

# Quick Response Logistics in Retailing as an Information Technology Based Concept

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## Abstract

The concept of quick response logistics implies supply chain management strategy focused on increasing its efficiency. It is based on the implementation of modern information technologies, which should ensure a two-way flow of information between the participants. The concept of quick response logistics implies transformation of the traditional relationships, which were primarily based on individual interests to a partnership characterized by equality and cooperation of all the actors in supply chains. The aim of this paper is to point toward the benefits that the application of this concept provides, and which are reflected in the reduction of costs, inventory levels, number of errors, risk, order cycle, quicker flow of products, greater flexibility, better and faster response to consumer demand, etc. In accordance with this, the following research methodology was applied: a) The theoretical research identified the indicators of the quick response logistics concept, such as: implementation of modern information technology in logistics operations, electronic data and information exchange between the actors in supply chain, long-term and fair relations between the actors in supply chain; b) Empirical research was conducted on the market of the Republic of Serbia on a sample of 70 respondents from retail stores and logistics centres as the key participants in their supply chains. The basic hypothesis about the statistically significant impact of the identified indicators to the retailer's speed of response to consumers demand, reducing the time from order to delivery and accuracy of delivery in accordance with consumer's requests was tested. 3) On the basis of the conducted tests ways were identified to enhance and implement the concept of quick response logistics in retailing in the Republic of Serbia. The disadvantages of the research and recommendations for future research are given in the paper.

## Keywords

Quick response, logistics, supply chain, information technology, retail.

## Introduction

A modern customer has great expectations about the level of service received. Thanks to the information technology used, the customer is very well informed about the offered products, their characteristics, prices, supply chains, etc. Therefore, the customer is becoming increasingly demanding, picky, impatient, "spoiled". For this reason, participants in the supply chain must work together on providing a quick response to customers' changing demands. This issue is of particular importance in the economic segments where prod-

ucts rapidly become obsolete and where the product life cycle is short, such as the textile and apparel industry.

Logistics and logistics management, as an integral part of the supply chain management, include the processes of planning, implementation and control of the efficiency and effectiveness of transport and storage of goods (including services), as well as related information, from the point of origin to the point of consumption in order to meet customers' requirements (Council of Supply Chain Management Professionals, 2013). The significance of logistics is reflected in the

additional values that it generates for the participants in the supply chain, which are expressed in usability of time and location, because products and services have little or no value if they are not owned by customers when (time) and where (place) they want to consume them.

This is why the goal of quick response logistics is to shorten the time from the idea and design of product to the moment when the product will be found on retailers' shelves. The application of information technologies within the quick response logistics enables continuous updating of the latest information on customers' requirements in order to properly plan and implement potential orders.

### 1. Literature review

According to Fisher and Raman (1996), who were among the first to study the effects of applying the quick response concept, the goal of the strategy is to shorten the time from order to delivery (including production and distribution), being based on known methods, but putting emphasis on information technologies in improving logistics operations.

The Council of Supply Chain Management Professionals (2013) defines the concept of quick response as a strategy widely accepted by traders and manufacturers in order to reduce and eliminate retail risks of running out of stock, forced price cuts and reduced operating costs. Retail can achieve these targets by proper deliveries and shortening the response time.

According to Lawson (as cited in Lipol, 2015), the quick response concept implies responsibility and flexibility in the company's efforts to provide a diversified range of products and services by quantity, quality and price, at the moment and at the place requested by customers and where there is demand.

The quick response concept (Quick Response – QR) was developed in 1985 by the consulting firm in the United States - Kurt Salmon Associates (KSA). This consulting company was hired by the textile industry to investigate the causes of insufficient competitiveness of the domestic textile and apparel industry in relation to those abroad. Having identified activities that create value in supply chains, it was determined that 66 weeks were required to carry out all production operations and for product to reach the retailer's shelves. The production process required 11 weeks, while the remaining 55 weeks were the result of oversized inventories, primarily their

“delay” in warehouses. Inefficient management of activities within supply chains resulted in losses of \$ 25 billion, or 20% of the total turnover of the industry.

Having identified high inventory costs as the main generator of losses, *Voluntary Interindustry Commerce Standards Association – VICS* was established by textile, apparel and retail industry in 1986 in the United States. These industries teamed up with the goal of simplifying supply chains and improving the supply of apparel items at the right time and at the right place, in a variety of products and lower prices. Particular attention was paid to the application of industrial standards in information technology (e.g.: barcodes, POS terminals, electronic data exchange, labelling of transport containers, rolls, etc.) and contract procedures.

It is very important to note that VICS and GS1 US, as two leading organizations in setting standards for supply chains in many industrial sectors, merged on 10<sup>th</sup> September 2012 (GS1 US, 2017). GS1 US, as a member of GS1, is an organization that delivers information standards and, in cooperation with industry, seeks to solve problems in supply chains through the establishment, adoption and implementation of GS1 standards. Benefits are achieved thanks to the GS1 global unique numerical and identification system, bar codes, electronic product coding, data synchronization and electronic information exchange.

GS1 US-VICS integration was created in order to provide, by joint forces, among other advantages, a platform for stimulation and implementation of innovations and new ideas in the segments of retail and logistics. Direct access to the standard-setting process and technical expertise needed for supporting responsible implementation and use of technologies in supply chains will in the long-term positively affect the retail financial results and the service package that it provides to customers.

Although introduced in apparel industry, the quick response concept has a wider application in different segments, as it allows the participants in the supply chain to have many advantages, such as: establishing long-term business relationships based on trust, reducing inventory, increasing product sales revenue, satisfying level of service, etc. (Jovanović, Vasiljević & Ilić, 2009).

### 1.1. Application of information technology in quick response logistics

The collection, flow and use of information about goods and its movement are one of the most important elements of successful business, both retail and other participants in supply chains. Timely and accurate information positively affects the speed, transparency and control of logistics operations. On the other hand, a large amount of information can cause difficulties in the decision-making and management processes if an appropriate information system has not been implemented.

Time management, being first in the marketplace and responding quickly to changing customer's demands, is a powerful weapon of competitiveness that affects the increase in profits and revenue. A quick response concept, as a strategy that basically involves focusing on a factor of time, includes all the activities of a company along the supply chain, from shortening development time (shorter and more frequent production cycles), more efficient transport and delivery (accelerating the flow of information and goods through the increased use of information technology) to retail (Birtwistle, Siddiqui, & Fiorito, 2003). It is therefore very important that the participants are equipped with information technology that will enable them to exchange accurate and timely information.

Quick response (Council of Supply Chain Management Professionals, 2013) is a partnership strategy where suppliers and retailers are looking for ways to respond quickly to customers' demands by sharing data from POS terminals to provide better forecasting of their needs for goods. The quick response concept can also refer to bar codes that are commonly used to transmit information and web links about products or services in promotional literature. With the development of information technology, the challenges and chances in applying the quick response concept are becoming increasingly complex nowadays; however, the benefits that the participants in the supply chain can achieve by implementing the quick response concept are significant.

Applying the quick response concept, retailers are committed to providing suppliers with data on sales, while suppliers commit themselves not to disclose confidential information and to use them solely in accordance with the needs of a particular retailer. Consequently, the concept of quick response implies changing the retailer's relation to suppliers, since retailers did not share such de-

tailed and confidential information before (Fiorito, May, & Straughn, 1995). Relationships between retailers and other participants in the supply chain include an equal partnership and cooperation based on trust.

**Table1** Technological and organizational phases of quick response development (Fernie & Sparks, 2014)

Phase	Introduction of basic quick response technologies
1	Stock Keeping Unit (SKU) Level Scanning Japanese Article Number (JAN) Standard Barcode Use of Electronic Data Interchange (EDI) Use of Standard Electronic Data Interchange (EDI)
Phase	Internal process reengineering via technological and organizational improvement
2	Electronic Communication for Replenishment Use of Cross-Docking Small Amounts of Inventory in the System Small Lot Size Order Processing Automatic Replenishment Program Just-in-time (JIT) Delivery Shipping Container Marking Advanced Shipping Notice
Phase	Realization of collaborative supply chain and Win-Win relationship
3	Real-time Sales Data Sharing Stock-out Data Sharing Quick Response (QR) Team Meets with Partnerships Material Resource Planning

## 2. Methodology

### Aim of the research

The aim of the research is to examine the contribution of indicators: implementation of modern information technologies in logistic operations, electronic exchange of data and information between participants in the supply chain, long-term and fair relations between the participants in the supply chain, to the application of the quick response of retail to customers' requirements, i.e. shortening the time in the supply chain from order to delivery of goods, as well as the timeliness of delivery in accordance with the customers' requirements.

### Research hypotheses

In this research, it was assumed the indicators contribute to the effective implementation of the quick response concept in the retail sector in the entire territory of Serbian market. The main research hypothesis reads:

H<sub>1</sub> – Indicators: implementation of modern information technologies in logistics operations,

electronic exchange of data and information between participants in the supply chain, long-term and fair relations between the participants in the supply chain, statistically significantly contribute to the implementation of the quick response concept in the retail sector of the Republic of Serbia.

### Variables

Several variables have been included in the research, on the basis of which the hypothesis would be confirmed or rejected: a) independent grouping variable: region of the Republic of Serbia (Vojvodina, City of Belgrade, Central-South Serbia); b) independent variables of the interval type of measurement: Implementation of modern information technologies, Electronic exchange of data and information between market entities and long-term and fair relations between the participants in the supply chain, and c) dependent variable: the quick response concept and delivery timeliness in accordance with the customers' requirements.

### Measuring instruments

A retailer belongs to a specific group or region on the Serbian market depending on the region in which the subject retailer operates: Vojvodina, City of Belgrade, and Central-South Serbia. The assessment of independent variables, i.e. indicators that influence the quick response concept in the delivery of consumer goods, was performed by a questionnaire containing 9 Likert-type items. Respondents were supposed to express their agreement with them on a five-step scale (*from 1 to 5 please assess how the mentioned indicator affects the application of the quick response concept and timeliness of delivery according to customers' requirements*). Based on the initial set of items, three dimensions are formed - implementation of modern information technologies, electronic exchange of data and information between market entities and long-term and fair relations between the participants in the supply chain.

### Sample

The research involved 70 respondents who, on behalf of retailers and logistics centres in which they work, evaluated the indicators of application of the quick response concept in the Serbian retail sector. Retailers and logistics centres covered by the survey are operating in the territory of Serbia, such as: Idea, Dis, Gomex, Maxi, Delta Logistic Transport, etc. Out of the total number of respon-

dents, 80% came from the Vojvodina and Belgrade regions, while 20% of the respondents were from Central-South Serbia. The representation of individual regions is given in Table 2.

**Table 2** Participation of respondents by regions

Region	Number	Percentage
Vojvodina	30	42.8
City of Belgrade	26	37.2
Central-South Serbia	14	20.0
TOTAL	70	100.0

### Procedure

The research involved people from the middle management level in the subject companies. The companies were contacted via e-mail explaining the purpose and nature of the research. After they confirmed their participation, they were provided with an on-line questionnaire. Filling in the questionnaire was anonymous.

### Statistical data processing

The data collected in the research were processed with the SPSS 20 statistical package. The obtained dimensions and responses from the respondents were described by descriptive statistics. Average values, as well as deviations for each dimension, were presented. The contribution of independent variables to the description of the quick response concept in the retail sector was examined by a multiple regression analysis.

## 3. Results

Descriptive statistics describe to what extent respondents agree that these indicators influence the implementation of the quick response concept in the retail sector in the Serbian market. Score 1 expresses the least agreement, while the grade 5 expresses the highest agreement. Descriptive indicators are given in Table 3. It is obvious that the respondents show highest agreement with the indicator implementation of modern information technologies ( $M=4.85$ ), and they least agree with the item long-term and fair relations between the participants in the supply chain (2.85). In addition to these descriptive indicators in Table 3, descriptive statistics for the variable are presented – the concept of quick response and delivery timeliness in accordance with the customers' requirements.

**Table 3** Descriptive indicators of the examined indicators

	Min.	Max.	Arithmetic mean	Standard deviation
Implementation of IT	3.00	4.88	4.8455	.48500
Electronic exchange of data and information	2.00	4.67	3.9923	.53669
Long-term and fair relations of the participants	1.25	3.25	2.8512	.64179
Quick response concept			3.8343	1.13436

Multiple regression analysis was applied to examine the impact and correlation between the mentioned group of indicators and the quick response concept. First, the overall sample will be used for testing, and then the sub-samples (regions). Enter method was applied on the entire sample, in which all independent variables were included together in order to predict the dependent variable. The obtained results indicate that the regression model is statistically significant ( $F(70,3) = 4.20, p < 0.001$ ). The set of examined indicators statistically significantly predicts the concept of quick response in the retail sector, as well as the timeliness of the delivery of goods in accordance with the customers' requirements. It describes 38.4% of the variance of the criteria. Besides the overall contribution of the set of predictors, the contribution of individual predictors was also examined. Their contribution is given in the Table 4 below.

**Table 4** Contributions of individual predictors to the explanation of the criterion variable

Model	Non-standardized Coefficients		Standardized Coefficients	T	Significance
	B	Std. Error	Beta		
1 (constant)	4.253	1.258		3.614	.000
Implementation of IT	1.277	.304	.359	4.198	.000
Electronic exchange of data and information	.502	.369	.204	2.234	.027
Long-term and fair relations of the participants in the supply chain	.117	.192	.049	.608	.454

Based on the data given in the table, it can be concluded that the criterion variable is statistically significantly predicted by variables of implementation of modern information technologies ( $p = .000$ ) and electronic exchange of data and information ( $p = .027$ ). The variables predict the concept of quick response in a positive direction in the entire market of the Republic of Serbia. This means that their increase is accompanied by the increase in timeliness of delivery of goods accord-

ing to the customers' requirements, i.e. the concept of quick response is applied more efficiently.

On the other hand, the variable long-term and fair relations between the participants in supply chains ( $p = .544$ ) did not make a statistically significant contribution, i.e. according to the respondents, it moderately influences the examined criterion ( $p = .454$ ). Testing conducted on sub-samples (regions) shows identical results as at the level of the entire market of the Republic of Serbia, such as: a) region of Vojvodina: the regression model is statistically significant ( $F(30,3) = 4.51, p < 0.001$ ) and the included indicators explain 27.1% of the variance of criterion variable; b) region of the City of Belgrade: the regression model is statistically significant ( $F(26,3) = 4.64, p < 0.001$ ) and the included indicators explain 34.9% of the variance of criterion variable; and c) the region of Central-South Serbia: the regression model is statistically significant ( $F(14,3) = 5.56, p < 0.001$ ) and the included indicators explain 16.3% of the variance of criterion variable.

Based on the conducted testing, it can be concluded that the observed indicators: implementation of modern information technologies in logistics operations, electronic exchange of data and information between participants in the supply chain, long-term and fair relations between participants in the supply chain, statistically significantly influence and contribute to the implementation of the quick response concept in the retail sector in the Serbian market. This conclusion confirms the basic research hypothesis  $H_1$  in the paper.

## 4. Discussion

The confirmed basic research hypothesis on the statistically significant influence of mentioned indicators on the implementation and realization of the quick response concept in retail and supply chains suggests that it is necessary to define the quick response model based on the analysed indicators. Based on Table 4, using the fact that the regression model at the level of the Serbian entire market describes 38.4% of criteria variance, it is possible to define the following model (equation) of the quick response concept to customers' demands in the retail sector (1):

$$y = 4.25 + 1.28x_1 + 0.50x_2 + 0.12x_3 \quad (1)$$

In the given equation,  $y$  represents a dependent variable (the concept of quick response and delivery timeliness in accordance with the customers'

requirements), while the variables  $x$  are independent variables, such as:  $x_1$  – implementation of modern information technologies in logistics operations;  $x_2$  – electronic exchange of data and information between participants in the supply chain, and  $x_3$  – long-term and fair relations between participants in the supply chain.

Acting upon the presented equation should be a guide to the management of retailers and logistics centres on how to approach the improvement of their services in meeting the needs of potential and existing customers. Implementation of the quick response concept in retail and supply chains implies that a company should ensure timely delivery of goods to customers, and to respond quickly to all their extraordinary requirements and needs. The mentioned equation requires the supply chain management to work on the introduction of modern information technologies and IT support in all logistic operations ( $B=1.28$ ), from the procurement of goods from the manufacturer, through continuous control and monitoring of inventory status, up to the delivery of goods to the end (final) customer in retailers.

The concept of quick response also implies electronic exchange of data and information between all participants in the supply chain ( $B=0.50$ ), through the implementation of internal applications that will provide: a) two-way constructive communication between employees in the supply chain and customers, and accelerate the fulfilment of their requirements and flexibility in delivery, b) expert consulting services, c) support to customers in case of lost and delayed delivery (e.g. Timely notification of changes in quantity, time, location of delivery), etc. Last but not least, the long-term and fair relations between the participants in the supply chain ( $B=0.12$ ) should be based on mutual assistance, understanding, respect, and professional training for work with modern IT technologies, working together on development of standards, etc.

## Conclusion

The need for examining the implementation of the quick response concept in Serbian retail sector has arisen as a consequence of the fact that it is a segment of the service process increasingly emphasized as a key competitive advantage in the Serbian market. With this regard, the main aim of the research was to create a model of the quick response concept and to precisely define the impact of indicators such as the implementation of modern information technologies in logistic op-

erations, electronic exchange of data and information between participants in the supply chain and the long-term and fair relationship between participants in the supply chain.

In this context, a survey was carried out among the employees in retail and supply chains in the Serbian market and a basic research hypothesis was tested on a statistically significant impact of the mentioned indicators on the implementation of the quick response concept. The application of multiple regression analysis confirmed the hypothesis on the statistically significant influence of the analysed indicators on the basis of which we defined the equation of the quick response concept at the level of the entire Serbian market. The most important indicator was the implementation of modern information technologies and electronic exchange of data and information among all participants in supply chains. Respondents gave a somewhat minor importance to the long-term and fair relations between the participants in supply chains.

The defined model of the quick response concept has a practical significance. It can help the supply chain management in defining and creating loyal customers by shortening the time in the supply chain from order to delivery. Furthermore, application of this model will ensure greater timeliness of delivery in accordance with the customers' requirements. These will directly affect the profitability of retail facilities and logistics centres through meeting the needs, wishes and interests of the customers better and faster than the competition.

Shortcoming of the conducted research is reflected in a small sample of respondents, as well as the fact that one market (Republic of Serbia) and only three indicators were analysed. Therefore, as guidelines for future research, we suggest the following: a) include a significantly larger sample of respondents (e.g. 300+), b) focus on defining subgroups within these indicators and how their impact reflects on the implementation of the quick response concept, and c) expand testing on the South East European market and make comparisons between EU member states and transition countries. **SM**

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