.

In order to meet e-customer requirements, increase sales and lower costs, Shipwire proposes the following practices:

- automated lot breaks (minimizing handling costs by having automatically break up master cases into individual items),
- freight shipping options (less-than-full and full-truckload options),
- cross-docking (simultaneously shipping products to retailers and customers or shipping out pending backorders as soon as they come in),
- consolidating and staging product (for international orders, holding product and reducing costs in warehouses before freight shipping),
- purchase order management (specifying different packaging and shipping preferences and connectivity for each retailer) [Shipwire, 2015].

According to Shipwire, apart from intelligent routing and professional packaging, areas that could be improved include: shipping confirmation by detailed e-mail sent out automatically, customizing specific labels on each package, personalizing inserts, providing real-time rates to customer, receiving tracking numbers as soon as the warehouse ships orders, and editing and cancelling orders [Shipwire, 2015].

Measurement of Excellence in E-Commerce Logistics Service

Excellence in customer service is a difficult strategic decision, due to the costs of providing it. Ensuring an acceptable and satisfactory level of customer service requires continuous, systematic monitoring of specific indicators and metrics. Generally, one may point out various trade indicators that are in line with these used in other business areas as well as traffic indicators for e-commerce used for all websites. Among numerous indicators, the most important are:

Trade indicators that are in line with these used in other business areas:

- average order value of individual transactions,
- average margins on individual transactions,
- abandoned order values (the percentage of transactions that have not occurred),
- marketing costs per individual transaction (the comparison of this indicator with average margins informs the profitability of marketing activities),
- customer life value (purchase values in a unit of time multiplied by the expected loyalty period).

Traffic indicators for e-commerce used by all websites (and not only business ones):

- number of visits in website stores in a unit of time,
- number of individual users who visited website stores in a unit of time,
- transaction volume in relation to the above-mentioned indicators informs the quality of visits and marketing communication,
- rejection ratio as a percentage of visits finished immediately after entering the website, which may indicate inefficient marketing activities or service design and errors.

Evaluation might include all three phases: pre-transaction, transaction and post-transaction (see Table 7).

TABLE 7. E-customer logistics service indicators

Phase	Customer service indicator
Pre-transaction	<ul style="list-style-type: none"> • Service level resulting from inventory (according to the number of deliveries, orders, and delivery volume) • Availability of product affinity (which products are purchased together)

Phase	Customer service indicator
Transaction	<ul style="list-style-type: none"> • Time of answer to the special request • Time of order confirmation • Time of realization • Flexibility (readiness to achieve non-standard delivery realization) • Quality and quantity delivery accuracy • Delivery terms and conditions accuracy
Post-transaction	<ul style="list-style-type: none"> • Time for giving information to the customer about extraordinary occurrences • Complaint indicator according to the number of deliveries, items of deliveries, delivery volume, quantity and quality test • Returns volume • Returning visitors versus all visitors

Source: own elaboration.

Conclusions

The article describes the evolution of distribution systems of direct deliveries from suppliers or wholesalers (in the 1970s) to the current e-fulfillment distribution network, multichannel and omnichannel strategy. Moreover, it identifies the most important benefits for Polish e-customers; namely, 24/7 availability, no physical distance, the ability to compare competitive offers, and lower price points than those offered in traditional channels.

E-commerce creates new opportunities, but also challenges, as the development of online channels must be matched by a similar evolution of a company's logistics system, which should also meet environmental requirements. Numerous good practices in each phase of e-customer logistics service – such as efficient interactions that enhance customer's satisfaction while reducing a company's communication costs – present advantages and disadvantages. Therefore, their application hinges on manager priorities and the communication model adopted by the company.

The article points out several e-customer service logistics aspects that need careful management, and also proposes e-customer service logistics indicators as a way to continuously monitor (as a means to systematically improve) e-customer service levels. We hope our findings will be useful to managers in the rapidly developing and highly competitive e-commerce business.

At the same time, we recognize certain limitations to the study, such as the small number of case studies discussed, and encourage other authors undertaking further research to include such topics as reverse logistics, the application of breakthrough technologies, and 3D printing.

Notes

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