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**COMPLEX CUSTOMERS SERVICE IN SUPPLY CHAIN
MANAGEMENT: LOGISTICS AND MARKETING PERFORMANCE**

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***Abstract:** The main elements of the formation of a supply chain management system, such as logistics and marketing, are considered by the authors. Their role in the formation of supply chains is analyzed. An analytical assessment of their significance is given. The authors systemized many quantitative and qualitative metrics and indicators of logistics and marketing performance, logically structured them and pointed out the possibility of their systemic application. The author's scheme has been created that reveals the role of logistics and marketing in the formation of Complex Customer's Service. An example of an integrated assessment of the efficiency of a supply chain system with an implemented assessment of logistics and marketing is given.*

***Keywords:** supply chain, supply chain management (SCM), marketing, logistics, performance indicators, Complex Customer's Service, scheme, modern e-tools*

INTRODUCTION

As global markets worldwide are rapidly growing, customers dictate new requirements with respect to supply chain services. The new Complex Customer Service in supply chains forces industrial suppliers, retailers, wholesalers, and logistics providers to negotiate processes across the systems and stakeholders in the supply chains. Advanced software as a service for SCM provides real-time control over planning and execution. It incorporates consumers into business supply chains shifting accent to the quality service management. As well, nowadays, SCM is more interesting in value capture versus value creating, since it is shortening business cycles from the projecting point (business start-ups) and new product sets up to results receiving.

The main accent is stressed under the necessity to develop high-developed logistics and marketing performance. That is the research branch for our article. Thus, the aim of the article is describing the main metrics and indicators, influencing logistics and marketing performance when creating effective supply chains.

METHODOLOGY

General scientific methods have been applied in our research, such as:

(a) *methods of theoretical recognition*: formalization and systematization of the scientific literature on the research problem, deductive method, method of scientific abstraction;

(b) *general logical and structural research methods*: an economic analysis of existing scientific researches and the content-analysis of documentation, a generalization of results, a systematic approach to integrate a wide range of metrics influencing logistics and marketing performance in supply chains.

RESULTS

Logistics is seen as a process of strategically managing the procurement, inventory movement for materials, semi-materials and finished goods (and the related information flows) through the company and its marketing channels in such a way that current and future profitability are maximised through the cost-effective fulfilment of orders (Christopher, 2011). Thus, logistic tasks are to optimize goods and services flow based on information flow (internal and external). The scientist has distinguished some features dominating in today's business chains that should take under consideration. First, the new competition type service-based instead of product-based, very short delivery cycles (agile), creation of multiple competitive advantages based on product-oriented processes perfectness. Second, deepening interdependence, digitalization and globalization of large businesses worldwide interested in global sourcing and global selling in order to capture global markets, huge tendency of multinational corporatization (national companies go to serve only specific, local demand), JIT-delivery competition. Third, overcapacity and total overproduction, oversupplying led to downward pressure on price, boundless information due to the extremely high Internet penetration rate make easy price comparability. All of mentioned has resulted in re-orientation from product-centred to client-centred business based on the customers' value consciousness, customers' taking control and personified quality service.

Christopher (2011) and Reihl (2016) have structured the customer service complex into the three phases pre-transaction (including feedbacks consideration on company's service policy, inspection and audit of an adequacy of firm's organizational structure and service system flexibility); transaction (including product and JIT-delivery reliability); and post-transaction (including customers' while product use, warranty, repair service, procedures for customer complaints and product replacement). Reihl has indicated the current importance of the modern e-tools (e-planning, e-distribution, e-commerce and e-finance).

Our authorial view is summarized in *Figure 1*.

<i>Fragmentation</i>	<i>Consolidation</i>	<i>Integration</i>	<i>Value capture</i>	<i>Digitalization</i>
Demand forecasting	ERP		SCM	
Sourcing				
Procurement	warehousing		Information	
Production planning				
Materials inventory	material handling packaging	Logistics	Technologies Marketing/ Sales	E-planning E-distribution E-commerce E-finance
Warehousing				
Material handling	MRP		Strategic Planning Financing	
Packaging				
Goods inventory	Distributional			
Distribution Orders				
processing	Focus			
Transportation				
Customer service				

Figure 1: From traditional to modern business supply chain

Source: summarised by authors according to Christopher (2011); Reith (2016)

As it has been noted by Stevenson (2011), an integrated supply chain to reach a balance between high customer service and cost is based on the strategy synchronizing the requirements of the final customer with the flow of materials and information. Customer service is the result from the combined efforts of all supply chain elements and their functions, both internal and external to the company. Customer service is treated as an intermediate performance outcome and financial performance is viewed as the final performance outcome.

Vickery, Jayaramb, Droge, & Calantone (2003) have remarked that customer service is a conglomeration of individual services whose importance differs from one business to another. In their model, they considered dimensions of service performance both general and specific referring to a manufacturing context. The key customer service performance indicators are pre-sale customer service, product support (or post-sale customer service), responsiveness to customers, delivery dependability, and delivery speed. Customer service element is an essential resulting part of SCM from the point of value capturing and providing time and place utility through the distribution systems and its Multi- and Omni-channels. A key indicator of customers'

satisfaction is achieving the *demanded availability* that can be become complicated because of various factors impact like delivery frequency and reliability, stock levels and the order cycle time.

Vickery, Jayaramb, Droge, & Calantone (2003) developed model that helps to measure customer's service performance based on four clustering with subordinating metrics. It includes integrative information technologies (integrated electronic data interchange, integrated information systems, computerized production system); supply chain integration (supplier partnering, closer customer relationships, cross-functional teams); customer service (presale customer service, product support, responsiveness to customers, delivery speed, delivery dependability); financial performance (pre-tax return on assets, return on sales, return on investment).

Lin, Chang, Chen, & Xin (2003) have offered to measure service customer performance based on such indicators as customer order volume and frequency, average shipping time, delivery efficiency, customer backorders, time needed to fulfil backorders, margin breakdown for individual customers and products.

Maklan, S., & Klaus, P. (2011) has proposed customer service assessment via two-level model, showing explanatory customers experience, satisfaction and loyalty via such indexes as peace-of-mind, outcome focus, moments-of-truth and product experience, which they measured via special surveys. However, verbal indicators are qualitative and subjective; they have to be summarized by using regression dependence with a special verification.

Total picture, which is normally used for a complete assessment of the customer service performance, is given by Marr (2012), who justified all metrics and structured them in a logical way.

Described indicators reflect commonly used approach that can be used by any business to measure customer service and marketing affords numerically in a supply chain. It basically includes the main feedbacks on customers' service via prism of ordering-completing-delivering-supporting processes by means of available transportation and distribution channels. All indicators are structured according to the proposed quality-time-finance-productivity approach (*Table 1*).

Table 1

Customers service performance indicators (CSPI) by functions

Indicator	Definition	Formula
	<i>QUALITY</i>	
Churn rate	Acquiring customers, calculated as the number of customers who left in a defined period of time (LC) divided by the average number of total customers during the same period (TCB)	$\frac{LC}{TCB}$

Table 1: continued

Customer retention rate	The percentage of customers that continue using your product over a period of time (TCB), calculated as the existing customers (EC) at the end of the period minus newly acquired customers (AQ) during that period over existing customers at the beginning of the period	$\frac{EC - AC}{TCB}$
Percentage of returns	This indicator measures the percentage of returned goods (RP), out of all sales placed during a defined period of time TS	$\frac{RP}{TS}$
Customer satisfaction score	Estimated by scoring the customer satisfaction with the product using 10-scaled choice. Explanation is shown in the index below.	Grading clients
Net promoter score	This indicator focuses on uncovering customer loyalty by asking only one question <i>'How likely are you to recommend us to other customers?'</i> Each time a customer responds to this question with a 10-scaled choice, the answer is segmented by criteria: Promoters (9-10): They are repeat clients and will have a high customer lifetime value. The more Promoters, the healthier your business. Passives (7-8): The customers are satisfied, but likely to switch to a competitor if they find a new/ better/ cheaper product. Detractors (0-6): The customers are unsatisfied and likely to damage reputation by sharing their negative experience with the product	Scaled 1-10 Grading clients
On-time delivery	Number of customers orders delivered on time (CODT) divided by the total number of orders (TCO)	$\frac{CODT}{TCO}$
Customer lifetime value	This indicator measures the amount of revenue customers contribute to the business for as long they are clients, calculating as the total earned revenue from a customer (CR) multiplied with the length of the business relationship (t) with deduction the initial cost of acquiring them (ICA)	$CR \times t - ICA$
	<i>TIME</i>	
On-time delivery	Number of customers orders delivered on time (CODT) divided by the total number of orders (TCO)	$\frac{CODT}{TCO}$
Products lead-time	The time it takes from buyer order (TB) to seller (TS) ship goods	$TS - TB$
First response time	Duration of the time customer gives a feedback on the product	Days, weeks
Average resolution	Duration of resolution for the customer issue	Days, weeks
	<i>FINANCE</i>	
Total service cost	This indicator is used to calculate the country's costs related to supply planning (SP), supplier management (SM), and procurement execution (PE) over a defined period of time	$SP + SM + PE$

Table 1: continued

Ratio service cost in total cost	This indicator measures the percentage of customer service costs (CSC) in total costs (TC)	$\frac{CSC}{TC}$
Cash flow growth rate	It is monetary flow coming from purchases (CF) measured as a percentage increase/decrease during a defined period of time	$\frac{CF2 - CF1}{CF1}$
<i>PRODUCTIVITY</i>		
Product fill rate	This indicator measures a quantity of goods shipped on time (GOT) in a total quantity (TQ) of consumers orders' during a defined period	$\frac{GOT}{TQ}$
Shipping time / Shipping frequency	Time spent by seller to deliver products to the customer Times order's requests fulfilment in a defined period of time	Days counted, Times counted
Customer engagement rate	This indicator measures tracking the number of clients who are actively purchasing (AP) the product over a certain period as a proportion of all purchasers during that same period (TP)	$\frac{AP}{TP}$
Customer complaints rate	This indicator shows the proportion of customers complaining (CC) about the product over total number of transactions (TP)	$\frac{CC}{TP}$
Logistic manager productivity	This indicator measures performance of logistic managers involved in supply chain support in the distribution and service sub-divisions, it is calculated as a monetary sum of all contracts (CS) signed with customers during a defined period of time	Contracts signed

Source: completed by authors according to Lin, Chang, Chen, & Xin (2003); Vickery, Jayaramb, Droge, & Calantone (2003); Aronovich, Tien, Collins, Sommerlatte, & Allain (2010); Marr (2012)

As soon as today logistics is impossible without several of transportation types, it worth to classify transport/distribution performance indicators, as nowadays they are the part of supply chain creation (*Table 2*).

Table 2

Distribution/Transportation performance indicators (DPI/TPI) by functions

Indicator	Definition	Formula
<i>QUALITY</i>		
On-time arrivals	This indicator measures the percentage of shipments arriving on time (SAOT) for a set delivery (TSD) date during a defined period	$\frac{SAOT}{TSD}$
Shipments where quantity dispatched is quantity received	This indicator measures the percentage of shipments where the correct items and quantity of products dispatched with the vehicle (QDQR) match the amount received during a defined period of time	$\frac{QDQR}{TSD}$

Table 2: continued

Percentage of shipments arriving in a good condition	This indicator measures the percentage of shipments arriving without damage (punctures to the package, crushed package; or exposure to water damage, direct sunlight) during a defined period of time (AWD)	$\frac{AWD}{TSD}$
Kilometres between accidents	This indicator measures the average number of km between vehicle accidents by a specific driver, vehicle, or route during a defined period of time as total kilometres driven over number of accidents (A)	$\frac{KM}{A}$
Time between accidents	This indicator measures the average amount of time between vehicle accidents by a specific driver, vehicle, or route during a defined period of time as total time driven (T) over number of accidents (A)	$\frac{T}{A}$
	<i>TIME</i>	
Average delivery time	This indicator measures the average transit time (hours or days) from when a shipment leaves a facility until it arrives at its destination, for a specified warehouse, distribution point, region/district, vehicle, or route during a defined period of time (TTH) over number of shipments	$\frac{TTH}{TSD}$
Average vehicle loading/unloading time	This indicator measures the average amount of time it takes to load or unload a vehicle (TLU) at each pickup/delivery location by driver, type of vehicle, carrier, route, or location during a defined period of time	$\frac{TLU}{TSD}$
Vehicle turnaround time	This indicator measures the percentage of time (hours/days) spent idle between a vehicle's arrival at a facility and its departure inclusive of loading/ unloading time (NAD), during a defined period of time (TSI)	$\frac{TSI}{NAD}$
	<i>FINANCE</i>	
Total transportation cost	This indicator measures the sum of all transportation costs related to a specific driver, type of vehicle, carrier (outsourced), route, or region/ district/facility during a defined period of time; including inbound and outbound transport, fuel, tires, maintenance, acquiring and staffing a fleet, or freight bills	Sum of transport costs
Average transport cost per km/volume/ weight	This indicator measures the average transportation cost per kilometre (km) or volume or weight (as relevant/appropriate) related to a specific driver, type of vehicle, route, region/district/facility, or carrier (outsourced) during a defined period of time; including inbound and outbound transport, fuel, tires, maintenance, acquiring and staffing a fleet, or, if outsourced, freight bills	Sum of transport costs $\frac{costs}{KM}$

Table 2: continued

Ratio of transport cost to value of product	This indicator measures the ratio of all transportation costs related to a specific driver, type of vehicle, route, region/district/facility, or carrier (outsourced) to the total value of product shipped (TVPS) during a defined period of time. Transportation costs include inbound and outbound transport, fuel, maintenance, acquiring and staffing a fleet, or freight bills	Sum of transport <u>costs</u> TVPS
<i>PRODUCTIVITY</i>		
Vehicle use availability	This indicator measures the amount of time a vehicle was available for use (TAT) during a defined period of time because it was out of service	<u>TAT</u> 365
Container capacity utilization	This indicator measures the percentage of vehicle/container capacity (TCU) used out of the maximum available by weight or volume (Max)	<u>TCU</u> Max
Fleet Yield	This indicator measures the average quantity of products by case or kilogram delivered (TQD) per person-hour (part- and/or full-time staff) during a defined period of time (PH)	<u>TQD</u> PH
Average number of stops per route	This indicator measures the average number of stops for deliveries per route (NS) in a given region/district (NR) during a defined period of time	<u>NS</u> NR

Source: completed by author according to Stevens (1989); Vickery, Jayaramb, Droge, & Calantone (2003); Aronovich, Tien, Collins, Sommerlatte, & Allain (2010); Christopher (2011)

According to Levitt, T. (2004), 'sustained growth depends on how broadly you define your business – and how carefully you gauge your customers' needs, because people don't buy products, they buy benefits'. Definitely, goods must fit a certain quality, features, technology, but the service surround (delivery lead-time and flexibility, reliability, after-sales support) are twice significant. Traditional '4P' marketing mix place importance on capturing customers (Kotler, 2002). However, Reith (2016) ascertained that keeping customers and building up a strong relationship is more important due to their loyalty and involvedness (lifetime value creation). For this reason, the focus of a supply chain has to be on the customer needs (demand chain management) and therefore designed from the customer backwards (JIT-strategy). The impact of customer service based on SCM on marketing company's effectiveness is displayed below (*Figure 2*).

Kozlenkova, Hult, Lund, Mena, and Kekec (2015) have proved, SCM has a major impact on the company's manufacturing, and as a result, its financials and can alter the cash flow or ROI significantly. Nevertheless, many firms target profit-maximization and forget about the capital employed.

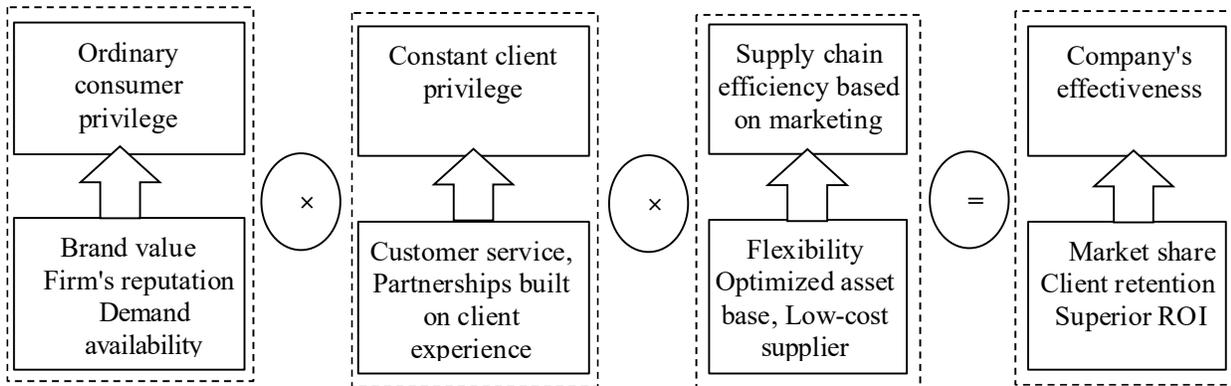


Figure 2: The Complex Customer Service and Logistics on Effectiveness

Source: summarised by author according to Kotler (2002); Levitt (2004); Christopher (2011); Reith (2016)

The SCM functions of logistics, purchasing, and operations should serve as the coordinated and integrated input into the customer value-creating function of marketing channels. In their interpretation, marketing channels test an efficiency in the chain's relationship with end-customers. A value is developed along the participants, activity and resource links in the supply chain, but is assessed when customers buy goods. Within the context of creating end-customer value, it is worth to note that marketing channels, logistics, purchasing, and operations come perspective of what provides capturing value.

Summarizing all elements of a supply chain creating and capturing value due to satisfying needs and wants of customers via service and marketing, we have to conclude that the main task of SCM is to supply the demand in front of the background, when both risk and uncertainty of business environment lower the demand forecasting accuracy. All described performance metrics are oriented in retrospective, i.e. they are a set of recorded data in the past. Their analysis needs time and actions afterwards, even with the use of advanced software. That obviously leads to the lead lag in the procurement, manufacturing, sourcing and delivery of required goods (difference between the logistics lead-time and the customers' order fulfilment).

The large companies try to solve this problem by stocking based on forecasts, although a more cost-effective way proposes reducing the lead-time gap by approaching the logistics lead-time to the customers' order cycle due to the marketing influence. The best way to raise demand predictability by sharing information alongside the supply chain (between all links and managers involved in). In case of higher demand predictability and producing or delivering velocity that, a key point of lean strategy, the inventory costs and capacity can respond quickly by reducing.

Thus, it is important to orient SCM to anticipate the real demand and enable cost-effective adjustments with the help of digital advanced technologies. On-time and in-full deliveries with minimum inventory should be managed by means of demand marketing corrections, execution at stock keeping units (SKU) level based on demand and performance measurements (lead-time gap). Here, a very important role has the customers' involvedness and responsiveness to the products purchased.

CONCLUSIONS

Collaborative planning, forecasting and replenishment between the firms (buyer/supplier) should enable vendor-managed inventory. The supplier uses the information directly from the point-of-use or the point-of-sales making its shipping planning. The benefits of such integrated strategy will reduced capital invested, will optimize manufacturing, will reduce storage capacity, and as a result – will decrease costs (inventory, wastage, overtime, warehouse, transportation) and will increased value (availability, consumer satisfaction) that will rise sales and profits indeed. Thus, '4P' marketing mix should turn to '4R' SRM and to help supply chain managers with accomplishing future business goals. Responsiveness as a demand-driven concept will contribute an agility to react on the fast changes in a business environment and customers' needs and wants. Reliability as a ground in the production management will improve a supply chain reducing manufacturing process variability. Resilience as a key demand management concept and inventory management factor will fix the attitudes with supplier on the JIT-basis and will save a supply chain against of vulnerabilities. Relationships are the main point of integrating marketing strategy dedicated to the keeping strong collaborative partnerships on sourcing, procurement, warehousing, distribution, transportation, customers' feedback with all stakeholders alongside the supply chain that will lead to the 'win-win management' due to sharing, improved quality, reduced costs, integrated scheduling of the production and delivery based on the advanced usage of modern digital tools.

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