

Katarzyna Topolska

WSB University in Wrocław ul. Fabryczna 29/31 Wrocław

e-mail: ktopolska@cils-consulting.pl

THE USE OF LOGISTIC INSTRUMENTS IN EFFECTIVE EFFICIENT MANAGEMENT OF A TRANSPORT COMPANY

s. 187-196

ABSTRACT

The paper will present weaknesses of a management process being diagnosed in a transport company and the implementation of logistic instruments for the purposes of making improvements and showing an aspiration to effectively manage a company. This topic is significant in respect of socially general benefits as well as from the enterprise's point of view. Application of logistic tools presented in the paper to transport companies affects reduction of negative effects of transport operations, completion of actions targeting a balanced growth resulting in enhanced effectiveness of a transport system in the entire supply chain. Transport is an indispensable element of logistic systems. Its organisation and effective functioning affect smoothness of logistic chains.

KEYWORDS

transport process, management, telematics

INTRODUCTION

Logistic management belongs to development directions of the management concept. It consists in formulating and applying an appropriate corporate strategy. Its characteristic feature is a complex view over an entire organization. A systemic approach and integration eliminate barriers between organizational cells. The main target is to adjust to customer's needs and reduce costs. It is possible thanks to effective planning, controlling and inspecting. According to Leavitt's diamond, variables affecting logistics management comprise tasks, employees, technology and organization [13 page.18]. An approach to logistics and knowledge of corporate employees are very important. An appropriate level of education

and awareness of organization members enable effective management of operations and to achieve goals. It is similar to requirements and time for completion of tasks. The higher the quality and the shorter time of rendering our services, the better satisfaction of customer's needs. Our competitiveness grows and our market position is strengthened. Technology is necessary here. The equipment we have must meet appropriate technical and environmental requirements. However all these factors are supported by specialist software assisting our work. All these elements are strictly interrelated with each other and affect the structure of an organization.

Logistic management pays special attention to facilitation through application of computer equipment most often and specialist software. A strategic logistic direction involves improvement of efficiency and cost reduction [1 page 29]. Investments must be made in order to facilitate organization and eliminate weaknesses related to bottlenecks.

A logistic concept of integrated management of an enterprise is the key to its functioning and achieving successes in the contemporary, competitive market.

Management elements involve planning, controlling and inspection. Logistic planning in an enterprise is done on three levels: tactical, strategic and operational ones. The tactical scope includes setting tasks, competences and responsibilities of a logistic department. It allows an entire company to define tasks, set objectives and directions of operations agreed in a strategic plan as well as to adjust them to conditions the company is operating in.

Strategic planning takes into account all long-term decisions. It takes place on the highest level of management. It is to define and accomplish goals of the organization as well as to define resources and tools necessary for their accomplishment. It accounts for the micro and macro environment of an enterprise. So strategic management is a philosophy of corporate functioning. It involves developing an organization, orientation on opportunities and avoidance of threats occurring in its environment [11 page 47]. A logistics strategic plan enables integration of key areas in an enterprise such as an IT system, operational activities, an organizational structure, customer service.

When planning strategically in transport micro enterprises we may consider alternative issues:

- to buy new transport means in order to increase profits, create possibilities of better customer service, strengthen a position in the transport services market or to enlarge activities by adding forwarding services;
- if we decide to further build our position in the market as a carrier and we choose a new transportation means, will it pay better to take a credit or lease over a few years' time;
- how will our decisions and our activities affect the environment;
- is worthwhile supporting an organization with specialist programmes facilitating management of the rolling stock, control and other activities on the operational level.

Operational planning is of short-term nature. It concerns planning particular steps aiming to follow a strategy of handling and building a logistic system. Its scope comprises all processes of transportation, loading, packaging, marking thanks to which we carry out the flow of goods [10 str. 22].

Logistic controlling interferes the planning process through decisions. Planning is done under circumstances of insecurity so the realization process is not going as planned. Despite advanced technology, possibilities of applying qualified programmes, simulations we are not able to take into account all situations which may occur. Decisions made should correspond with the selected strategy.

Thanks to controlling we have a possibility of locating deviations from the realized planning in the right time so we can take appropriate preventive measures. This allows us to effectively eliminate threats.

1. MANAGING PROCESSES IN AN ENTERPRISE

Process management may be presented as interrelated with each other elements as follows [6 str. 60]:

Identification of processes namely definition and documentation of processes occurring in an enterprise and defining new processes as a result of market analysis; modelling processes i.e. shaping parameters of the course of the process, effects of process completion;

Introduction of processes in order to secure a correct start and functioning of processes; Managing processes to secure continuity (repetitiveness) of process functioning, setting tasks, the scope of responsibility and the control over process completions and regular evaluation of effectiveness of process operation on the basis of established measures and indicators.

A process approach is directly related to generating values for customers. The essence of process management consists in not only facilitation of our work but first of all the best satisfaction of customers' needs. That is why solutions must be applied aiming at efficient and smooth action as well as adjustment of services or products to our customers. Formulation of process objectives apart from customer's requirements should take into account strategic and operational goals of an organization as well as principles of benchmarking.

The smoothness of processes is affected by random and special causes. Random incidents originate from the mere process, its nature and there are a lot of them however their consequences are comparatively minor [7 page 87]. Nevertheless it may turn out that their overall impact is very strong and there is a necessity of changing a process. The management is fully responsible for them.

Special causes occur occasionally. However their consequences may significantly hinder the process. These causes include an unprepared employee, faulty semi-product and others. In order to identify such inconsistencies we may use a cause and effect diagram or Pareto's diagram.

We must know that a logistic system creates entire logistic processes. Nowadays there is a tendency to outsource the organization of external logistic processes to logistics operators. They offer a complete carriage service including organizing, palletizing, storing and handling the goods on behalf of the customer. Such a company is to reduce customer's costs and their costs which can be achieved through a very well organized work system e.g. the one based on just-in-time principle. Through outsourcing an enterprise gets rid of additional activities and may concentrate on development of core activities.

One of the methods of researching effectiveness in management of an enterprise is the Statistical Process Control aiming to check efficiency of the process and locate its weaknesses. SPC is used for searching sources of deviations and preventing the rise of irregularities. Its tasks also involve constant monitoring and improving processes.

The use of SPC method allows us to [7 page 339]:

define if the process is able to meet requirements;

define if the process meets the requirements within the assumed or any time;

anticipate and take corrective measures when a process does not meet defined requirements.

The SPC procedure:

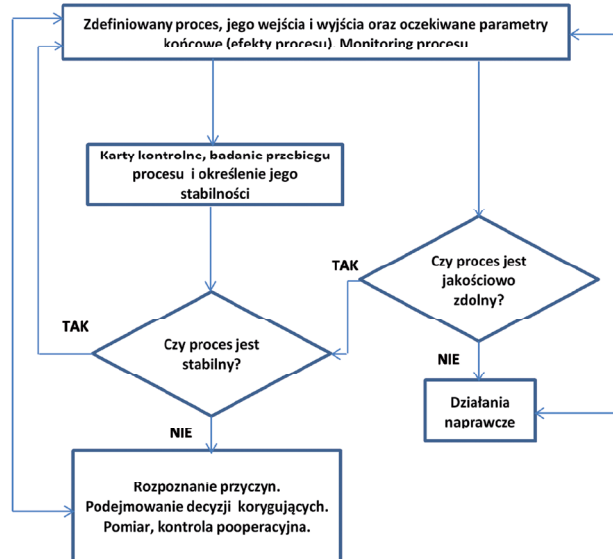


Fig. 1. The course of statistical controlling of the process. Source: [7 page 340].

Thanks to statistics tools we transform results of observation into information helpful in decision processes. Apart from collecting relevant data, we must have knowledge on the methods which must be used for the analysis. The achieved result of the interpretation must be appropriately adopted into practice.

Data is collected by means of control charts. They are linear graphs containing additional two lines called an upper one and a lower one. Using control charts we can observe a few subsequent measurement points making up a sequence of values growing or declining or deviations from the mean value or there might be results exceeding the control lines [7 page 340]. Such monitoring allows us to define whether the process is stable or not stable. If it is unstable, causes of this instability must be defined and corrective measures taken.

2. METHODS FACILITATING A TRANSPORT PROCESS

We can illustrate areas of activities which need facilitating on the basis of research and analyses. Corrective measures are taken in order to eliminate errors and mistakes. Most often it is enough to make changes to the course of processes completed in an enterprise but sometimes it is necessary to engage additional resources. Nowadays they provide a wide range of possibilities. They are selected depending on the type of enterprise and its business. .

2.1. EXPERT SYSTEMS

An expert system may be defined as a system based on knowledge and recognized as a programme to be used for imitating specialist knowledge and an ability to draw conclusions by qualified specialists regarding a precisely limited scopes of tasks [10 pages 334]. A company rendering transport services may use a series of expert programmes aiding management of this type of business. The market offers programmes enabling

accepting orders, issuing transport and forwarding orders, bills of lading CMR, invoicing, filing purchases, stock and collecting receivables. Moreover they have an option of human resources management – records of employees, contracts, settlements, generating reports for the purposes of the State Labour Inspection and Inspection of Road Transport. Documents are generated in PDF, JPG formats and may be printed, sent via e-mail. They have an in-built function of a diary reminding of important deadlines such as technical and medical check-ups, insurance, calibrations of tachographs.

Thanks to databases which we create when using the programmes, we may generate various reports useful for managers and the management. The programmes are modular and give a customer a possibility of adjusting them to their individual needs. The customer may choose which module to purchase.

Monitoring systems based on GPS – Global Positioning System are another class of programmes facilitating transport management. They facilitate management of a fleet of vehicles. They show location of vehicles and history of routes made. We may check if the driver stuck to the established route. GPS systems are welcome by contractors commissioning the carriage of cargo. If it is not possible to contact a driver in order to get necessary information, GPS solves the problem and each question of a customer may be instantly answered.

Additional options of monitoring programmes enable controlling of fuel consumption. Special probes installed in fuel tanks inform about fuel consumption of a particular vehicle. When the limit is exceeded we are informed about it. It is the way to check honesty of drivers and their driving style because we are informed about the speed and motor revolutions.

2.2. FREIGHT EXCHANGES

In order to eliminate empty runs and optimally use the loading space it is useful to resort to freight exchanges. TimoCom Truck&Cargo® is the most popular one. It offers cargo, free loading and warehousing space as well as a platform for tenders. We ourselves may communicate and sell our cargo. In order to become a user of the freight exchange, an enterprise must undergo a correct verification such as inspection of valid registration documents. A company must operate in to market for at least a year. After successful verification we receive a login, a customer's number and a password. Then we are fully able to use all its functions. Membership to the exchange confirms prestige of the company. TimoCom Truck&Cargo® provides its customers with support in collecting receivables for transport services. The collection department blocks entrepreneurs who do not pay their debts and pose a risk for other users to incur losses. It provides competent advisory and support in the event of problems. There is another freight exchange operating on similar principles which can be compared to Timo Com Truck&Cargo® namely Trans.eu established by Logintrans Sp.z o.o.

2.3. SELECTION OF PURCHASING SOURCES

A procurement process does not only concern production companies. Strategies for selecting suppliers and sources of purchases are also drawn up in service companies. It is an area with a view of savings and cost reduction.

The answer to the question how many, when and where to buy involves:

- a detailed market analysis, familiarization with catalogues, advertisements, price lists,
- sending enquiries;
- choosing the most favourable suppliers;
- negotiations;
- concluding a contract.

Depending on what must be bought during the selection of a supplier it is important to take into consideration their location because it will affect the delivery time. The price is connected to sales terms defining who incurs transport costs, insurance of consignments etc. [11 page 175].

Our decisions about who will be a supplier of necessary products for our operations have a significance in the facilitation process. If delivered products and services do not meet our requirements we must make a decision about changing a supplier. That is why, it is so important to make the right choice about sources of supplies. A scoring method is a useful tool here. Stages of the scoring method is as follows [11 str. 176]:

- defining basic selection criteria;
- establishing scoring principles in respect of particular criteria;
- introduction of possible importance to particular criteria and parameters because not each of them may have equal importance to an enterprise;
- calculation of points scored by particular suppliers;
- selection of a supplier.
- From the point of view of a transport company out choices may concern:
 - spare parts- shall we choose a service supplier or shall we use a supplier offering cheaper counterparts;
 - fuel - filling up a car in cash or signing a contract guaranteeing discounts and delayed payments;
 - means of transport- which of the producers meets our expectations most, shall we buy a new or a second hand vehicle;
 - financing method- shall we use a bank or a lease company.

All above aspects to a greater or lesser extent will affect the incurred costs and effectiveness of services rendered and development.

2.4. A QUALITY MAP

A survey of customer satisfaction for the purposes of achieving valuable conclusions may also be obtained by calculating CSI – Customer Satisfaction Index.

The first step is to identify factors affecting customer satisfaction. The next one is to conduct a survey. A customer may give a specific number of points to each of the factors. Particular aspects are evaluated from two perspectives. The first one evaluates the quality, the second one is importance customers attach to a particular factor. All the results of the survey are gathered in a specification where we calculate an overall importance and a grade by means of formulas as follows:

$$w_i = \frac{\sum_k w_k \times n_{w_k}}{\sum_k n_{w_k}} \quad c_i = \frac{\sum_k c_k \times n_{c_k}}{\sum_k n_{c_k}} \quad (1)$$

w_i - coefficient of importance;

c_i - satisfaction grade;

i - aspect taken into account in the form;

k - number of grades used in the questionnaire;

w_k/c_k - value of importance/grade provided according to a range in the questionnaire;

n_{w_k}/n_{c_k} - number of indications of particular importance/ grade.

The next step involves calculation of mean importance and satisfaction grades in order mark a division on the axis of the quality map.

$$W_{SR} = \frac{\sum_{i=1}^N w_i}{N} \quad C_{SR} = \frac{\sum_{i=1}^N c_i}{N} \quad (2)$$

w_{sr} - mean importance (weight);
 c_{sr} - mean of satisfaction grades;
 N - number of factors examined;
 w_i - coefficient of importance ;
 c_i - satisfaction evaluation.

A quality map is created on the basis of the above calculations. It consist of quarters. Depending on the location of coordinates (w_i, w_i, c_i, c_i) we provide interpretation. When reading the map we can see which factors do not require interference, which must be maintained and which should be corrected.

C_{sr}	Possibility of transferring resources into different fields	Maintain
	Correct as the last one	Correct as the first one

Figure 2. Quality map. Source: Personal collection

On the basis of the collected data we calculate CSI.

$$CSI = \sum_{i=1}^N w_i \times c_i \quad (3)$$

CSI - customer satisfaction index;
 w_i - coefficient of importance (weight);
 c_i - satisfaction evaluation;
 N - number of factors examined.

It is important that the research should be repeated regularly. Customer satisfaction factors do not have to be changed. Regularity of the research secures a possibility of comparing to what extent CSI is changing. It helps us to see if our actions are effective.

3. EFFECTIVE MANAGEMENT OF A TRANSPORT PROCESS

For the purposes of location of process areas requiring improvements a six-month observation was conducted from May 2013 to October 2013. The table below presents the most frequent defects occurring during execution and planning of a transport process.

Table 1. Table summarising defects. Source : Personal collection

Category of defects	Number of defects	Share of defects compared to the total	Accumulated number of defects	Share of accumulated numbers compared to the total
Bad influence of information	50	32,47%	50	32,47%
Not keeping deadlines	45	29,22%	95	61,69%
Bad planning of work time	31	20,13%	126	81,82%
Empty runs over 100km	12	7,79%	138	89,61%
Claims not covered by carrier liability insurance	10	6,49%	148	96,10%
Failure rate	5	3,25%	153	99,35%
Claims covered by carrier liability insurance	1	0,65%	154	100,00%
Total	154	100%		

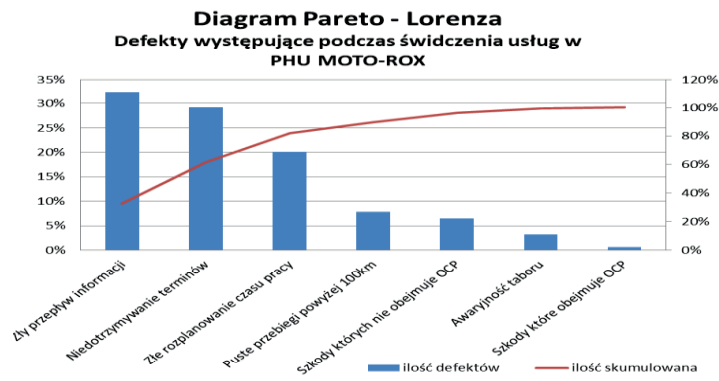


Fig. 3. Pareto Lorenz's diagram. Source: Personal collection

The above research shows that first of all planning of work time must be improved in the first place if we want to improve a transport process. According to the previous figure its accounts for 20% of irregularities generating 80% of main problems. Then we must work on the bad information flow.

The problem concerns both planning work time of a drivers as well as planning deviations from loading and unloading time. Specialist training may help to eliminate these deviations. Logical and considered decisions are the basis. Hasty actions based only on suppositions generate negative consequences.

Process facilitation requires researching customer satisfaction. Our customers' opinion will provide us with valuable hints including information about areas to be facilitated.

The questionnaire prepared included the most important aspects of services. The results are presented in the table below (tab.2) and the quality map (Fig. 4).

CSI amounts to 194. It is high but at the moment it is not useful information because this research must be regularly repeated. So after implementation of improvements to the customer service process and the transport process the survey must be repeated. If the index exceeds 194 it will denote that the applied solutions contributed to process facilitation.

Organization in the private sector especially in micro enterprises a lot must be done to the management style so chances to introduce changes are minor. There are no funds nor trade unions looking after employees. No bonus systems and incentive systems affect employees' attitude to performance at work. An owner does not always see a necessity to broaden their knowledge which results in more organizational mistakes and limited awareness of the necessity of making changes. As a result it translates into the quality of services rendered.

There is an issue of transferring information which is little precise, inaccurate and incomprehensible. In this area there are often misunderstandings, understatements or doubling.

Table 2. Result of the survey. Source: Personal collection

← Mean grade	Very good	Good	OK	Poor	Couldn't any worse	Aspects of services rendered	Insignificant	Little significant	Neutral	Significant	Vital	← Mean weight
	5	4	3	2	1		1	2	3	4	5	
4,18	23	16	8	3	0	Keeping deadlines	0	0	1	9	40	4,78
4,10	18	20	11	1	0	Speed of order execution	0	1	2	22	27	4,62
4,86	46	2	1	1	0	Carrying goods in undamaged condition	0	0	0	2	48	4,96
4,94	42	7	3	0	0	Quality of the rolling stock	0	15	2	29	4	3,44
3,86	23	12	0	15	0	Easy communication	1	3	0	16	31	4,52
3,84	19	13	9	9	0	Information flow	2	2	0	15	31	4,42
4,86	43	7	0	0	0	Credibility of a company	0	2	0	15	33	4,58
4,36	25	18	7	0	0	Quality of services reflected by the price	0	0	0	5	45	4,90
4,16	15	30	3	2	0	Adjustment of services to customer's needs	0	9	5	20	15	3,76
4,26	22	21	5	2	0	Professionalism of services rendered	0	0	0	9	41	4,82
4,34	Mean grade						Mean weight					4,48
Index CSI= $4,18 \times 4,78 + 4,10 \times 4,62 + 4,86 \times 4,96 + 4,94 \times 3,44 + 3,86 \times 4,52 + 3,84 \times 4,42 + 4,86 \times 4,58 + 4,36 \times 4,90 + 4,16 \times 3,76 + 4,26 \times 4,82 = 194$												

The chart below shows that the quality of the rolling stock and a degree of reflection of the quality of services in the price are aspects not requiring changes. Credibility of a company and carrying goods in undamaged condition were also highly evaluated by our customers - the level must be maintained. Elements to be improved comprise easy communication, professionalism of services rendered, keeping deadlines as well as the speed of order execution. Attention should be paid to the fact that these factors are inter-related. No keeping deadlines and difficult contact affected a poor evaluation of professionalism of services rendered. It confirms the necessity of improving planning as well as applying measures aiding communication with the customer.

CONCLUSIONS

The use of a quality map and Pareto-Lorenzo's diagram allowed us to locate weaknesses of the transport process and the process of customer service. We were able to elaborate methods aiming to improve functioning of an organization as well as the process occurring therein. Aptness of the improvements made may be evaluated after carrying out subsequent survey. If the next analysis shows a higher CSI than the current one, we will be sure that the methods are right. It should be noted that making improvements denotes not only costs but work of all members of the organization, raising effectiveness of operations, customer satisfaction and a stronger market position.

REFERENCES

- [1] Abt S.: Zarządzanie Logistyczne w Przedsiębiorstwie, Polskie Wydawnictwo Ekonomiczne, Warszawa 1998
- [2] Coyle J.J., Bardi E.J., Langley C.J.: Zarządzanie Logistyczne, Polskie Wydawnictwo Ekonomiczne, Warszawa 2002
- [3] Harrison A., Hoek R.: Zarządzanie logistyką, PWE, Warszawa 2010
- [4] Kubicki J., Kuriata A.: Problemy Logistyczne w modelowaniu systemów transportowych [4] Wydawnictwo Komunikacji i Łączności Warszawa 2000r
- [5] Matulewski M., Konecka S., Fajer P., Wojciechowski A.: Systemy Logistyczne. Podręcznik do kształcenia w zawodzie technik logistyk, Instytut Logistyki i Magazynowania, Poznań 2007
- [6] Mikołajczyk Z.: Techniki organizatorskie w rozwiązywaniu problemów zarządzania, Wydawnictwo Naukowe PWN, Warszawa 2002
- [7] Mroczko F.: Zarządzanie Jakością, Prace naukowe WWSZiP, Wałbrzych 2011
- [8] Murphy P.R jr., Wood D.F. Nowoczesna logistyka, Wydawnictwo Helion 2011
- [9] Neider J.: Transport Międzynarodowy, Polskie Wydawnictwo Ekonomiczne, Warszawa 2008
- [10] Pfohl H.C.: Zarządzanie logistyką. Funkcje i instrumenty, Instytut Logistyki i Magazynowania, Poznań 1998r
- [11] Skowronek Cz., Sarjusz-Wolski Z.: Logistyka w przedsiębiorstwie, Polskie Wydawnictwo Ekonomiczne
- [12] Sołtysik M.: Istota i cechy zarządzania logistycznego, „Gospodarka Materiałowa & Logistyka” 1994, nr 7-8
- [13] Stajniak M., Hajdul M., Foltyński M., Krupa A.: Spedycja i Transport Instytut Logistyki i Magazynowania, Poznań 2007
- [14] Toposłki M.: Zastosowanie metod heurystycznych do celu identyfikacji ograniczeń procesów logistycznych. Wydawnictwo Społecznej Akademii Nauk Przedsiębiorczość i Zarządzanie TomXVIII, Zeszyt 8, cz. 2 Warszawa 2017