# SUPPLY CHAIN COLLABORATION AS AN INNOVATIVE APPROACH OF WAREHOUSE MANAGEMENT: A CASE STUDY

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**Abstract**

Supply chain management, especially supply chain collaboration is a very much discussed topic in the field of modern logistics in recent years. Supply chain management is the term for the systems, resources, activities and procedures that are used to coordinate the materials, products, services, finance and information flows from materials suppliers through manufacturers, transporters, warehouses, wholesalers and retailers to consumers. Effective supply chain management is an essential strategy for company success in global and e-markets to get products to market faster and at minimal total costs. Supply chain collaboration is a total coordination and integration function which enables company easier and more effective using of available resources, to successfully reduce total costs, to provide and sustain the sub-contracting relationships. The objective of supply chain collaboration is to achieve sustainable competitive advantage. This paper deals with supply chain collaboration issue as an innovative approach of warehouse management in a case study. The paper shows supply chain collaboration between supplier of logistic services and manufacturer of automotive parts and discusses options which can make a synergy effect in application to practice.

**Key words:** supply chain management, collaborative initiatives, logistic services, logistic costs

**JEL Code:** M11, M19

## Introduction

The fact that logistics harmonizes material, spatial and temporal differentiation of production and consumption leads to cost savings, decrease in stocks and release of capital and thus to increased efficiency and improved economic results of the company (Sixta and Mačát, 2010). Logistics is a tool for attracting and retaining customers, because it gives them benefits; thereby it contributes to maintaining or boosting competitiveness of the company and

improving its market performance. It is a discipline focused on the overall optimization, coordination and synchronization of all activities throughout the supply chain; supply chain creation and management is essential for flexible and economical achieving the final (synergy) effect (Pernica, 1998). Effective supply chain management is an essential strategy for company success in global and e-markets to get products to market faster and at minimal total costs (Gunasekaran, Lai and Cheng, 2008).

In this paper, attention is paid to broader involvement of external logistic services provider (as one of actors in the supply chain) into the operations of manufacturing company. The provider will continue to carry out not only material handling and storage, but also will be involved in the manufacturing operations of the company. The paper is focused on the following research question: Is broader involvement of external logistic services provider into the operations of manufacturing company able to bring some saving of personnel costs? The entire issue is shown on the example of part of the logistic chain in the automotive industry.

# 1 Theoretical background and methodology

In recent years there are growing efforts for collaboration within supply chain management. A collaborative supply chain means that „two or more independent companies work jointly to plan and execute supply chain operations with greater success than when acting in isolation" (Simatupang and Sridharan, 2002). Studies show that more than 90% of the surveyed manufacturing companies are already involved in collaborative initiatives, or are preparing to do so in the near future (Hammant, 2011). Surveys confirm that logistic costs represent a significant portion of the product costs in many companies, they are therefore trying to find tools to manage these costs; reengineering of logistic processes is regarded as a basic tool (Christopher, 2005). The main reason for collaboration within the logistic processes are synergy effects resulting from cooperation (Horvath, 2001; Simatupang and Sridharan, 2005; Fawcett, Magnan and McCarter, 2008).

With increasing competition and growing pressure of globalization companies are trying within the supply chain collaboration to transfer part of competencies to the companies that through their expertise and qualified personnel can ensure an effective execution of logistic operations. The structure and behaviour of the logistic chain is based on a requirement to flexibly and efficiently meet the needs of end customers (Sixta and Mačát, 2010). The aim of the collaboration is to save operating costs due to optimization of logistic operations, reduce stocks, minimize capital expenditures and increase labour productivity (Sixta and

Mačát, 2010). This can be achieved by unambiguous definition of responsibilities and the corresponding transfer of information (including instructions and information contributing to control logistic operations in the desired way).

High levels of interconnection, mutual trust and information sharing are key elements for supply chain collaboration (Singh and Power, 2009). If such interconnection occurs, an increase in effectiveness can be achieved (Cruijssen, Dullaert and Joro, 2010). Collaborative initiatives, however, according to some studies do not bring the expected benefits (Fawcett et al., 2012). The main reason is according to Barratt (2004) failing to understand what all collaboration means and what it entails. It is also very difficult to understand the dynamics and complexity of the whole process (Fawcett et al., 2012).

In relation to the research question formulated in the introduction of this paper a case study of supply chain collaboration is elaborated in the following text. Attention is focused on collaborative initiative in the field of logistic services; it is a broader involvement of logistic services provider (Ewals Cargo Care) into production operations of the company, which manufactures automotive seats (Johnson Controls Automobilové součástky/Johnson Controls Automotive Parts). Focus is on the effects of the collaborative initiative in the use of human resources. The case study (as one of the qualitative research methods) was chosen because it counts among the most frequently used methods within the research focused on the implementation of different management approaches into practice of organizations (Hoque, 2014). Detailed information obtained on the basis of one specific case of collaboration can contribute to deeper understanding of the examined problems and their broader practical application. Data used in the case study is based on real logistic processes in both companies. It was obtained based on an analysis of logistic operations at Johnson Controls Automotive Parts and its sister plant based in Lozorno near Bratislava. Economic calculations are based on accounting data of both companies, i.e. Ewals Cargo Care and Johnson Controls Automotive Parts. In compliance with the research question a comparative analysis is accomplished in the end of the case study, with the aim to specify the saving of personnel costs arising from supply chain collaboration.

## 2 Case study: supply chain collaboration between supplier of logistic services and manufacturer of automotive parts

The case study focuses on supply chain collaboration between the supplier of logistic services (Ewals Cargo Care, hereinafter ECC) and manufacturer of automotive seats (Johnson

Controls Automotive Parts, hereinafter JCA). ECC is a globally active company, providing transportation, warehousing and other logistic services. ECC offers its customers primarily in the automotive, electrical engineering and heavy industry a wide range of services. Offer of storage services includes, in addition to providing warehouse space, taking responsibility for warehouse operation, inspection and keeping records of material and finished products. In addition to storage service itself ECC offers complete input and output logistic services, i.e. material putting in stock, material inventory control, material supply for production line, removal from storage and despatch of finished products and packaging, quantity and quality control of finished products, including making out all required accompanying documents. Another link in the chain is JCA, a manufacturing company, which is engaged in production of car seat covers and assembly of car seats. JCA supplies its products to a wide range of customers from the automotive industry. At the time of making the case study company was preparing manufacture of car seats for the new model of Porsche. Within the framework of this manufacture, JCA considers the ECC involvement in the production process. It seems economically beneficial to deepen cooperation between the two companies so that ECC would be involved in performing logistic activities in pre-assembly operations, specifically, it would take responsibility for logistic operations in the process of sticking car seat heating systems, including sequential delivery to the assembly line of car seats.

The aim of the ECC involvement in the production process is to achieve synergy effects beneficial for the manufacturer of car seats and provider of logistic services. The resulting effect should be higher production capability of both partners and lower costs of the final product. This is a qualitatively new form of collaboration with the broadest possible involvement of logistic services provider, which in this case is directly involved in the production process. Case study only focuses on the effects of this collaboration in the use of human resources.

At the time of preparing the case study there was only available information about the current state of collaboration, i.e. the use of human resources within the existing scope of ECC services. Data on the need for human resources for logistic operations performed during the pre-assembly operations in the process of sticking car seat heating systems was obtained from the JCA sister plant based in Lozorno near Bratislava. This plant manufactures seat systems for the Porsche Cayenne model; manufacturing practices and capacity needs are in principle not different from the production of seats for the new model of Porsche.

JCA expects from establishing deeper collaboration with external logistic provider streamlining logistic operations, reducing administrative burden, better use of logistic and

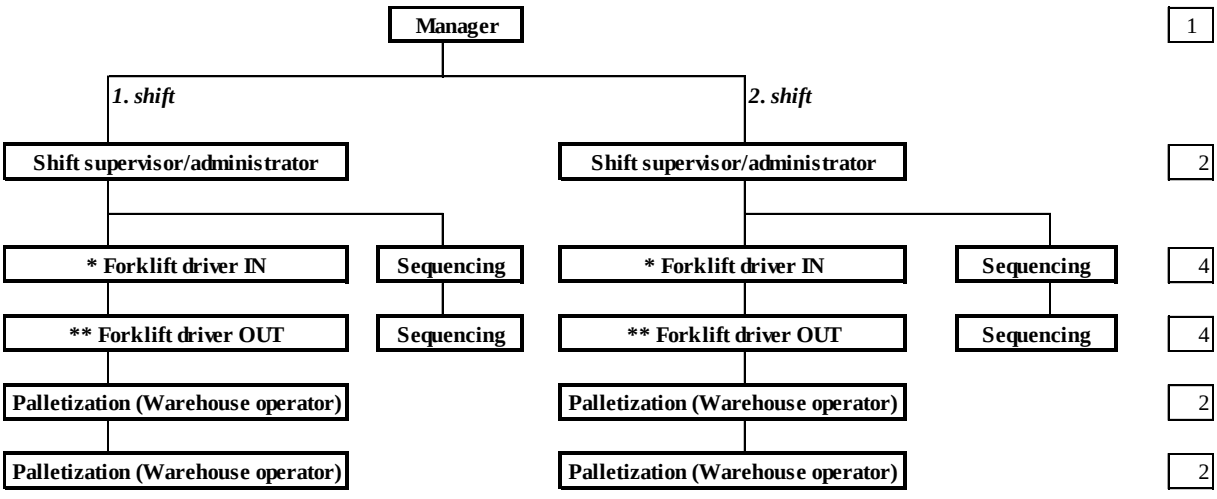
production staff and more effective use of warehouse and production space. In this paper, attention is focused only on the effects in the area of labour utilization and in the area of personnel costs.

The case study compares two models of collaboration between ECC and JCA. The first model is a still used system of collaboration where the ECC performs for JCA only logistic services in the field of material storage; logistic services in the upcoming process of sticking car seat heating systems, including sequential delivery to the assembly line of car seats, would be ensured by JCA on its own. The latter model is a deepening of supply chain collaboration through the ECC involvement into manufacturing operations aiming to realize the synergy effects in the use of human resources and reduce total personnel costs.

## 2.1 Labour force requirements in the event of maintaining the existing level of collaboration

According to the still used model of collaboration between the two companies there was established the necessary number of ECC workers performing the range of contracted logistic services. Fig. 1 summarizes labour force requirements, including jobs and shift coverage. The total number of ECC workers involved in collaboration is 15 persons.

**Fig. 1: Labour force requirements – supplier of logistic services ECC**




| |
|---|
| * provides the receipt and put-away |
| ** provides storage of finished foams and expedition |

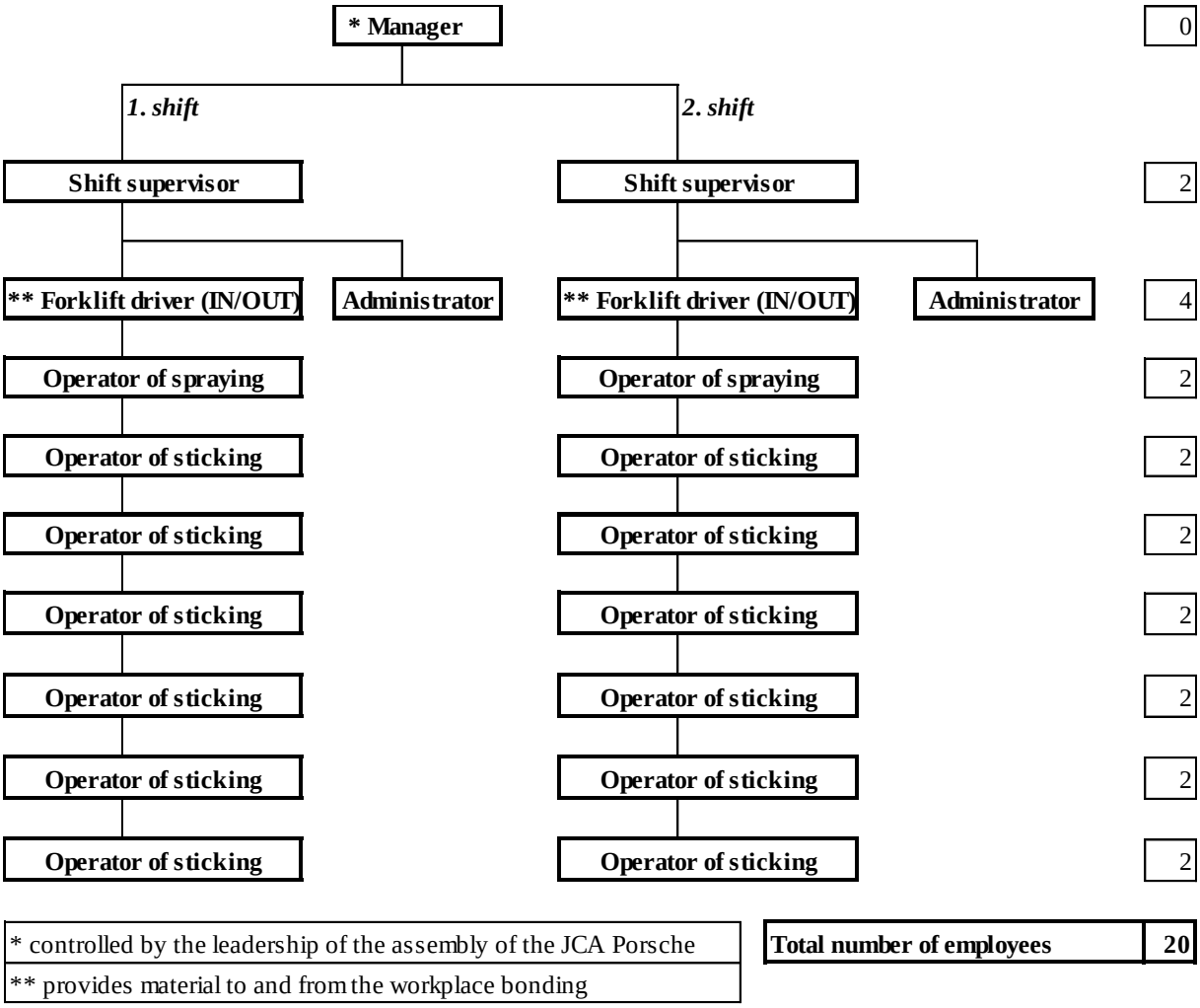
| | |
|---|---|
| **Total number of employees** | **15** |

Source: Authors

Based on the experience of the Slovak manufacturer (plant in Lozorno) there were established labour force requirements to perform adequate logistic services in the process of sticking car

seat heating systems at JCA – see Fig. 2. The total number of workers for operation on a two-shift basis is 20 persons.

**Fig. 2: Labour force requirements – sticking car seat heating systems – JCA**

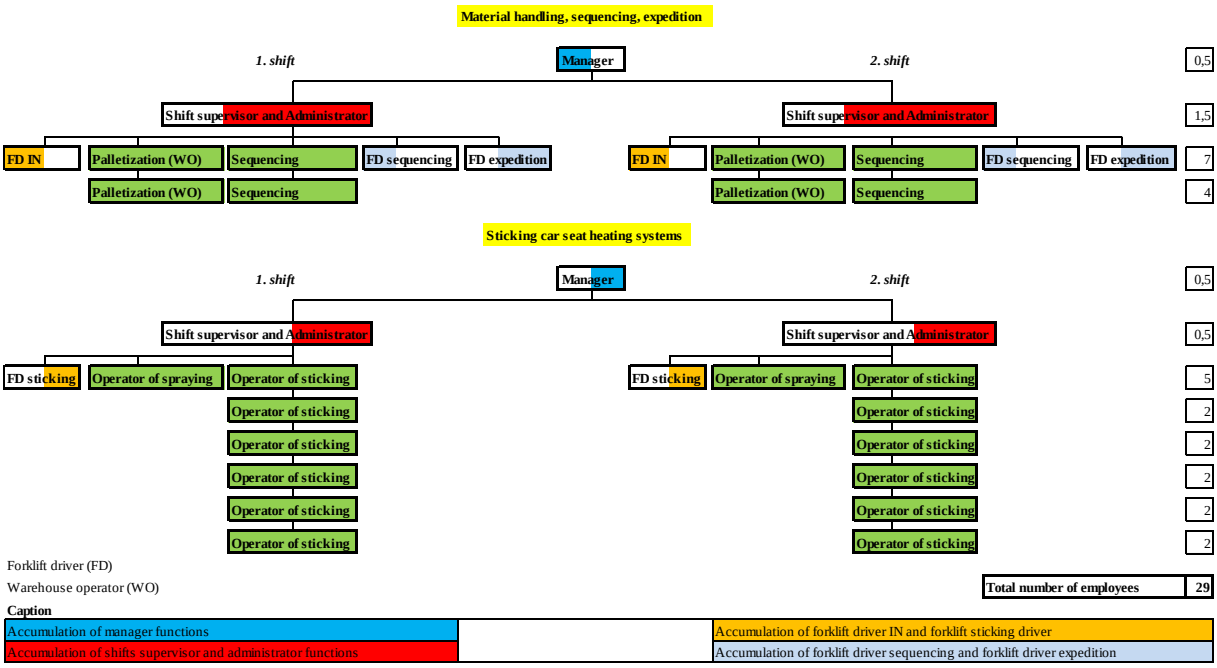



Source: Authors

## 2.2 Labour force requirements in the event of ECC involvement into manufacturing operations

When calculating the required number of workers for this model of collaboration there are taken into account synergies involving the possible cumulation of individual jobs and reduction of administrative activities required for the transfer of materials and intermediate products (seat foam fitted with heating system). Fig. 3 summarizes the total labour force requirements. The total number of workers with respect to their optimal utilization and with regard to the optimal course and management of logistic operations is 29 persons.

**Fig. 3: Labour force requirements – ECC involvement into JCA manufacturing operations**




Source: Authors

## 2.3 Comparison of the two models of collaboration

It results from the above-mentioned analyses that the model of collaboration with the broader ECC involvement into JCA manufacturing operations would reduce the number of workers performing the required logistic operations (by 6 workers). This reduction of the number of workers is associated with savings of the total personnel costs. The amount of the potential cost savings in personnel costs results from Fig. 4. When making calculations, the rules of remuneration of workers in both companies and the jobs of individual workers were taken into account.

The total personnel costs for the existing system of providing logistic services amount to CZK 1,099,065 per month, in the event of expanding collaboration with ECC into manufacturing operations the personnel costs would be reduced by CZK 213,296 per month, representing an annual saving of more than CZK 2.5 million.

**Fig. 4: Total personnel costs – comparison of the two models of collaboration**

| Costs according to the standard model of cooperation | | | |
|---|---|---|---|
| **Material handling, sequencing, expedition - ECC** | | | |
| | **Total per month** | | 434,732 CZK |
| | 1.Shift | 2.Shift | Total |
| Staff (person) | **8** | **7** | **15** |
| **Sticking car seat heating systems - JCA** | | | |
| | **Total per month** | | 664,333 CZK |
| | 1.Shift | 2.Shift | Total |
| Staff (person) | **10** | **10** | **20** |
| | | | |
| Staff in shift | **18** | **17** | |
| **Total staff (person)** | | | **35** |
| **Total personnel costs based on the standard model (per month)** | | | **1,099,065 CZK** |

| Costs for participation ECC in the manufacturing operations | | | |
|---|---|---|---|
| **Material handling, sequencing, expedition - ECC** | | | |
| | **Total per month** | | 357,878 CZK |
| | 1.Shift | 2.Shift | Total |
| Staff (person) | **6.75** | **6.25** | **13** |
| **Sticking car seat heating systems - ECC** | | | |
| | **Total per month** | | 527,891 CZK |
| | 1.Shift | 2.Shift | Total |
| Staff (person) | **8.25** | **7.75** | **16** |
| | | | |
| Staff in shift | **15** | **14** | |
| **Total staff (person)** | | | **29** |
| **Total personnel costs based on the new model (per month)** | | | **885,770 CZK** |

Source: Authors

## Conclusion

The aim of this paper was to present a case study example of supply chain collaboration and discuss the effects resulting from this collaborative initiative. Case study shows that through deepening collaboration within the supply chain it is possible to achieve benefits that are presented in special literature. Expansion of collaboration between the two partners into the field of logistic services in the manufacturing process brings several effects. One of them is a reduction in the total number of workers who perform the required logistic services. Both collaborating companies could thus realize cost savings or improve their economic results. The actual impact on the economic results of both partner companies depends on an agreement between them, i.e. conditions which will be embedded into the contract for the provision of logistic services.

Another advantage can be found in the improvement of logistic operations. ECC workers are specially trained in the field of logistic services, JCA with the ECC involvement into production logistics should gain an advantage of this specialization; these advantages are pointed out by e.g. Pernica (2005). There are also improvements in operational management and some administrative operations are eliminated.

Deepened collaboration within supply chains may not always be equally beneficial for all partners (supply chain members). A company (that decides to involve external logistic services provider into its manufacturing operations) gains dependence on the provider and may lose control over the course and quality of the production process. Deepened

collaboration is also associated with the risk of loss of confidential information and important data.

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## References

Barratt, M. (2004). Understanding the meaning of collaboration in the supply chain. *Supply Chain Management: An International Journal*, 9, 1, 30-42.

Christopher, M. (2005). *Logistics and Supply Chain Management*. London: Financial Times/Prentice Hall.

Cruijssen, F., Dullaert, W. and Joro, T. (2010). Freight transportation efficiency through horizontal cooperation in Flanders. *International Journal of Logistics: Research and Applications*, 13, 3, 161-178.

Fawcett, S.E., Fawcett, A.M., Watson, B.J. and Magnan, G.M. (2012). Peeking inside the black box: toward an understanding of supply chain collaboration dynamics. *Journal of Supply Chain Management*, 48, 1, 44-72.

Fawcett, S.E., Magnan, G.M. and McCarter, M.W. (2008). Benefits, barriers, and bridges to effective supply chain management. *Supply Chain Management: An International Journal*, 13, 1, 35-48.

Gunasekaran, A., Lai, K. and Cheng, T.C.E. (2008). Responsive supply chain: a competitive strategy in a networked economy. *Omega*, 36, 549-564.

Hammant, J. (2011). Collaboration: heard it all before? *Logistics and Transport Focus*, 13, 7, 32-34.

Hoque, Z. (2014). 20 years of studies on the balanced scorecard: Trends, accomplishments, gaps and opportunities for future research. *The British Accounting Review*, 46, 33-59.

Horvath, L. (2001). Collaboration: the key to value creation in supply chain management. *Supply Chain Management: An International Journal*, 6, 5, 205-207.

Pernica, P. (1998). *Logistický management*. Praha: Radix.

Pernica, P. (2005). *Logistika (Supply Chain Management) pro 21. století*. Praha: Radix.

Simatupang, T.M. and Sridharan, R. (2005). The collaboration index: a measure for supply chain collaboration. *International Journal of Physical Distribution and Logistics Management*, 35, 1, 44-62.
Simutupang, T.M. and Sridharan, R. (2002). The collaborative supply chain. *International Journal of Logistics Management*, 13, 1, 15-30.
Singh, P.J. and Power, D. (2009). The nature and effectiveness of collaboration between firms, their customers and suppliers: a supply chain perspective. *Supply Chain Management: An International Journal*, 14, 3, 189-200.
Sixta, J. and Mačát, V. (2010). *Logistika, teorie a praxe*. Brno: Computer Press.

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