

Original article

## Analysis and evaluation of transport effectiveness and profitability

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### INFORMATIONS

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### ABSTRACT

*Transport is one of the final stages in the sales of the produced batch. Manufacturing enterprises each time face a dilemma whether to hire a carrier to transport finished goods or invest in their own transportation fleet. The aim of the article is to look at transport through the prism of finished goods. The discussed transport relates to road transport of metal products. The authors conducted research on the basis of the comparative analysis based on selected manufacturing companies. The analysis concerns the actual cost of transport when choosing the option of an external carrier and the carriage by own means of transport, as well as occurring transport damages.*

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### KEYWORDS

*safety, transport, analysis, cargo transport*



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## Introduction

The specificity of manufacturing companies is related to the range of processes and operations that occur in them. Their core business activity is based on the manufacturing of a finished product, and all the organization's actions are focused on it. The creation of a finished product is the added value for manufacturing companies, which enables their existence. The production process, storage, supply and distribution are undoubtedly the main processes taking place in the manufacturing company. The transport process is treated as an ancillary activity. The supply chain and the transport of finished goods also become a separate issue in the operation of those companies. At present, the market is experiencing a growing tendency of using external transport for supply purposes. However, other rules apply to the transport of finished goods.

In general, transport refers to the movement of goods in time and space, which consists of the following elements:

- preparation of a cargo lot,
- movement of the cargo,
- transport,

- financial and legal service of transport,
- analysis and evaluation of cargo transport [Krawczyk 2011].

The transport of goods includes such elements as:

- cargo loading,
- cargo carriage,
- possible storage of the cargo in intermediate warehouses,
- cargo unloading,
- quantitative and qualitative control of the cargo [Krawczyk 2011].

Implementing the external transport process in a production enterprise requires the involvement of a significant number of people and the performance of numerous activities. Every action is of the utmost importance to achieve the required effect, which is to move the product from point A to point B at a certain time and cost with maintaining the highest standards of cargo security. The safety and quality of cargo as well as its time-in-transit are the most important factors in the process of external transport. The costs involved in this project are put on the backburner.

## **1. Options for the fulfillment of external transport**

Transportation of goods can be carried out not only by various means of transport, but also by hiring an external carrier or by arranging own transport section. At present the tendency to abandon own transport in favor of an external carrier is more and more often applied. The choice of external transport makes sense in economic and organizational terms. Contemporary entrepreneurs, and consequently also customers, cease to consider the economic aspect as the most important factor in choosing a product or service. The realities of contemporary life have created a quality as the main stimulant. The price of the product and service goes to the background. This is a production department, which is mainly responsible for the product quality, but not always. It is often the case that during the final quality control of the manufactured goods they are assessed as impeccable but a customer receives damaged goods. The organizers and operators of external transport processes are to blame for this.

During transport the goods are exposed to various factors, mechanical or physical but also climatic, chemical or biological. Mechanical and physical exposure refers to the influence of external direct and indirect forces that may damage the packaging of the product or the product itself. Physico-mechanical damage is primarily a matter of transshipment, badly secured goods during transportation, and careless handling of loads. Climate hazards are associated with changing ambient temperature, humidity, or exposure to the sun or precipitation. Whereas chemical exposure is related to the spills of chemicals that may have direct contact with the cargo carried. Biological threats appear when microorganisms or small animals (insects, small rodents) can attack the cargo. During transportation, other unforeseen events can occur such as fire, flood, dirt, mud or traffic accidents and any other damage to the means of transport, as well as any unauthorized third party's access to the vehicle carrying the goods, thus affecting the cargo [Krawczyk 2011].

Keeping the transport section in companies has become unprofitable, in favor of a more comfortable and less complex option offered by external transport. When choosing the second variant, an entrepreneur is obliged to:

- choose a shipping company,
- determine the date of loading and unloading,
- prepare the goods for loading at the agreed time,
- prepare the necessary transport documents,
- complete (if necessary) customs formalities,
- inform a customer of the planned unloading date,
- pay the invoice for the transportation service.

The shipping company is obliged to deliver goods, without damage to the appointed address within the specified time. In the case of time or quality failures in the carriage of goods, not only is the forwarding company to be fully responsible for the above but also the image of the entrepreneur becomes decreased. Failing to deliver products on time may have serious financial consequences, which will burden the forwarding company. It can be stated that the manufacturing company will not incur any additional costs in this case, but one must consider the crucial issue, which is the loss of credibility with customers. Mutual trust, financial credibility and reliability are the most appreciated features for counterparties. Therefore, delays in delivering goods or delivering defective goods damage the company's image in the eyes of customers, which could result in termination of further cooperation. The consequences of such a decision can be very serious for the continued functioning of the company. Even if the company manages to maintain a balance after losing one customer, its reputation in the environment as one having problems with timeliness or poor quality products may cause the withdrawal of other customers (although this incident was not directly related to them) and the lack of new customers.

Such behavior can undermine the reputation and honor of the organization and consequently lead to liquidation of the company. External companies' deadline skipping in service delivery is becoming less common. Damaged goods are the biggest problem on the part of external carriers. Drivers do not pay much attention to the quality of goods delivered, but focus primarily on handing over the cargo on time. Quality is pushed to the background. Damage to goods during transportation is most likely to occur during improper product security and careless handling of cargo. In case of partial loading, carriers often recharge the vehicle with other loads, thus the likelihood of damage to the goods transported increases. Not only does it entail the transport company's financial responsibility, but also the loss of the good name of the company in the eyes of the customer. Such a situation leads to:

- making a complaint concerning a product damaged,
- notifying the carrier of the damaged cargo,
- shipping the goods at the entrepreneur's expense,
- repair or replacement of damaged goods,
- shipping the repaired goods,

- the customer's acceptance,
- reimbursement for the damaged cargo by the carrier.

Choosing an external carrier to transport finished goods to the final customer, instead of cost savings, can result in the loss of the company's good reputation and the waste of time and money for the replacement of the defective product. The carrier ought to compensate for the damage suffered – the cost of the damaged cargo, however it will never repair the lost credibility and time spent on rectifying the defect.

## **2. Assessment of own department of external transport in a manufacturing enterprise**

Own transport department in a company is undoubtedly a costly venture. Despite the high costs of maintaining the fleet and additional workplaces, this option may allow avoiding many unforeseen situations such as, for example, recharging a vehicle with other loads. The costs, which employers have to pay when choosing this option, refer to:

- employment of an experienced driver,
- paying all social benefits including fees for business trips,
- buying a vehicle,
- obtaining necessary motor insurance,
- tolls,
- charges for depreciation, service and possible repairs,
- fuel costs.

When choosing this variant, an employer is obliged to ensure the driver's position for the period of the signed contract, even if the goods are not exported on a given day, week or month. However, such a state of affairs can be taken advantage of and supply services or other transport services may be covered, so as not to generate unnecessary costs. Damage to the goods can also occur when using own transport, but the risks of careless handling of the cargo or recharging vehicles with other goods are eliminated.

## **3. The analysis and evaluation of transport on the example of selected enterprises**

The comparative analysis was carried out in three production enterprises from the vicinity of Opole (the Opolskie province). Upon the explicit request of the companies' owners it is not possible to use their names in the article. These manufacturing companies in question use two transport methods to carriage their goods. The first one is the transport of own products to customers by trucks. The second option concerns the use of an external carrier.

Company A was established in 1991. From the beginning of its activity, the driver's responsibilities lied with the owner. Due to the increase in production and the company's development, the owner was forced to cease to perform transport in person for

the benefit of freight forwarding services. After a short time the company invested in the transport department. Currently it employs 33 workers.

Company B was founded in 2004, in a very short time the company was very successful, which translated into a rapid increase in employment. Today, 78 employees are employed there. From the very beginning it has divided transport services between its own transport department and external carriers.

Company C has existed since 1993. Customers, who received the goods by themselves, contracted the first shipments to the company. Over time, with the change in the specifics of the enterprise, it appeared necessary to buy trucks. The sharp increase in production over the last three years has resulted in the division of the whole transports into transport operations carried out on their own and freight forwarding. Enterprise C employs 204 workers.

The table below presents the average production data for the flagship product in each of the three companies for the past twelve months:

**Table 1.** Production data

	<b>Company A</b>	<b>Company B</b>	<b>Company C</b>
Average number of items sold per month [pcs]	10 824	82 173	3 240
Average daily production [pcs]	541	4 108	160
Cost of one product	€ 57.87	PLN 14.50	PLN 268.61

*Source: [Own study].*

Companies A and B send goods to Germany, to towns separated by the same distance of about 820 km, and in both cases the time of transport by own rolling stock is about 30 hours including unloading. On the other hand Company C sends the goods to a place in Poland, 23 km away from the company headquarters. In the third case the time necessary to cover this distance is about 120 minutes, including the time needed to unload the goods. The average hourly wage for drivers employed by Companies A, B and C is PLN 183.79. While the price for the transport service is € 80.00 in Companies A and B for the carriage of one EUR pallet and € 870.00 for the whole truck hire. Due to the fact that the products of Company C are not intended for traditional pallet loading, therefore, the entire truck should be rented for the carriage of finished goods. The cost of transportation for the third Company is PLN 221.40. Detailed data is shown in Table 2.

In each of the three cases presented above, it can be concluded that external transport is more profitable for a company. Costs are much lower than when choosing the option of own transport.

After analyzing all the claims that were lodged from July 2015 to July 2016, there were selected only those complaints, which were undoubtedly affected by the transport. Claims data for Companies A, B and C are as follows.

**Table 2.** Transport data

	Company A	Company B		Company C
<b>Type of transport</b>				
EUR pallet		X		
Truck	X	X		X
Quantity of pallets/month	217	22		No data
Quantity of trucks/month	7	1		12
<b>Shipping costs (external transport)</b>				
1 EUR pallet	€ 80.00	€ 80.00		PLN 221.40
Truck	€ 870.00	€ 870.00		PLN 221.40
Shipping cost/month	€ 6 090.00	€ 870.00	€ 1 760.00	PLN 2 656.80
<b>Shipping cost (own transport)</b>				
Truck	PLN 5 513.70	PLN 5 513.70		PLN 367.58
Shipping cost/month	PLN 38 595.90	PLN 5 513.70		PLN 4 410.96

*Source: [Own study].*

**Table 3.** Claims

	Company A	Company B	Company C
Average number of claims per month using own transport [pcs]	79	839	149
Average number of claims per month using external transport [pcs]	247	7 692	161
Average number of claims per month [pcs]	163	4215	155
Costs of repair/replacement of products with own transport + costs of handling complaints	€ 4 833.42	PLN 13 916.50	PLN 15 157.39
Costs of repair/replacement of products with external transport + costs of complaint procedure	€ 14 555.58	PLN 113 605.06	PLN 16 378.93

*Source: [Own study].*

The data shows that more damage arises with the use of external transport. In Company A there are up to three times more complaints with external transport involved than when the goods are shipped with their own rolling stock. As much as 9 times more damage is caused to Company B. There is a small percentage of the difference between own and external transport for Company C. Companies A and B have no possibility of repairing broken products, any damage to a product causes the necessity of its replacement. The repair option applies only to Company C. In the case of the latter, half of the damages involved minor repairs, one quarter of them covered the total replacement by a new product, and the last part of the complaints related to the exchange of cases. All the three analyzed Companies avoided problems with late delivery of goods.

In spite of the savings that the Companies have with an external carrier, the final cost of transportation is as follows:

**Table 4.** Actual cost of transport

	<b>Company A</b>	<b>Company B</b>	<b>Company C</b>
Actual average cost of own transport/month	PLN 57 929.58	PLN 19 430.20	PLN 19 568.35
Actual average cost of external transport/month	PLN 82 582.32	PLN 117 085.06	PLN 19 035.73

*Source: [Own study].*

## Conclusions

The data obtained during the analyses showed that, despite the great financial difference between external and company's own transports, the main part of defects to goods comes from the use of an external carrier's delivery services. Therefore, not always the basic data on hiring a carrier or investing in own rolling stock is realistic. The profitability of a particular carrier does not depend on the cost of shipment but on the whole transport operation, which includes:

- quality of transportation,
- timeliness of delivery,
- price

Complaints that were recorded in Companies A, B and C, regarding their own rolling stock used, concerned mainly the incorrect protection of the cargo. Moreover, external carriers recharged vehicles with other loads, which also caused damage to the goods, and carried out improper unloading. The greatest difference in terms of the amount of complaints and therefore the price of transport is for Company B. From the data collected, it is known that Company B received a refund of approximately 70% of the value of the damaged goods. However, the recovery of compensation is considered a long-term process, which does not always guarantee 100% reimbursement. Companies A and B failed to attempt to recover costs from the transport company's insurance. Receiving a certain amount of money from a transport company to compensate for losses sustained does not restore the affected trust and credibility that Companies A, B and C have been working on for many years. The losses incurred by the Companies in question are not drastic in financial terms and do not result in the financial liquidity risk. Therefore, investing in own transport department is worth considering in order not to jeopardize the most important values such as trust, professionalism and unquestioned opinion.

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## Conflict of interests

The author declared no conflict of interests.

### Author contributions


All authors contributed to the interpretation of results and writing of the paper. All authors read and approved the final manuscript.

### Ethical statement

The research complies with all national and international ethical requirements.

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