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CROSS-DOCKING IN THE SALES SUPPLY CHAIN: INTEGRATION OF INFORMATION AND COMMUNICATION (I+C) RELATIONSHIPS

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Abstract

The secret of the successfully working companies resides in the consistent adaptation as well as the high-level satisfaction of the continuously changing consumer demands. According to a current approach in these days we can talk about the competition struggle not only of companies and products but also of the supply chains of certain companies [4].

The management of the supply chain means the coordination of the product, service and information flow inside and outside of networks in order to reach consumer satisfaction [2]. Consequently, the supply chain indicates all those organizations and their activities, which forward the product from the raw material source to the end user, at the same time, include the information system, assuring communication among the participants of this process [5]. The key of assuring consumer satisfaction is the maximization of the supply chain usually organically independent of participants' performance (producing companies, suppliers, distributors, and logistics providers) as well as the optimization of operating costs.

The change of disposition data along the supply chain cuts down order lead time, improves flexibility and increases the performance of logistics services. The realization of the effective information flow means to activate and operate connection among logistics softwares, which have different structure and functions in practice. Passing company limits necessitates the efficient communication among partners participating in the operation of the supply chain. The logistics system, which was established by the commercial and producing companies as well as their partners according to the above, is called logistics databus, partners jointly operating the supply chain and being in dispositional relationship with each other are called virtual companies [7].

The study presents the reasons, which lead towards the joining a 3rd party logistics provider (3PL) on the sales supply chain, and reveals the challenges of cooperation as well as enlightens through an example from the field of supply logistics that in addition to the separation of warehousing and distribution how it is possible to assure information flow through passing company limits.

Keywords: sales supply chain, 3rd party logistics provider (3PL), cross-docking, I+C relationship

1. Joining a Third Party Logistics Provider on the Sales Supply Chain

According to the classical structure of sales supply chain, the supply of sales points is assured by the company's commercial warehouse, which carries out centralized logistics functions as it is seen in *Fig. 1*. Thus, the commercial warehouse fulfils warehousing functions like receipt of goods from suppliers, promotional co-packaging activities, storing, order picking, assembling delivery units and distribution.

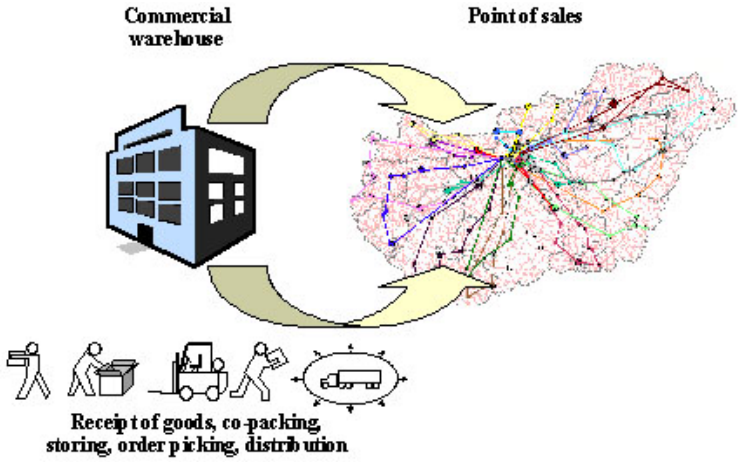

Fig. 1. Centralized warehousing and distribution

The above described structure only hardly can meet the continuously increasing consumer demand, which occurs in the field of distribution – and which also puts in a risk of company's competitiveness. The new challenges put pressure primarily on the companies' distribution system: the number of partners and delivery points grows, the volume of orders decreases, however, their frequency increases, the time for receiving goods becomes shorter, the prescription relating to the working hours of drivers becomes stricter and also order lead time becomes even shorter. Because of the increase in public traffic and the delivery problems the overall planning of distribution is quite uncertain. At the same time consumers require not only accurate delivery during the day but exact information during the distribution as well [3]. In the age of sharpening market competition, the company management cannot divide its attention and resources to complete part-functions and background activities, therefore outsourcing of distribution to a 3PL is among the aims of more and more commercial companies [1].

Separating warehousing and distribution functions could be an answer for the above mentioned challenges according to *Fig. 2*.

By application of cross-docking technique, the logistics functions like receipt of goods, order picking, assembling delivery units which are 'more sensitive' for the

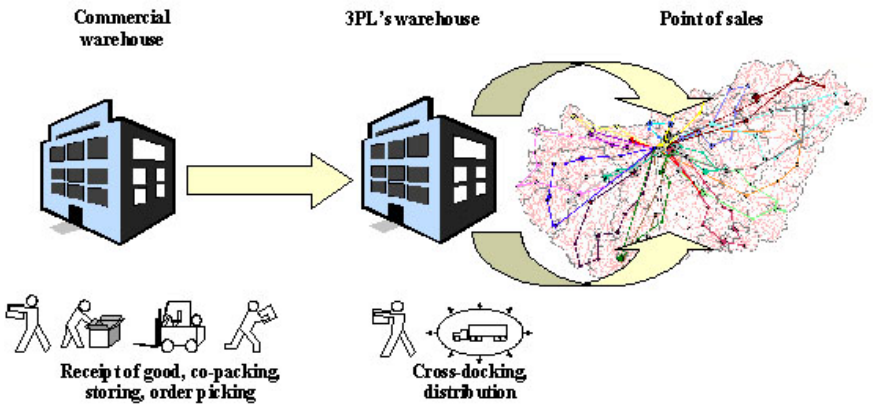

Fig. 2. Cross-docking: separation of warehousing and distribution functions

(consigner) commercial company and require professional and product knowledge may further remain within the company, but physical distribution is carried out by a 3PL, wedging between the consigner and its customers.

Dividing activities according to the above is primarily aimed at cost cutting, however, offer efficiency improvement as well. By outsourcing of distribution the supply chain may become more flexible, i.e. may dynamically comply with the seasonal requirements: satisfies the demands during the peaks but does not use redundant resources in the seasonal bottom. *Table 1* compares the centralized and cross-docking structure from the aspect of cost, service level, efficiency, capacity utilization, scope of responsibilities, as well as information and communication relationships. In the next part of this study we deal with the possibilities of realizing the information and communication (I+C) integration of the cross-docking structure.

2. Information Flow in the Extended Supply Chain

The most important challenge of the extended supply chains on the side of I+C is that information flow must be assured through passing company limits. Practically, in case of cross-docking deliveries it is necessary to activate an operative interface between the order-handling or ERP[1] system of the consigner company and the WMS[2] and routing system of the 3PL.

Fig. 3 shows one of the possible ways of the order-handling process within an extended supply chain. Compared to the classical process, a new item is that after the consumer demands are processed, orders and all of the delivery-related information must be passed both to the commercial warehouse, which carries out order

[1]Enterprise Resource Planning
[2]Warehouse Management System

Table 1. Comparison of centralized and cross-docking structure

	Centralized structure	Cross-docking structure
Costs	Most of the charges are fixed due to the vehicle fleet – owned by the consigner company	Costs follow the real logistics performance, fixed parts of charges are missing
Service level	Shorter lead times, however, the service level is poor	Longer lead-time due to the cross-docking
Efficiency, capacity	Allocated resources do not meet real demand	The needed capacity is adequate to the demand
Responsibility	Defined by the company policy	Divided between the parties, therefore further clarification is needed
I+C relations	*In accordance with the company's internal communication channels*	*Communication should be assured through passing company limits*

picking and to the logistic provider, which fulfils routing and resource allocation of distribution. On the basis of data, it is possible to acknowledge the delivery date as well as qualitative confirmation of orders.

Thus, cross-docking concept does not basically necessitate the reconsideration of logistics communication: we should strive for a single point of communication, i.e. information flow between sales points and the 3PL must take place through the logistics department of the consigner company.

We can separate the data, which are to be handed over to the 3PL to build the routes and prepare the delivery scheduling as follows:

- Data of customers: identity code of sales points, name, zip code and address of the customer, time windows of the sales point with the indication of the possible lunch time,
- Data of customer orders: order and delivery note number, appointed delivery date, amount, size and weight of the delivery units, specialties, which make possible for the logistic provider to order a given vehicle type or a given driver (e.g. taking into consideration entrance and weight restrictions, language command, etc).

Based on the above, the orders should be handed over to the 3PL not in such details as set in the ERP system i.e. on item and amount level, but only on the level of delivery units (e.g. pallet, delivery box, containers, etc.) because only the amount, size and weight of delivery units, which should be delivered in the same relation mean relevant information from the aspect of routing. However, if the goods require special treatment then related information must be assured together with customer orders.

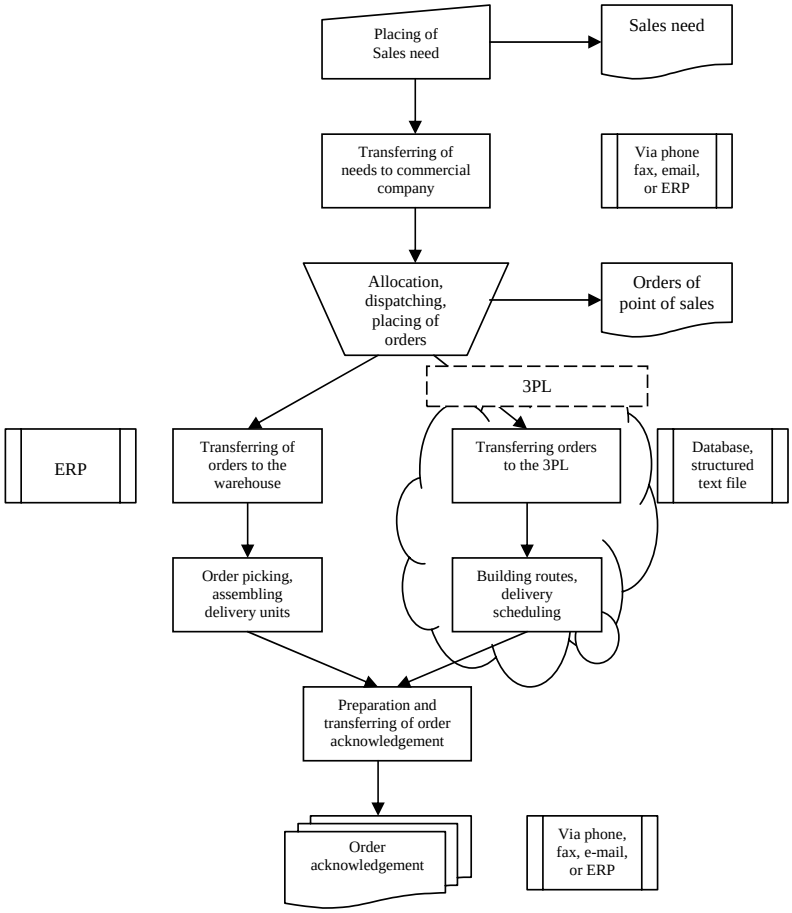

Fig. 3. Order handling process in case of cross-docking distribution

In order to keep the continuity of daily business it is important for the partners to pay special attention to the maintenance of data: most of failures or non-fulfilment of deliveries may originate from the poor setting of routing system (false delivery addresses, disregard of entrance and weight restrictions etc.). In many cases the fluent transfer of order data between information systems may be realized through the application of standard data link interfaces. Practically, it means that the ODBC[3] databases or structured text files, generated by ERP system have been imported into a routing system of the 3PL. With the help of data connection, the duplication of manual data recording can be avoided, what influences favorably the data-quality in the systems. At the same time it also makes possible to decrease the lead times

[3]Open Database Connectivity Compliant

from placing of orders until the delivery. The time of building routes may significantly decrease, therefore the delivery period, which has a great importance for the customers, may be postponed to a later date [3].

Delivery scheduling, carried out by the logistic provider, must be handed over to the consumer company in order to complete order acknowledgements. Since the acknowledgements should include in detail the picked items and amount in addition to the planned delivery date, therefore it is practical to transmit these data in a structured way. After building routes at least the following data must be handed over to the consigner: identity code of the sales points, customer name, order and delivery note number, planned date of delivery (hour, minute), vehicle plate number. As soon as all data are at service in the ERP, the possibility arises to send the order acknowledgements to the customers.

In case of implementing a cross-docking distribution system, it is recommended for the consigner company to redesign certain processes related to warehousing. The establishment of delivery units and related delivery notes should possibly happen by joining the logistics provider's staff. During the whole distribution process the possibility of the direct and unambiguous identification of the shipments as well as the conjugation of delivery items and their delivery notes must be assured. In the case when the processes are controlled according to the above, failures, which originate from the change of goods, can be decreased to a large extent, therefore the quality of distribution can be improved significantly. Join of a 3PL to the supply chain can be successful only if the physical logistics tasks – like receipt and preparation of goods for delivery at the 3PL, handover of goods to customers at the sales points – are accurately documented and known by the participants of the process.

3. Between Delivery Follow-up and Performance Measurement

We have referred in the previous paragraph to the relationship of the quality of logistics services and information flow several times. We can determine that in order that the 3PL supplies quality services, the consigner must provide exact information for planning and organizing the work, what first of all requires effective communication and well-tried communication channels [5]. Due to the competition on the more or less saturated market the aim of logistics is to satisfy qualitatively consumer demands. An important cornerstone of the quality service is that the consigner and the 3PL jointly assure reliable and up-to-date information for the customers during the whole delivery period. The modern routing programme packages as well as the GIS[4] make possible for the dispatchers who carry out the operative vehicle control, to continuously follow-up the situation of the vehicles during the delivery cycle. Thus, the occasional differences may simply be modelled and routes can be re-planned in case of need. With the help of a developed interface the on-line operative data recorded by the routing software may become available for the customers

[4]Geographical Information System

on the Internet, too. *Fig. 4* shows a screenshot of a sample test system.

The most important data following deliveries, which are to be published on Internet-based platforms: the identity code of the sales point, the name of the customer, the order and the delivery note number, plate number of the vehicle performing the delivery, delivery period recorded in the acknowledgement and delivery period calculated on the basis of the on-line operative delivery management information.

An important aspect is that the above mentioned solution assures the efficiency improvement of the dispatchers' work as well, cuts down the coordination tasks of the consigning company (since phone calls related to delivery status practically cease), at the same time it makes possible direct access to the exact delivery information.

Nowadays, it comes into the highlight at the commercial companies that the quality of logistics services should be measured consciously, systematically and objectively. Therefore, determination of such indices is needed, which are appropriate to provide comparable values for the estimation of the quality of a certain contracted activity. The aims, which relate to delivery periods, reliability of delivery and flexibility are in direct connection with the consumer demand, therefore, in this field the establishment of an objective measurement system is necessary [6]. The data assured by the 3PL according to the above are appropriate to measure the performance on a daily, weekly and monthly basis and also make possible the discovery of the cross-docking delivery system's weaknesses while showing way for further developments. The performance measurement also assures the control of 3PL's operational efficiency, at the same time it may be a key performance indicator (KPI) as a basis of a "penalty calculator" of the contract to be entered with the 3PL.

4. Communication Channels

The third party joining the supply chain definitely owns different company culture, organization, internal processes and policy. Companies take it suspiciously if an existing or future partner wishes to get introspection of the company's internal mechanism but it should be realized that effective and open communication among the partners has indispensable importance because in the long run it promotes the development of confidential atmosphere between the parties. The daily operating processes require the usage of modern communication tools on both sides: although in these days it is very rare that the consigning company establishes direct connection between its ERP and the WMS and GIS of the 3PL, however, the development of e-mail or web-based interfaces are more and more frequent.

However, the relationship of the so called human interfaces [4] is more important than the communication between systems: accurately regulated and documented processes, the data connection among the partners are necessary conditions of the effective operation, but on the basis of experiences the success primarily depends on how much it is possible to inspire the employees of different companies

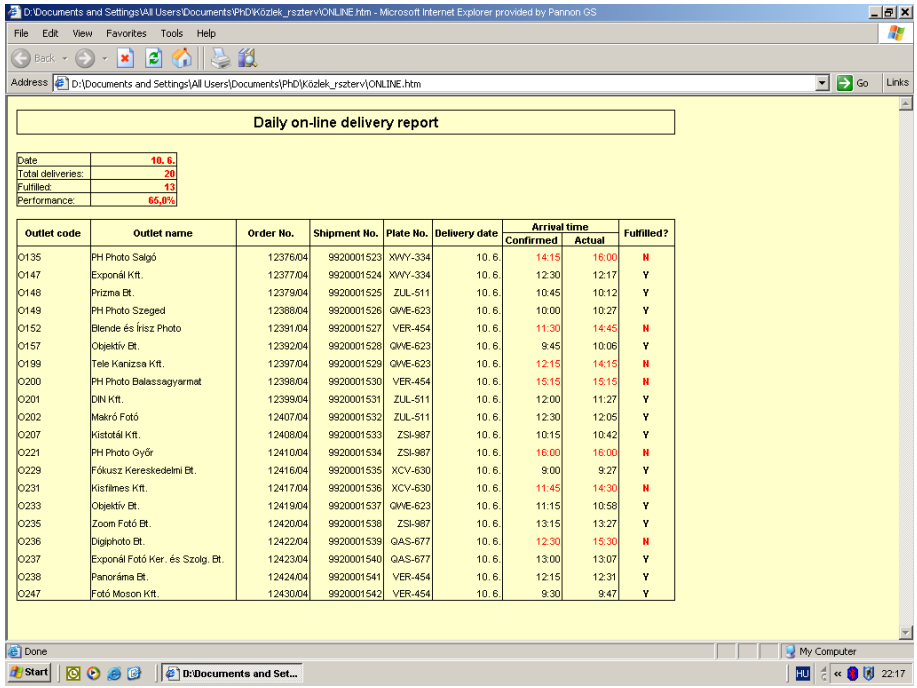

Fig. 4. On-line follow-up on deliveries via Internet (screenshot of a test-system)

to work together. One of the most important aims of communication is that the 3PL makes available up-to-date and reliable information, i.e. that the consigner will be able to fully maintain control over the operation, at the same time the 3PL will receive continuous feedback or in certain cases help from the consigner. The base of a fair and partner cooperation is the maintenance of a continuous and productive communication among partners participating in the process.

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