IMPROVING THE COMMUNICATION OF STAKEHOLDERS IN LOGISTICS PROCESSES – A CASE STUDY

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Purpose: The aim of the research was to identify problems and develop a way to improve the communication process between partners in the logistics process.

Design/methodology/approach: By analysing complaints and interviewing employees, the most important problems in the process were identified. Thanks to the 5 Whys analysis, the root causes of the problems were then identified. Understanding the sources of problems was used to design and implement an IT system supporting communication between suppliers and the manufacturer.

Findings: The use of a quality management tool has identified the causes of the problems observed. Three basic sources have been distinguished: lack of dedicated platform to contact the carrier, lack of a knowledge base about the means of transport available at carriers and lack of integration of documentation with a given carrier in the IT system. By knowing the sources of the problems, it was possible to design an efficient and effective IT system.

Research limitations/implications: Improvement of the process was possible thanks to the involvement of top management and awareness of the necessity of changes by interested parties.

Practical implications: As a result of the analyses, a coherent design of the IT system was developed, whose implementation ensured that problems in the process were reduced, including sending errors and invoicing errors, as well as a shortening of the average processing time for a single order.

Originality/value: The implication of quality management tools to improve the logistics process.

Keywords: carrier, transport, logistic, communication, system, problems, quality.

Category of the paper: case study.

1. Introduction

Economic and technical development, growing expectations of customers, pressure to reduce costs, shortened time of access to the product, as well as constantly striving to increase the level of the quality of products and services, result in changes in both the directions and methods of enterprise management.

Currently operating enterprises must accept the great changeability of the environment, and, as a consequence, adapt to the market conditions by introducing new managerial solutions and improving the existing ones. From the point of view of contemporary enterprise management, an important issue is to be able to recognise the chances and threats facing entrepreneurs, as well as taking appropriate measures, including logistic measures, so as to build one's own competitiveness on the market.

Globalisation, competition and uncertainty in management of resources generate the necessity of developing logistics and taking an appropriate approach to logistic management. Companies are trying to increase their competitive advantage and strengthen their position on the market by running projects aimed at streamlining the existing processes and eliminating any errors in them.

The article presents a method of improving logistic processes, focused on the aspect of information flow between the process stakeholders. It has been assumed that the use of quality management tools will enable proper identification of the causes of problems observed, which will translate into the effectiveness of the implemented improvement measures.

2. Information flow

The improvement of processes related to the manufacture of products is particularly important for the competitiveness of enterprises. Both the manufacturing and other supporting processes have an impact on the final effect of the entire production system, which is customer satisfaction. One such process is delivering products to the customer. When external companies are used for this purpose, the aspect of communication becomes particularly important between the customer and the manufacturer, the customer and the supplier, as well as between the manufacturer and the supplier (Smolnik, 2016; Hąbek, 2008; Midor, 2019; Molenda, 2019). This can be expressed schematically by means of Figure 1.
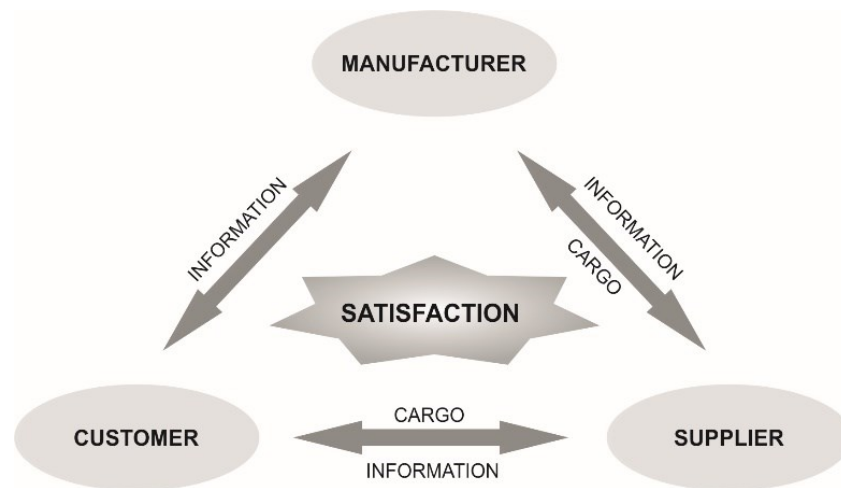
Figure 1. Information flow model.

Customer satisfaction with the delivery will consist of the delivery date and knowledge about it and the form of delivery in accordance with previously agreed standards (Kempny, 2009; Biesaga-Słomczewska and Iwińska-Knop, 2013). This can be ensured by proper and effective communication between the manufacturer, supplier and customer (Kowalczyk and Nartowska, 2013).

2.1. Communication

Nowadays, communication is understood by scientists on many planes. An example of this is the multitude of definitions that deal with countless different aspects of this phenomenon. This process can be described in general terms by stating that communication is the transmission of content from one person to another (Shuter, 1984; Ober, 2013). Developing this scientific definition, they expanded its meaning to include forms of communication. Pszczołkowski defined communication as a process, in the course of which a certain person makes their thoughts, desires or knowledge known and understood by another person (Pszczołowski, 1978). Głodowski (2006), on the other hand, states that communication is a dynamic process, consisting of exchanging, i.e. sending and receiving messages within a specific situation or context. Many researchers have pointed out the role of symbols in the process of communication, e.g. Dance describes it as a process in which people seek to share meaning through symbolic messages (Dance, 1970). Similarly, A. Pocztowski describes it as a process of information exchange by means of spoken and written words, symbols or body language (Pocztowski, 2007). Describing the phenomenon of communication, one cannot overlook the aspect of exerting influence. This is emphasised in the definitions by Adler and Gundersen, followed by Karpowicz, where communication is a complex, multi-layered and dynamic process, through which we exchange meanings; thus, it is not only about providing information, but also about transmitting thoughts and will, thanks to which people communicate with each other (Karpowicz, 2002; Adler and Gundersen, 2008). In summary, the process of relaying information – communicating – can be described by the model shown in Figure 2.
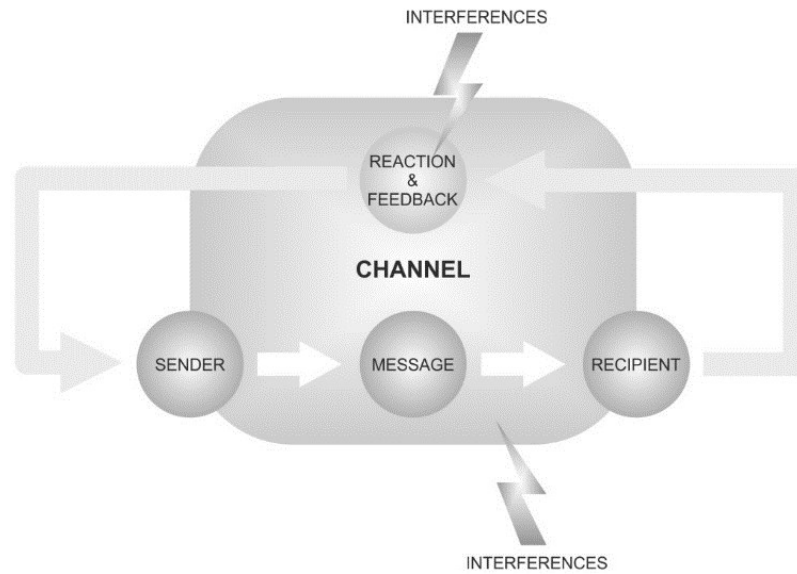
Figure 2. Communication model. Own study based on (Wajda, 2003; Ober, 2013; Stoner et al., 2003).

For the communication process to take place, one needs the sender of the message and, of course, its recipient. The sender encrypts their message and, using the communication channel (one or more), passes on their information to the recipient. The message is decoded (interpreted) by the recipient and causes certain reactions, and often also feedback, i.e. interaction with the sender (Sypniewska, 2015). The sender formulates the message by subjecting it to coding, i.e. communicating it by means of symbols, such as speech, writing or gestures. At the same time, they choose the method of relaying information – an information channel to be interpreted as a means of communication between the sender and the recipient (Sypniewska, 2013; Głodowski, 2006; Ober, 2007; Jaska, 2018). It should be noted that the encoding of information affects the recipient's degree of understanding of the message. This phenomenon is influenced by, among others, the recipient's experience and the similarity of meanings and symbols. The selection of the appropriate channel determines the effectiveness of information provision, resistance to interference and its subsequent usability (e.g. durability).

Among the ways of encoding information in the process of communication, the following stand out: writing, diagram, chart, drawing, gesture or even facial expression (Ober, 2007). The way information is encoded is inseparable from the choice of the information channel. Literature distinguishes between two basic groups of information channels: verbal and non-verbal (Dembińska-Cyran, 2004). The basic way of relaying information is the verbal plane, i.e. the spoken word, written word and all kinds of illustrations. The non-verbal layer is a kind of complement to the verbal message and contains such elements as: gestures, facial expression, voice timbre, emoticons in instant messengers, etc. (Doberek-Ostrowska, 1999; Sypniewska, 2015; Szaban, 2003). Among the communication channels, we primarily distinguish oral and written communication. In the case of oral communication, it can occur: in person, in a group of people, over the telephone, through public speaking and meetings. These, in turn, can be divided into direct (face-to-face) and indirect (via telephone, television,

computer network, instant messengers). Written communications are usually various types of notes, emails, text on a computer screen, text-based instant messengers and visual forms – graphic or video. Nowadays, instant messengers are gaining great popularity as channels for relaying information in organisations, being a medium for conveying sounds, images and written texts. In addition, special portals are being created to communicate with organisations working together (Ober, 2013; Juszczyk, 2011; Major and Spałek, 2017).

The course of the communication process is subject to various types of interference. This interference, known as noise, causes the course of communication and relaying of information to deviate from the ideal level intended by the sender. The noise can be divided into internal and external interference. Internal interference comes from the communication process itself and is a consequence of – most often – incomplete information, choosing an unsuitable communication channel and/or inadequate method of coding, e.g. not adapted to the recipient level. Researchers also point out that the source of internal noise is the indisposition of the recipient or the sender, which makes it impossible to focus properly on relaying and receiving information (Doberek-Ostrowska, 1999; Sypniewska, 2015). External noise has its sources in the immediate vicinity of the communication process and is independent of the sender-receiver system. Examples of such interference are: noise during the relaying of oral information, low bandwidth Internet connection in videoconferencing, etc. (Zalewska, 2006; Sypniewska, 2013; Ober, 2013; Sobkowiak, 1997; Chodkowski, 2017; Nęcki, 2000). An important element of communication that can minimise the impact of interference is feedback from the recipient. Through their reaction, they can signal the existence of an information gap (Potocki et al., 2003; Jaska, 2018). All kinds of interference, regardless of the origin, reduce the quality of the communication process.

2.2. Quality of communication between company stakeholders

The term "quality" in literature is a broad concept. However, it primarily focuses on the requirements and needs of the customer, e.g. according to J.S. Oakland, quality is about satisfying the customer's current and future needs. Philip Bernard Crosby defines quality as the conformance to requirements, A. Feigenbaum understands quality as the characteristics of a product or service that causes a given product to meet the expectations of the user (Stoma, 2012). P. Grudowski (2007) writes about the extent to which a set of properties of a product, service, system or process meets the requirements of the customer or other interested parties. J.M. Juran points out the occurrence of several meanings of the term quality:
- the extent to which a specific product meets the demands of a specific customer,
- the extent to which the product can potentially satisfy the end user,
- the exten to which the product conforms to the model of the standard or to accepted requirements,
- the extent of the user's preference for a particular product over other products,
- a separate feature or set of features that characterise a given product.

To summarise, it is possible to adopt a general definition expressed in PN-EN ISO 900:2006 that quality is the extent to which a set of inherent properties meets the requirements (Borys, 2012; Wolniak and Skotnicka, 2005). Taking into account the above considerations, it is necessary to identify what features of communication determine its quality; in other words, what properties will satisfy the requirements of the sender and recipient and what interference will affect the quality of communication.

The quality of communication is a very complex concept. There are many studies in literature on the subject indicating many aspects of this phenomenon. Vos and Schoemaker (2004) synthetically describe the quality in communication as having five dimensions. These are:

- clarity, i.e. the intelligibility of the relayed content,
- recipient orientation,
- consistency and logic,

responding to changes and using feedback to improve the process,

- effectiveness and efficiency.

Olsztyńska points out that the quality of communication is primarily (Olsztyńska, 2002):

- awareness of the communication process,
- understanding based on and the clarity of the message and dialogue,
- credibility,
- commitment.

E. Robertson developed a pyramid of communication quality, in which he presented four levels, the achievement of which leads to a high level of communication (Holtz, 2004; Rogala, 2014):

1. Messages should reach the appropriate recipients in the right form and time.
2. The content and form of the message should be tailored to the specific recipients.
3. Convincing the addressee that the messages relayed are relevant to their work.
4. Communication should affect the addressee – influence their thoughts, commitment and action.

Ewa Jaska (2018) notes in her research that the most important factors influencing the effectiveness of communication include: Relationships between employees, Personality, Professional experience, Culture and organisational climate, Organisational structure.

The choice of the information channel also has a significant impact on the quality of the messages relayed. The most popular communication channels include written (letter, email, text messenger) and oral (face-to-face conversation, telephone, multimedia messenger) (Major and Spałek, 2017). The oral communication channel should be used when (Kania, 2017):

- an immediate response is needed,
- the message is relatively simple and easy to understand,
- a record of the conversation is not needed,

– one can meet the other person quickly and without any problems,

– the participation of other people in conversation is needed in order to make decisions or resolve conflicts,

– there is a need to observe the behaviour, tone of voice and gestures of the other person (emotional factor).

In turn, the written channel is used when:

– there is no need for an immediate response,

– the message is complicated or requires planning,

– the content of the message should be available to the recipient over a longer period of time,

– a documented record of the conversation is needed,

– the recipients involved in the communication are numerous and in many locations,

– we want to avoid the twisting of facts that result from relaying them orally,

– direct contact with the other party is inconvenient.

In addition to the features that should characterise proper communication, one cannot overlook the various types of interference that may occur, regardless of the intention of the sender. J. Shaban (2003) points to the main interferences, which include:

– the sender's lack of faith in the content of the information they are relaying,

– the recipient's lack of knowledge of the information received,

– insufficient interest of the recipient in the content of the information received,

– lack of ability to relay the content of information,

– cultural differences, the basis of which is, e.g., a language barrier,

– time pressure not allowing one to communicate effectively.

A. Potocki (2003), in his work, defines interference as "information gaps" and identifies two main groups of causes:

– the recipient receives incomplete information, which does not allow them to take the expected action and – at the same time – hopes the sender supplements it in the future,

– the recipient does not agree with part or all of the message and does not use it to carry out any decision-making action.

Apart from the interference generated by the participants of the communication process and by the environment in which they find themselves, the important components of noise are also elements related to random phenomena. They are very difficult or even impossible to predict. Examples of such interference may be such phenomena as: too little paper in the fax machine, placing a letter on the wrong desk, sending an email to the wrong addressee, forgetting about an agreed telephone call, computer freeze, etc.

3. Case study

3.1. Subject of the research

The case study was carried out in a manufacturing company, the main area of activity of which is the production of thermal insulation materials for the construction industry. The conducted analyses focused on the process of transporting the finished products to the recipient and, in particular, on the communication between the manufacturer and companies providing logistic services by means of road transport.

The company in question does not have its own transport facilities, and all such services are carried out by external carriers. The number of monthly transport orders carried out in the company is, on average, approx. 600; however, due to the specificity of the construction industry, this amount varies depending on the season. Most orders are carried out in the last quarter of the year. The transported goods are of a large volume and relatively low weight, so the company requires vehicles with a minimum loading height of 2.75 m.

3.2. Communication process with the carrier

Each transport order issued in the company's MRP system consists of the following data:
- Name of the carrier,
- Type of vehicle,
- Loading and delivery date,
- Places of delivery,
- Distance,
- Price,
- Load number.

The order issued in the SAP system was exported to a .pdf file and then sent by email to the carrier. On receipt of the order, the carrier received a load number, which was then given to the driver, who refers to it when reporting for the load at the plant. The above steps can be presented as the following process visible in Figure 3:
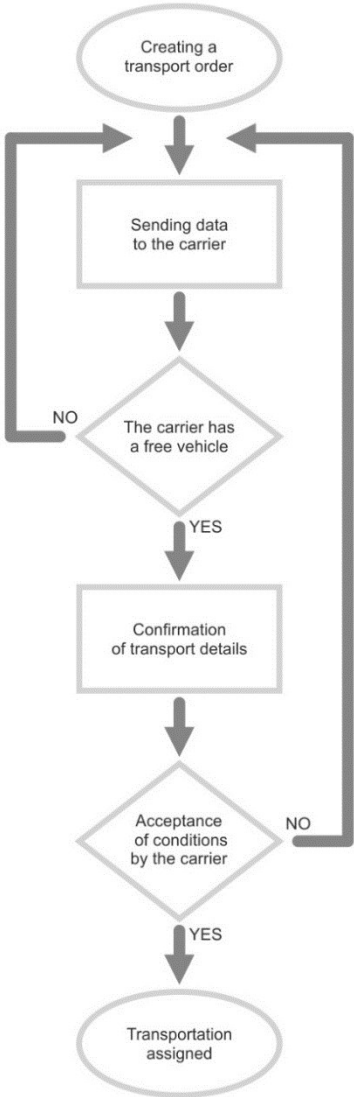
Figure 3. Procedure for creating a transport order.

The above procedure, despite its simple structure, is time-consuming. In order to complete it, the operator of the order had to make a series of calls with subsequent carriers, giving them details of the transports. Based on their knowledge and experience, the person dealing with transport specified which company should be contacted first. However, this did not mean that the order chosen by the dispatcher turned out to be the right one nor was the availability of vehicles for particular routes guaranteed.

The findings collected in this way had to be entered into individual transport orders in the MRP system. Each of them, in the form of a .pdf file, then had to be sent by email to the appropriate carrier.

An important element of the process from the point of view of business contacts was also maintaining the assumed balance in the amount of transport assigned to individual carriers cooperating with the company. There could not be a situation where one transport company would reveive too high a share of the contracts, as this could mean being too dependent on it, which was not in line with the company's strategy. Bearing in mind the long-term cooperation,

the right proportions had to be kept when separating orders. This involved a continuous analysis of the shares and often a quick decision on the choice of the carrier to which a given route was offered.

The last element that the person assigning routes had to take into account was the attractiveness of the route for the carrier. In the case of domestic transport, some regions of Poland are difficult for carriers to operate in, due to the relatively small amount of possible return transport. In turn, other directions are very attractive. Here, too, it was necessary to maintain balance and properly separated routes. The way to solve this problem was to combine the routes into packages (offering several less and more attractive routes together). The effectiveness of all the activities described above depended on the experience of the person dealing with transport. The communication channels in this process were: telephone, email and instant messenger.

3.3.   Identification of problems

After the analysis of transport documentation, reports, in-depth observation and individual in-depth interviews with logistics department employees, the following problems were identified in current operations:

- large variation in the cost of transport services,
- no transport notification,
- wrongly issued invoices,
- excessive dependence on one or several transport companies,
- delivery to the customer of goods other than those ordered,
- accidental disclosure of rates to other carriers,
- delays in delivery.

The effect of these problems could be a loss of counterparty trust, which, as a consequence, could even lead to the loss of key customers, and thus to a significant drop in turnover.

To find out the causes of the problems, the 5 Whys tool, known in the automotive industry, was used to solve uncomplicated problems in production processes. It is based on the fact that for each identified problem, a sequence of "why?" questions is asked. Questions are asked until a satisfactory answer is obtained, i.e. the root cause of the analysed problem is known. The analysis carried out using the 5 Why method is presented in Figure 4.
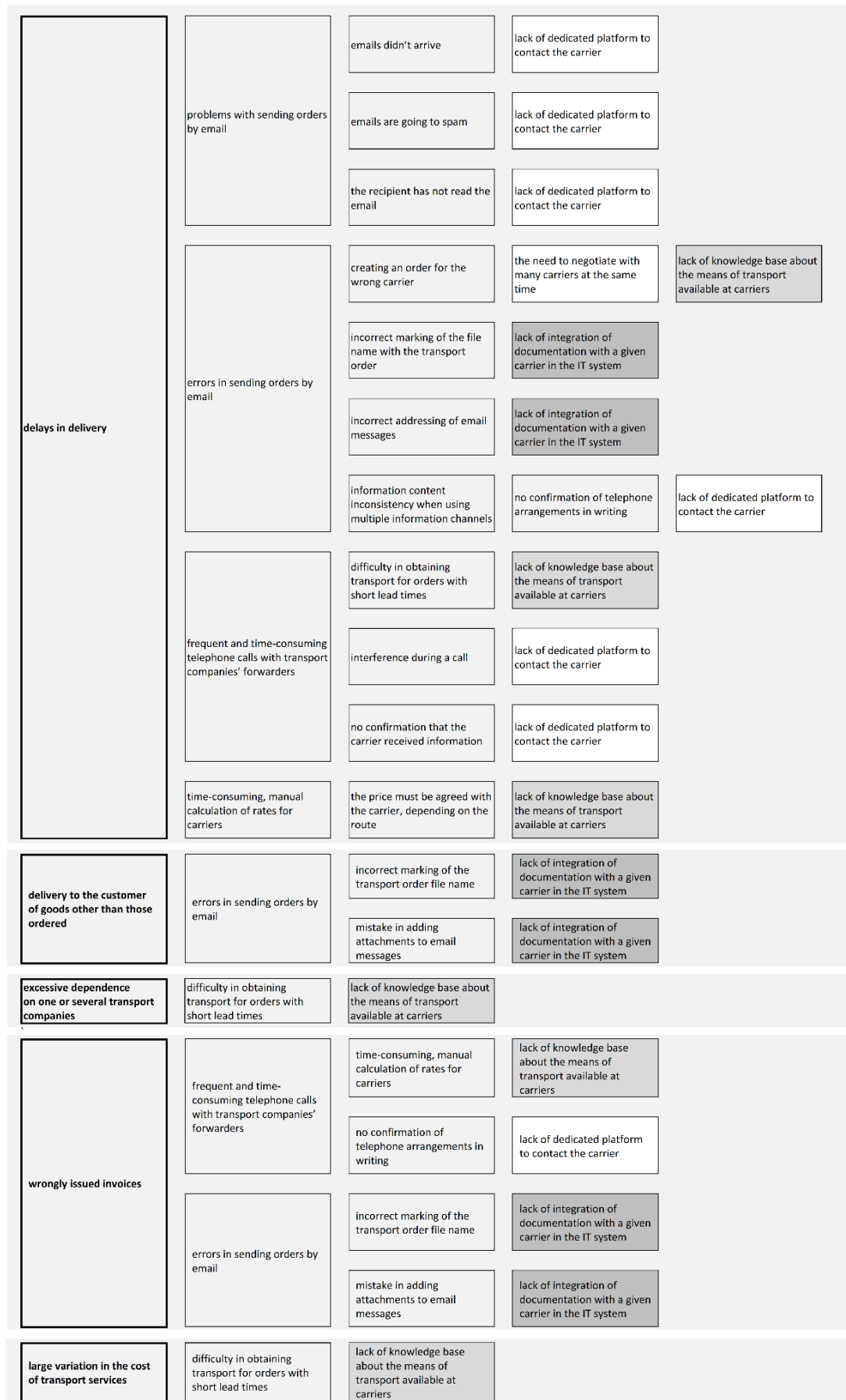
delays in delivery	problems with sending orders by email	emails didn't arrive	lack of dedicated platform to contact the carrier	
		emails are going to spam	lack of dedicated platform to contact the carrier	
		the recipient has not read the email	lack of dedicated platform to contact the carrier	
	errors in sending orders by email	creating an order for the wrong carrier	the need to negotiate with many carriers at the same time	lack of knowledge base about the means of transport available at carriers
		incorrect marking of the file name with the transport order	lack of integration of documentation with a given carrier in the IT system	
		incorrect addressing of email messages	lack of integration of documentation with a given carrier in the IT system	
		information content inconsistency when using multiple information channels	no confirmation of telephone arrangements in writing	lack of dedicated platform to contact the carrier
	frequent and time-consuming telephone calls with transport companies' forwarders	difficulty in obtaining transport for orders with short lead times	lack of knowledge base about the means of transport available at carriers	
		interference during a call	lack of dedicated platform to contact the carrier	
		no confirmation that the carrier received information	lack of dedicated platform to contact the carrier	
	time-consuming, manual calculation of rates for carriers	the price must be agreed with the carrier, depending on the route	lack of knowledge base about the means of transport available at carriers	
delivery to the customer of goods other than those ordered	errors in sending orders by email	incorrect marking of the transport order file name	lack of integration of documentation with a given carrier in the IT system	
		mistake in adding attachments to email messages	lack of integration of documentation with a given carrier in the IT system	
excessive dependence on one or several transport companies	difficulty in obtaining transport for orders with short lead times	lack of knowledge base about the means of transport available at carriers		
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		mistake in adding attachments to email messages	lack of integration of documentation with a given carrier in the IT system	
large variation in the cost of transport services	difficulty in obtaining transport for orders with short lead times	lack of knowledge base about the means of transport available at carriers		

Figure 4. Analysis of 5 Whys.

As a result of the 5 Whys analysis carried out, it was possible to learn the root causes of the identified problems in the process of contracting the transport of products.

Among the causes of the occurring problems, the most important of them should be mentioned, namely:

- problems with sending orders by email,
    - errors in sending orders by email,
    - frequent and time-consuming telephone calls with transport companies' forwarders,
    - time-consuming, manual calculation of rates for carriers,
    - difficulty in obtaining transport for orders with short lead times.

Identified by means of the 5 Whys analysis (Fig. 3), three main elements were found to be the root causes of all analysed problems:

- lack of dedicated platform to contact the carrier,
- lack of knowledge base about the means of transport available at carriers,
- lack of integration of documentation with a given carrier in the IT system.

3.4. Improvement activities

Based on the analysis of the collected data, it was concluded that the source of most of these problems is incorrect or inefficient communication. Improving the quality of communication between the manufacturer and the carriers comes down to achieving the following objectives:

- systematic assigning of orders to individual carriers,
- receiving current, up-to-date and immediate feedback,
- eliminating human error,
- facilitating the exchange of information between the shipper and the carriers,
- collecting all information in a single system accessible to all stakeholders.

It was possible to meet all the assumptions by developing and implementing a dedicated network IT system. Such a system had to be implemented both in the production company and at all logistic partners.

The implemented system made it possible to change the procedure for assigning transport, and most of it was automated (Figure 5).
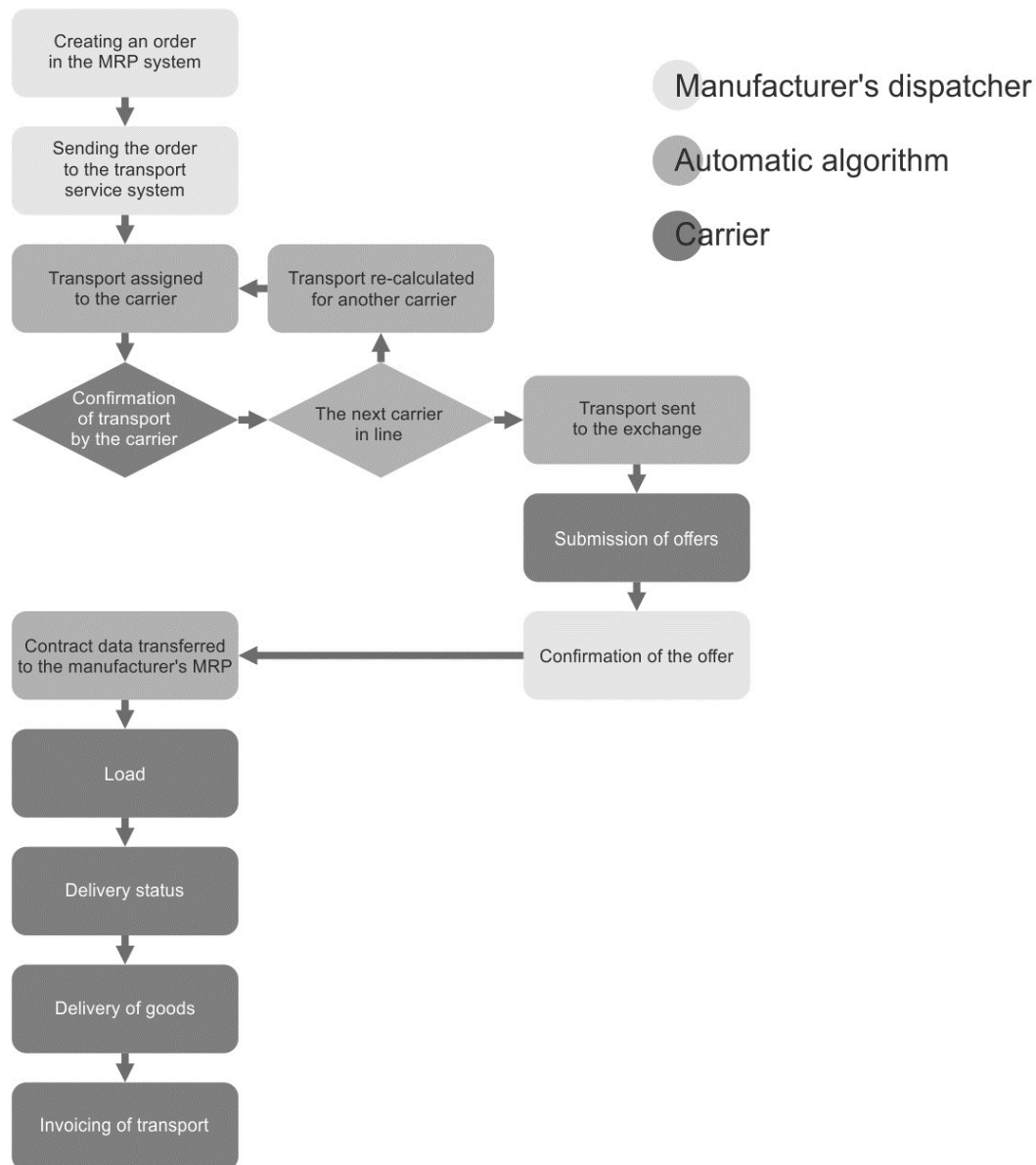
Figure 5. Procedure for assigning transport after introducing changes.

The dispatcher creates a transport order in the company's MRP system, the data of which is sent to a new transport service platform. The algorithm, based on carrier data (technical possibilities, participation in monthly orders, preferred destinations, etc.), assigns the order to the selected partner and awaits their confirmation. If the carrier does not confirm their readiness for execution, the order is sent to another company. If none of the contractors confirms the transport, the order goes to the "exchange". There, transport companies make offers, and the dispatcher "manually" chooses the carrier.

If the order has been accepted by the logistic partner, the booking of the loading date, load and delivery of the goods follows. During transport, the carrier is obliged to enter into the system information related to the status of delivery and possible delays. After the delivery stage is completed, the service is invoiced.

The procedure modified in this way resulted in a number of benefits, the most significant of which are:

- increased transparency, both in the selection of carriers and in the rules of cooperation (selection algorithm, calculation of service rate),
- easier exchange of information between shipper and carriers (one standard for information exchange),
- systematising and simplifying information in the system (one place to access orders, avoiding the generation of unnecessary documents and errors),
- enabling the assessment of individual carriers on the basis of historical data (quantified values show the level of carriers in an objective manner),
- elimination of invoicing errors.

The implementation of the new system and related procedures has made it possible to reduce the number of people handling transport from three to one, with an increased number of orders.

4. Summary

Thanks to the implementation of the new system, communication between the shipper and carriers improved significantly. All significant changes are presented in Table 1.

Table 1.
Effects of improvement

Element of the process	Before improvement	After improvement
communication	frequent	limited to a minimum
sending orders	by email	systemically
calculation of rates	manual	automatic
carrier selection	by dispatcher	automatic
confirmation of order acceptance	none formally	systemically
load notification	none	systemically
additional information	on request	systemically
sending errors	approx. 2.5%	0%
average processing time for a single order	approx. 7 min.	approx. 3 min.
invoicing errors	approx. 12%	0%

It is particularly important, from the shipper's point of view, to receive immediate, structured feedback for each planned transport. The availability of up-to-date information on transport notifications is often a big plus for the customer on construction sites. It allows them to plan resources for unloading transport and to effectively manage deliveries.

The costs of emergency deliveries resulting directly from communication errors were reduced. Thanks to the use of the internal exchange, all carriers have immediate information about available transport and are often able to offer very favourable conditions.

Shortening the time needed to find a means of transport and handle an order allowed for a reduction in the number of employees involved in handling transport, which resulted in more efficient planning of the logistics department working time. There was a change in the role of the dispatcher, as well as their responsibilities. Nowadays, thanks to the automated process of assigning orders, its most important tasks include:

– creating transport in the MRP system,
– deciding whether the transport is to be automatically assigned or put on the exchange,
– a periodic review of the current level of participation of carriers,
– periodic price adjustments.

The implementation of the project has also brought unexpected benefits to transport companies in the form of improved service quality. Although this improvement has been, to some extent, enforced – through monthly evaluation reports of the subcontractors – it caused the carriers to attach more importance to the timeliness of their services, and thus become more competitive with similar companies.

To summarise, despite the fact that the work on improving the process of carrying out transport orders took more than six months, it should be stated that the actions taken achieved the intended effect. A value that was not foreseen is the positive impact on the quality of services provided by transport companies based on periodic evaluations generated by the IT system.

Acknowledgements

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