

TRANSPORT OPERATIONS AS A PART OF SUPPLY CHAIN MANAGEMENT BASED ON THE QUICK RESPONSE METHOD

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1. Integrative Tendencies for Creating the Customer Value

In an era of rapid, unanticipated change, the most competitive firms will be those that respond quickly and efficiently [6]. Such a method of satisfying customer's needs, however, requires applying Supply Chain management, because supply chain management or supply chain partnership must be considered a key component of a strategy based on agile manufacturing or quick response [7]. Cooperation or partnership on the inter-company basis in SCM to achieve the quick response, however, usually requires adjusting process systems of particular elements (companies) engaged in the given system. Nevertheless, the matter is not just to adjust the process management through which the customer value is created and delivered but it is also necessary to consider adjusting other corporate processes which support these major processes. The matter then is that speed, flexibility and efficiency of the value-creating process may be critically jeopardised as a consequence of insufficient performance of these auxiliary processes. It is then necessary to manage not only the value-creating process on the basis of Quick Response principles but it is necessary to apply these principles in managing the entire corporate process system and other corporate processes. One of the processes having a fundamental impact to successfulness of implementation of QR-based SCM is transport of raw materials, materials to the company and transport of products to the company's customers. It is thus necessary to take a new approach

towards management of transport operations. Transport itself must be flexible and elective enough to contribute a proper part not only to customer value but also to the company value. It must then proceed in a way ensuring that the expected raw materials, materials as well as finished products are supplied both to internal and external consumers in due time, or as the case may be very quickly and with reasonable costs. Transport operations and their running are thus of extraordinary importance for efficient implementation of QR-based SCM.

2. Quick Response Method and its Utilization in Supply Chain Management

When vendors enter QR partnerships, they also have to adapt to demand flow manufacturing, where production runs are customer driven rather than forecast driven. [3]. According to [4] Quick Response initiative intended to cut manufacturing and distribution lead times through a variety of means, including information technology such as electronic data interchange, point of sale scanners, and barcoding, logistics improvements such as automated warehousing and increased use of air freight, and improved manufacturing methods, ranging from laser fabric cutting to reorganization of the sewing process into modular sewing cells. A key component of the quick response strategy is the development of supply chain partnerships [7].

The nature of functioning of the QR-based supply chain management is depicted on **Fig. 1**. The basis of the cooperation is integration of information flows and provision of information on end users' needs and wishes to the particular elements (companies) retrospectively about the chain. Impulses for the operation of the entire chain come from the market. Up-to-date information on particular purchases by the customers form a basis not only for replenishing the stock but it enters also the shared information system. It will allow using this information for:

- planning the manufacturer's production,
- planning the needs of raw materials and materials with the manufacturer,
- planning the supplier's (manufacturer's) deliveries,
- accuracy check of the shared forecast of the demand and its updating.

Working on the up-to-date information arising directly from the customers, the salesman orders products from the manufacturer, and that is in the required product mix as well as the quantity. Owing to the interconnected information flow and possibility of the manufacturer's pre-preparation, the required items should be ready for delivery. The manufacturer deliveries products to the salesman according to their requirements or, as the case may be, according to the end users' requirements, while replenishing their own product inventories so that it could be at disposal according to the end users' needs. The manufacturer's needs of raw materials and materials are quite quickly satisfied by the supplier that is very flexible too as a result of the information exchange.

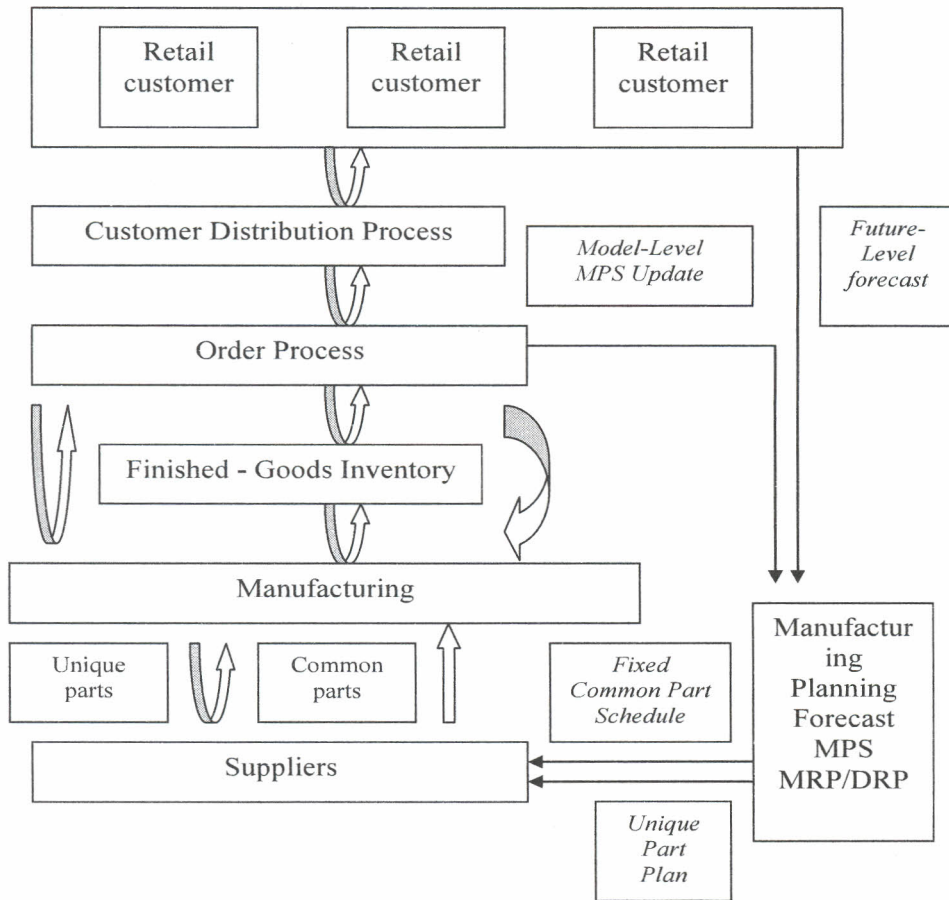


Fig. 1 Planning and forecasting in QR system [1]

The described system of cooperation may as well be more intensive, and that is to the intent that an automatic replenishing system may be introduced in the supplier-customer relations, i.e. the information interconnection is such that the customer yields complete responsibility to the supplier for replenishing the selected stock items. In that case, it is necessary for the suppliers to obtain not only information on the end users' needs but also information on needs planning or, as the case may be, their customers' production and the up-to-date stock level with items for which they bear responsibility. At the same time, it is possible to conclude a contract of the maximum and minimum stocks between two partners that will be maintained by the customer or, as the case may be, a contract of the signal level of stock ordering.

Upon realization of cooperation based on the Quick Response are thus also used JIT concept principles and principles of stock replenishing through P,Q – systems.

In this cooperation system, the customer ceases viewing his/her business partners as an obstacle in increasing the market share and achieving lower costs but as partners in increasing the entire chain's efficiency [1]. Application of QR-based cooperation encourages retailers, manufacturer and suppliers towards closer cooperation with the aim to achieve higher satisfying of customers in a more effective way. It is a vertical integration of the supplier-customer chain that works in compliance with the customers' needs and serves well the chain as a whole as well as its individual constituents [2]. The benefit of companies involved in this kind of cooperation may usually be quantified as well. According to a survey carried out prior to and after implementation of the quick response program in the companies involved in each supply chain in which this system was implemented, the key improvements identified among the companies included:

- A 90% increase in product sales, although total annual sales had only increased by 20%.
- Finished goods inventory turnover doubled.
- Order completion by due date increasing by more than 70%.
- Lead time from order to delivery halved.
- A 16% reduction in product rejects
- A significant improvement in employees' skills and competency, leading to multi-skilling.
- Annual labour turnover decreased from 27% to 18% [7].

A success of the Quick Response systems will not depend on in-plant re-engineering but also on external logistical and infrastructure support systems [6].

3. Transport Operations Management in the Quick Response System

Transportation system and timing of merchandise shipments must be an integral part of QR if the process is to reach its full potential. [3] Transport operation must then be managed so that the customers always obtained their value right in the moment they need it. Unreliability of transport operation brings about a need with customers to maintain a safety stock or, as the case may be, it increases the safety stock level. According to Gros [5], the safety stock is to prevent not only the risk of increasing demand for a certain item (consumption of a certain item) but also the risk of deviation in the delivery cycle. It recommends setting the safety stock on the basis of this relation:

$$x_p = n * \sigma_1 + n * \sigma_2 * \bar{x}, \tag{1}$$

where:

x_p safety stock,

- n n-multiple of the standard deviation,
- σ_1 standard deviation from the average daily consumption in the period under consideration,
- σ_2 n-multiple of the standard deviation from the average delivery cycle in the period under consideration,
- \bar{x} average daily consumption.

Thus, the higher the variability of the lead time is (and higher average consumption), the higher safety stock must be kept for covering the risk of deviation in the delivery cycle.

If a QR system was established between the supplier and customer, with the parallel absence of the partner providing transport operations, the full functionality of the entire system would probably not be achieved. With its introduction, however, the system gains not only reliability but at the same time the efficiency of transport operations increases. The main reason is the information pre-preparation in which this partner will be involved. Pre-information on future company's needs (in relation to their suppliers and customers) allows not only more effective planning of transport operations and decreasing the number of unexpected (extraordinary) demands for transport but it will also allow deciding, for example, about new investments into own transport equipments. Involvement of the partner realizing (or providing realization) the transport operations lay be depicted by **Fig. 2**.

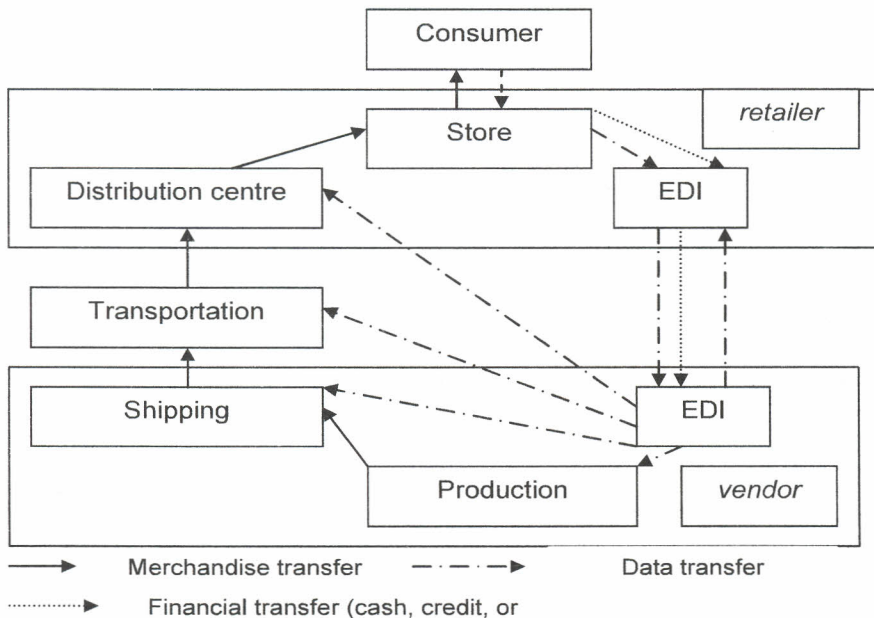


Fig. 2 Merchandise, data and financial transfer with quick response [3]

Thus, if a company builds a QR-based delivery system, it is necessary to get also the transport realizing entities involved in the given system. Modification of the present way of realization of transport operations is required in the both basic commonly used forms, and that is realization of transport operations under own workforce (company transport) as well as realization of transport operations through independent mediators or, as the case may be, directly forwarding service providers. Quick response requires new communication linkages and system [3].

Transport management in Quick Response system with company transport only

Upon realizing the transport operations under own company transport only, the thing is that the transport department of the company gets:

- As much information as possible on the future company's needs in the perspective of transfer of raw materials, materials and products,
- As fast information as possible on the up-to-date need of transport.

Providing information on the future needs of transport means informing the transport department about the forecast of demand and shape of the business plans (both the sales and purchases plans) or, as the case may be, about the shape of the automatic stock replenishing with the partners in the QR system (realization of e.g. P-system in stock replenishing). If the QR system partners carry out collaborative planning and forecasting in supply chain, the transport department should have access to its information or, as the case may be, it should get information derived from it. This information is necessary primarily for creating and adjusting the transport system including decision making on investments in own transport.

Similarly, it is important that the transport department get information as soon as possible (as much ahead of time as possible) on the up-to-date need of transport (for which it should, however, be pre-prepared). Thus, if the company monitors with its supplier the stock level which they replenish and provides this information to the transport department too, this department may significantly improve its estimate and thus expect the moment of ordering of transport operation. If the company provides transport of raw materials and materials from the suppliers under its own steam, it is then certainly necessary that the transport department is informed about the ordering level and monitors the development of up-to-date stock level of this item. This will again allow it improve forecasting the requirement for replenishing its own stock from the company of the raw materials and materials supplier.

Integrating transport in the Quick Response system thus requires a significant shift in the mutual relation of the company's departments of both the sales and purchases and transport. In the view of the information flows it is necessary to treat the transport department as a supplier and share information with them on the anticipated and up-to-date needs of one's customers as well as own needs, or information derived from it.

Implementation of own transport department in the QR system is easier than implementation of independent entities with which the company cooperates upon securing the transport.

Transport Management in QR System using Independent Forwarding Service Providers

If a company seeks to increase efficiency of the entire QR-based supply chain management and makes use of independent entities for transport, it is necessary to make a change in the mutual relations or, as the case may be, to form the mutual relation on the partnership basis. The company must view the transport intermediaries or, as the case may be, the carriers as partners and develop with them a similar form of cooperation as with the partners upon purchasing or, as the case may be, selling the products. It is very important to choose for the QR-based cooperation system suitable partners providing transport and set the mutual relations in a way suiting both the parties (i.e. bringing about a value to both the parties). That is a base for a long-term partnership. Therefore, it is very important that the both parties understand the other party's needs and the both partners express their willingness for establishing such a form of cooperation.

Subsequently, a shape of the business relation is planned between the company and, for example, the carrier in which what matters is the setting of the terms of the mutual cooperation and determination of responsibility for particular activities within the framework of realization of the transport process upon sale and purchase.

It is suitable to involve a partner realizing transport in the system of demand forecasting. On forecasting and planning, the company cooperates with the other links of the supply chain, and that contributes to an improved planning process in the entire supply chain and to decreasing the fluctuation of material flows. Working on this information is then the transport company when planning.

The plans must thus be made mutual relation, i.e. the transport company creates them on the basis of information (or business plans) shared by the partners in the supply chain. In this moment, it can be difficult for carriers to harmonize this business partner's needs with its other customers. It is thus necessary to take into consideration the principles of the modern conception of differentiated CRM and make the plan with respect to the individual customers' value for the transport company. It should, however, perceive its partner in the QR system as very attractive or attractive since participation in the given system should increase efficiency in transport activities as well as growth of its share in the transport expenses (of the QR partner). Flexibility in an transport requirement may then be provided by monitoring the stock movement as described above.

A necessary condition of effective information sharing is naturally a suitable software or, as the case may be, interconnection of (company's) information systems. The entire information system must work so that it processed quickly up-to-date

information coming from a partner involved in the supply chain, confronted it with the shared forecast, plans in the logistic chain as well as transport plans and forecasting of transport order. This information sharing should result in the expected order of transport (on the basis of which the transport is realized).

The QR-based system of value creating and delivering to the end users was originally drafted for cooperation within the framework of supplier-customer relations, with the fact being that it was also business intermediaries (distributors) that were incorporated into this system. Involvement of the distribution intermediaries as agents (representatives) is rather indirect, i.e. they act as business assistants (a manufacturer or, as the case may be, a distributor). Similarly, it is particularly suitable to involve in the given system the transport companies also providing transport (forwarders, forwarding agencies, intermodal transport operators) rather than entities as transport agent, broker that serve to bring company and forwarding company together.

The QR system requires willingness to cooperate and trust of the individual partners in the supplier-customer relations but also in the relations between the company and the transport companies. Extraordinarily difficult will be realizing this kind of cooperation with a partner who would provide the company's competition with transport services. In such case, the required dose of trust would not probably occur from the quarter of the enterprise. On the contrary, it might seem quite expedient if the transport company provided transport for a number of partners in the supply chain.

It follows from the indicated contemplation that similarly as the QR system strengthens the supplier-customer relations and contributes to the growth of the value of customers, it may also result in deepening of relations with entities brokering or realizing transport operations. This cooperation serves well to the both partners. The company may accelerate its process of product supplying to customers since selected activities may be dropped from the entire process, and that is, for example, the demand for transport services supplier or the choice of carrier. The expected transport order also signifies that the company is able to gain much higher flexibility from the carrier and, moreover, increases the reliability of supplies. The carrier also capitalizes on this form of cooperation. By interconnecting the information flows it obtains information on the expected volumes of transports and it may anticipate the up-to-date transport need ahead of time. Therefore, it may invest finance with a reduced risk in modification of its transport system and improve services provided to its partner (partners) in the QR system. This may become a basis of its competitive advantage and strengthening of its position with a QR partner. An appreciable advantage is also the experience it gains through the given cooperation and it may thus apply a similar system (or, as the case may be, get involved in it) in serving other customers as well.

4. Conclusion

QR was originally drafted for establishing the supplier-customer relations with perishable products or fashion products. The first applications emerged in relations between retails and their suppliers. It is, however, possible (and suitable) to apply the QR method in other parts of the chain or, as the case may be, to apply the QR method in the SCM chain. Not even then may the full functionality be guaranteed. To achieve it, it is necessary to involve also other entities in the entire system, for example, the independent forwarding companies. Benefits from the entire system then arise not only for the company itself but for its partner as well. It may thus be stated that involvement of transport entities in the QR system helps to increase their market value.

Submitted: 19.02.2009

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Resumé

DOPRAVNÍ OPERACE JAKO SOUČÁST ŘÍZENÍ HMTNÝCH TOKŮ NA BÁZI METODY QUICK RESPONSE

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Tendence podniků zakládat konkurenční výhodu na rychlosti a flexibilitě uspokojování požadavků zákazníků vedla k mezipodnikovému provazování hmotných toků a budování dodavatelsko-odběratelských řetězců. Pro zvyšování jejich výkonnosti je pak možné realizovat supply chain management na bázi metody Quick Response. To umožní radikálně zvýšit hodnotu, která je poskytována zákazníkům, a to bez automatického tlaku na zvýšení nákladů. Realizace dodávání na bázi QR nepochybně vyžaduje přizpůsobení hlavních procesů, které se přímo podílí

na poskytování hodnoty (prodej, výroba a nákup). Je však nutno přizpůsobit rovněž další procesy, tzn. ty, které podporují hodnototvorný proces. Jedním z procesů, jehož výkonnost klíčově ovlivňuje úspěšnost hodnototvorného procesu, je doprava. Aplikace metody QR vyvolává změny při realizaci dopravních operací vlastními silami, ale může významně ovlivnit i způsob nastavení obchodních vztahů s dopravními zprostředkovateli, resp. samotnými dopravci. Jejich zapojení do supply chain managementu na bázi QR musí však být takové, aby vzrůstala hodnota nejen podniku, ale oběma stranám. Článek popisuje dopady aplikace metody Quick Response v podniku na realizaci dopravních operací, a to jak při realizaci dopravy vlastními silami, tak při využívání nezávislých dopravců.

Summary

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Companies' tendency to base the competitive advantage on speed and flexibility of satisfying the customers' needs lead to inter-company linkage of material flows and establishing of supply chains. To increase their efficiency, it is then possible to realize supply chain management on the basis of the Quick Response method. This shall allow radical increase of the value provided to the customers, and that is without automatic pressure on cost increase. QR-based realization of supplies undoubtedly requires adjusting of the primary processes which directly participate in providing the value (sale, production and purchase). It is, however, necessary to adjust also other processes, i.e. those that support the value-creating process. One of the processes the efficiency of which pivotally affects successfulness of the value-creating process is transport. Application of the QR method invokes changes in realization of transport operations under own company transport but it may also significantly affect the way of business relations setting with transport intermediaries (as agent, broker) or, as the case may be, with the independent forwarding companies themselves. Their involvement in the QR-based supply chain management must, however, be such that it would make the value increase not only for the company but to the both partners. The article describes impacts of the Quick Response method application in the company in realization of transport operations.

Zusammenfassung

DIE VERKEHRSOPERATIONEN ALS DER BESTANDTEIL DER MATERIALFLUßLENKUNG AUF DER BASIS DER QUICK – RESPONSE – METHODE

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Die Realisation der Quick – Response- Methode im Betrieb bringt nicht nur Veränderungen im Wertbildungsprozeß des Betriebs, sondern auch in anderen Betriebsprozessen, die ihn unterstützen. Einer von den Prozessen, die durch diese Methode getroffen werden, ist der Verkehr. Zu den Veränderungen muss es nicht nur kommen, falls der Betrieb Verkehrsoperationen durch eigene Kräfte verwirklicht (zum Beispiel bei dem Landstraßenverkehr), als auch falls er Verkehrsvermittler und Verfrachter benutzt. Der Aufsatz beschreibt, wie die QR - Methodenapplikation das taktisch - operative Verkehrsmanagement, sowie auch die Einstellungsweise der Geschäftsbeziehung mit selbständigen Spediteursfirmen beeinflusst.

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