# LOGISTIC CONTROLLING AS A POSSIBLE WAY TO PROSPERITY IN THE CZECH REPUBLIC

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**Abstract:** The paper shows problems in the logistics and logistic controlling in the conditions of small and medium-sized enterprises in the Czech Republic. It includes results of the first phase of research within this area made in 2008 – 2009. The set includes answers of 104 enterprises in total of 132 possible answers (in a questionnaire research). We can find the main trends in relationships among the answers, i.e.size of enterprises and the function of the controlling department.

## Introduction

Enterprises try to raise their financial and economic efficiency, adapt to constantly changing trends and remain in the market. Ensuring the competitiveness of an enterprise is more demanding than ever. Rising costs, relatively saturated markets and disappointing economic trends, problems with legislation and tougher competition in the domestic and foreign markets have increased the pressure for productivity and efficiency.

Due to the emerging problems and the current global recession, current procedures are not sufficient for successful management. Therefore, entrepreneurs and managers need to extend the existing methods with new ones, which will lead to better management. This can be achieved by introducing new concepts and technologies that may help to achieve the main objectives, mainly to ensure profitability and liquidity of the company. According to Ndapwa Alweendo (2009), small and medium enterprises (SMEs) are the most disadvantaged by the current economic climate, and the NLA (the Namibia Logistics Association) aims to help keep small businesses afloat by creating opportunities for interaction with larger national and international clients, and securing supplier discounts for all members. An SME support programme (currently in the planning stages) that offers entrepreneurship training and access to finance is another benefit being offered to small businesses.

In addition to these key objectives, it is now necessary to focus the management efforts on maintaining a market position, customer satisfaction, the continued existence of the company and its growth potential. An important factor is the involvement of workers themselves in

meeting corporate objectives, which can be achieved by building an appropriate corporate culture and promoting their professional and personal development.

Unlike developed countries like the U.S. and the majority of Western European states, logistic controlling and logistics are often neglected in the Czech Republic. Only some companies, generally the larger ones or branch offices abroad, pay more attention to these issues. Therefore, this investigation follows a sample of enterprises with no previous selection by size or focus of the companies in order to compare the interests in the logistical problems in all sectors.

As the author has worked for more than 20 years in practice, she is concerned about tasks, which are necessary to be solved in many enterprises. But a lot of such problems have not been solved yet. This is why she has decided to work on that and try to discover a possible way to deal with these problems.

The same is stated in the paper of Haan, Kisperska-Morun, Placzek (2007). They believe that managerial techniques in SMEs change together with their growth and the logistics management constantly gets better support, adequate to requirements of smaller companies if financial and material assets are at their disposal. Naturally, single SMEs have smaller capacities than large corporations but it does not mean that they do not require professional logistic management. On the contrary, very often a single top manager has to acquire a portion of knowledge significantly larger than managers in big companies, being assisted by their deputies and employed experts. Or – as said in Poggel, Schoenwetter (2009) – most SMEs see the logistic manager responsible for the physical storage and distribution, but do not employ their logistic manager for any other purpose, while large companies show mainly an intra-divisional logistic concept as a key-function between the other departments.

## Aims

The aims of the paper are:

1. to analyse the situation related to logistics in the sample of enterprises;
2. to analyse a relation of the size of enterprises (rate of turnover and a number of employees) to the use of logistic criteria;
3. to discover how often – if so – enterprises deal with an improvement of relations between suppliers and consumers; and
4. to discover the most usual way of assessment of the above mentioned relations.

## Methodology

The first step was to assess the current situation in the sample of 104 enterprises in 2008–2009. A questionnaire aimed at key issues of logistics and logistic controlling was prepared. The investigation was applied mostly to enterprises in the region of South Bohemia (68%); mostly aimed at production (45%), followed by services (33%), trade (10%) or combined. There were 5% of enterprises focused on production and trade; 2% of enterprises focused on production and services and 2% of enterprises focused on all three sectors (production, trade and services).

All data were processed by correspondence analysis (CA) - a unimodal ordination method. The main aim of this method is an overall review of such a huge data set (132 possible answers to the questions in the questionnaire). We can find the main trends in relationships among the answers.

The result of this analysis is an ordination diagram showing points in an ordination space. The distance of the points corresponds to their dissimilarity. The points represent answers to the questions in the questionnaire. Any qualitative answer is shown as a point; any quantitative one is shown as a point for the maximum.

The ordination diagram is interpreted in the following way: The A point in the diagram close to the B point then in the case of choosing answer "a" by the company (in the questionnaire) means that probably answer "B" was chosen simultaneously. The A point placed on the opposite side of the diagram in comparison with localisation of the B point suggests that the company chose answer "a", but not "b" in the questionnaire. If there is a point representing some quantitative answer (such as turnover, number of employees or products, suppliers, etc.) on one side of the diagram it means that all points on this side of the diagram are supposed to be related to enterprises with a great value of this variable; points on the opposite side are related to enterprises with low values of the appropriate variable. Points in the middle of the diagram suggest that all enterprises answered the question in a way that was without any relation to the main trends.

Weights of answers to qualitative questions were set lower so that the sum of weights of all possible answers to one question was always equal to one. Quantitative answers were logarithmically transformed.

The canonical correspondence analysis (CCA) was used for two data subsets. This method allows, moreover, for testing the effect of explanatory variables. These were selected by a stepwise forward selection from a set of variables that express the size of a company and its logistics (questions No. 1, 3, 4, 8 and 14; see appendix No. 1).

The monitored logistic criteria (question No. 24) were used as the first data set processed by CCA. Significant variables ($\alpha = 0.05$) were used as active; others were used as passive. The later data set was made up of questions related to mutual supplier-consumer relations (questions No. 15, 18–20, 26–28, 30–33). Significant variables ($\alpha = 0.01$) were used as active; others were used as passive.

The ordination diagram CCA is read in a way very similar to the CA one. Explanatory variables can be expressed as points for centroids (qualitative variables) or arrows for direction of increase (quantitative ones). Above all, active variables affect the position of the response points (if there is only one active variable, it affects the position only on the first axis). Passive variables are plotted in the diagram but they do not affect the position of other points.

Canoco for Windows was used to process CA and CCA (TER BRAAK & ŠMILAUER 2002).

Finally, the author calculated a percentage of firms that check individual criteria (question No. 24), those that assess the co-operation with suppliers in specific intervals (question No. 19) and those that inform the suppliers about the results of the assessment (question No. 20).

The author summarizes the methodology here: (1) a CA ordination diagram was created for an overview of the data; (2) an effect of the size of a company and its logistics on monitoring of logistic criteria and mutual supplier-consumer relations was tested by CCA; (3) percentages of selected answers were calculated.

## Results

104 enterprises in the sample revealed that 31.7% had a logistic department and 11.5% had a department of logistic controlling. The following tables present what kinds of activities are performed (table 1) and departments that adopted common logistic activities (table 2).

**Tab. 1 Activities performed at departments of logistics**

| Logistic activity | % |
|---|---|
| Ordering | 72.1 |
| Operational management of production | 30.8 |
| Stock regulation | 47.1 |
| Warehousing | 48.1 |
| Packaging and expedition | 46.1 |
| Quality screening | 31.7 |
| Transport | 62.5 |
| IT | 12.5 |
| Logistic controlling | 15.4 |
| Reverse logistics | 18.3 |
| Other activities | 4.8 |

*Source: Author's own calculation*

Transferring of logistic activities to trade departments seems to be an appropriate solution. The trade department is concerned in high levels of economic indicators (inventories; transport) and monitors their cost as well as operational features compared to economic department. Problems with missing logistic department will rather influence logistic controlling and reverse logistics.

**Tab. 2 Departments that adopted common logistic activities**

| Department | % |
|---|---|
| Business | 46.1 |
| Economic | 23.1 |
| Production | 10.6 |
| Transport | 12.5 |
| Other | 7.7 |

*Source: Author's own calculation*

In the following part of the paper, numbers referring to the number of a question in the questionnaire are enclosed in brackets.

The following CA ordination diagram (figure 1) revealed that enterprises with separated logistic department concentrated on the left side (10) and enterprises without such department on the right side (9) of the diagram. Enterprises with a logistic department usually also have a department of controlling (21b); logistic activities are observed regularly (14a) and suppliers are informed about both positive and negative results (20). Logistic methods quoted in question 13 (EDI – 13a; Quick Response – 13b; KANBAN – 13e; ABC – 13g; benchmarking – 13k; looking for narrow spaces - 13m) and competition analysis are usually used.

In contrast, smaller enterprises without a separate logistic department do not inform their suppliers about the results of their screening in the negotiation (20), they do not deal with logistic activities continuously (14b), they do not have any certificate of quality (7N), a number of products is modified every year (32) and orders are received mainly by phone or personal contact (30a, 30d). Logistic department functions are transferred to another department - trade (9), transportation (9d) or another (9e). They are engaged in logistic activities such as taking orders from customers (11), operative management of production (11b), the problems of packaging and shipping (11f) or other activities (11k).

The first group of enterprises is generally larger in terms of the number of products (1), the number of employees (3), annual turnover (4) and the number of suppliers (15).

Furthermore, you can allocate a group of enterprises mostly modifying their production (32), receiving orders via the Internet portal (30e) and observing logistic activities in the whole chain (23a). This may not be dependent on the trends described in the preceding paragraph.

**Fig. 1 Ordination diagram of correspondence analysis**
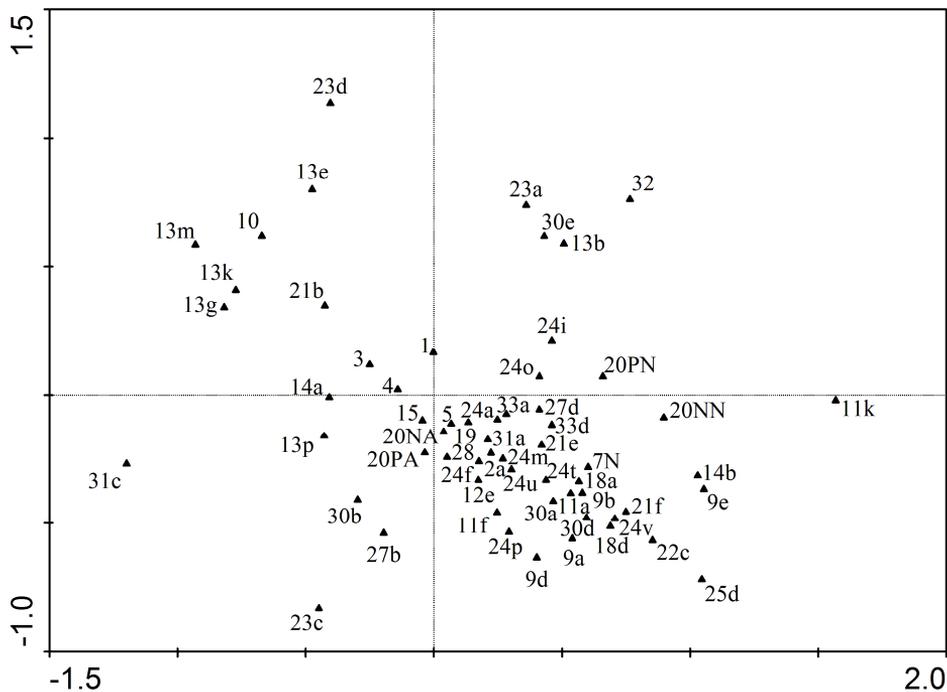


*Source: Author´s own calculation*

The first two axes represent 21.3% of variability (horizontal axes represent 12.8% of variability). Sixty answers that best fit to the first two axes are pictured as points (explanatory notes see Appendix).

The majority of enterprises monitored the maturity of invoices. This is a result of the fact that this is one of the key items of accountancy (table 3). A separate logistic department is the only factor that had a significant influence in mutual relations of the investigated criteria (variable 8; $F = 1.944$; $p = 0.012$); other variables are of a positive correlation with the above mentioned factor. Bigger enterprises with a logistic department observed usually average costs per storage place (24c); working capital in logistics (24b); costs due to a decrease in the inventory value (24h) and an inventory turnover per year (24i).

On the other hand, smaller enterprises without a logistic department paid more attention to monitoring the maturity of invoices (24u), the number of dispatched items per worker per a unit of time (24k) and an average inventory (24m) (figure 2).

However, there is a significant variability that is not possible to explain by the size of a company or its logistics. One cluster of criteria consists of costs per a unit of purchased dispatched goods (24t), the number of errors in deliveries in the overall volume (23q), usage of the transport capacity (24p) and costs due capital acquisition/credit interests for logistic activities (24g). Opposite cluster consists of capital bound in inventories (24a), share of costs due to storage in overall costs (24l) and inventories turnover (24j).

**Tab. 3 Percentage of each criterion** (100% = 96)

| % | Criterion |
|---|---|
| 91% | Monitoring the maturity of invoices |
| 76% | Capital bound in inventories |
| 68% | Average inventories |
| 67% | Following the time of dispatch |
| 67% | Share of sales returns |
| 66% | Cost due to purchase of inventories |
| 58% | Transport capacity use |
| 53% | Storage costs |
| 52% | Costs per unit of purchased/dispatched goods |
| 49% | Number of turnovers per year |
| 48% | Number of errors in deliveries in overall volume |
| 45% | Inventories turnover time |
| 45% | Storage capacity use |
| 44% | Average transport costs per 1 t of goods |
| 40% | Costs due to capital acquisition for logistic activities |
| 40% | Share of storage costs in total costs |
| 35% | Working capital in logistic activities |
| 35% | Revenue from saved costs due to a change of transporter |
| 33% | Average costs per storage unit |
| 32% | Costs due to a decrease of the inventories value |
| 26% | Number of dispatched items/day (or other time unit) |

*Source: Author's own calculation*

In figure 2, we can see criterions screened by smaller companies without a logistic department on the left side and criterions screened by bigger companies which have logistic departments on the right side. The first two axes represent 5.5% of variability (horizontal axes represent 3.8% of variability). Active variables are expressed as full circles (Explanatory notes see Appendix).

**Fig. 2 CCA ordination diagram**
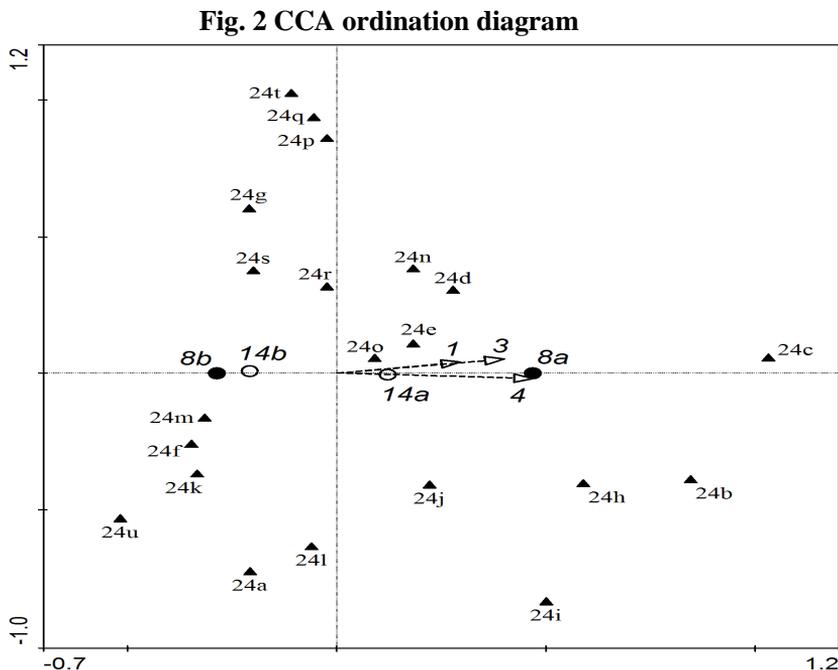


*Source: Author´s own calculation*

Concerning business relations, 56% of respondents answered that the cooperation with suppliers is assessed once a year (100% = 103 enterprises); 23% meets them once per quarter and only 20% of respondents meet their suppliers more often.

84% of enterprises inform their suppliers about the results of the assessment (100% = 104 enterprises). All these enterprises inform them about negative results, positive information is given only by a part of them (Table 4).

**Tab. 4 Answers of 104 enterprises to the question concerning information provided to their suppliers about the results of their investigation**

| | |
|---|---|
| PA+NA inform in 100% cases | 69% |
| PA+NN only positive information | 0% |
| PN+NA only negative information | 14% |
| PN+NN no information | 16% |

*Source: Author's own calculation*

The mutual relation of explanatory variables may be described in the following way (figure 3): variables related to the size of an enterprise and its logistics (questions 3, 4, 8 and 14) are of a mutual positive correlation with the exception of the number of types of goods/services (1) which is not dependent on the above mentioned tendency or even of slight negative correlation.

Enterprises engaged in services are of various sizes with a smaller number of types of services. Commercial firms are smaller but just as manufacturing companies offer more types of goods.

Large enterprises with higher turnovers and separate logistic departments, regardless of the number of types of products, normally receive orders otherwise; they often order by fax or otherwise (fig. 3).

Small enterprises often change the maturity of invoices and the quality of products supplied in the framework of agreements with their customers. They order by telephone and use only road transport (fig. 3).

Companies supplying a much broad portfolio of products usually supply to the retailer and accept orders via the web portal (fig. 3).

On the other hand, enterprises with a small number of products supply to the wholesalers, end-users or other customers (fig. 3).

Small enterprises that offer a small number of products take orders and make them mostly by personal contact, which is somewhat surprising in view of the higher costs. Moreover, they do not inform their suppliers of either the positive or negative impacts on their relationships (fig. 3).

**Fig. 3 CCA ordination diagram**
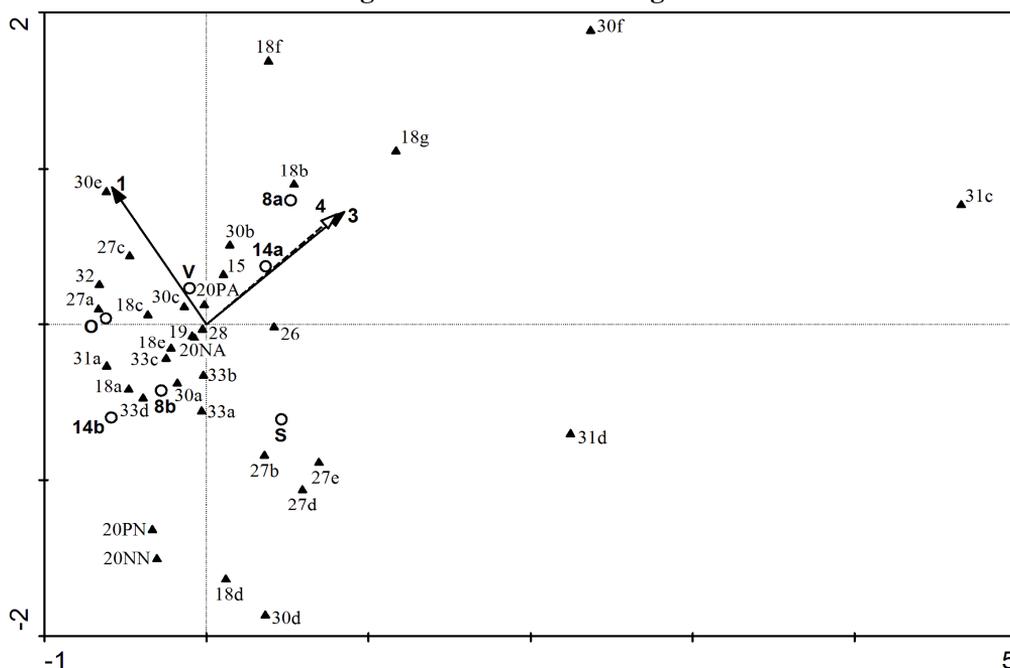


*Source: Author's own calculation*

First two ordination axes represent 5.5% of data variability. The first (horizontal) axes represent 3.8% of variability. The significance test of two first axes: $P = 0.002$; $F = 2.96$. Active variables are expressed as full arrows (explanatory notes see in Appendix).

## Discussion

Small and long-neglected problems always rise to prominence in times of recession. Enterprises have to seek new strategies to remain in the market trying new methods which could help save the company's existence and prosperity and jobs.

Paying more attention to logistics and logistic activities may mean potential cost savings or a source of increased performance, as Jusoh, Kamis (2010) mention. They revealed that two out of three independent variables were positively associated with business performance significantly.

Changes in logistics-related activities especially with orders and shipping can increase customer satisfaction and hence loyalty. Outsourcing of logistic operations can yield the same effect. It corresponds with the results of the Hungarian research (Szegedi, Z., 2008). They say the path to SME competitiveness – even when fixing and streamlining their logistics processes and installing their logistics information systems – begins with flexibility and adaptability: they must meet the unique needs of their large customers. On the contrary, Bagchi, Virum (2000) noted that only a few of the small and medium-sized enterprises (SME) have adequate administrative resources to participate in such development of competences.

Controlling and its introduction into the business processes is also an important part. Creative use of accounting, financial, marketing and product information may be a way of timely recognition of emerging problems and preparing appropriate instruments, including adjustments to the plan or strategy for their elimination. As said in Huang, Zhon, Yongkiaoxun (2009), by carrying out the common logistics, the small retail enterprises can get two kinds of benefits: direct benefits and indirect benefits. The direct benefits include the logistics operation cost saving, the sale enlarging. The indirect benefits include the supply priority, the information communication, the promptly distribution, the stability of supply chain relationship. To implement the common logistics, the rational distribution of corporation benefits is the key point of success to carry out the implementation of common logistics. Figure 4 shows the specific influence of controlling and its indicators on all spheres in any company.

**Fig. 4 Controlling and its indicators having an influence
to all spheres in the enterprise**
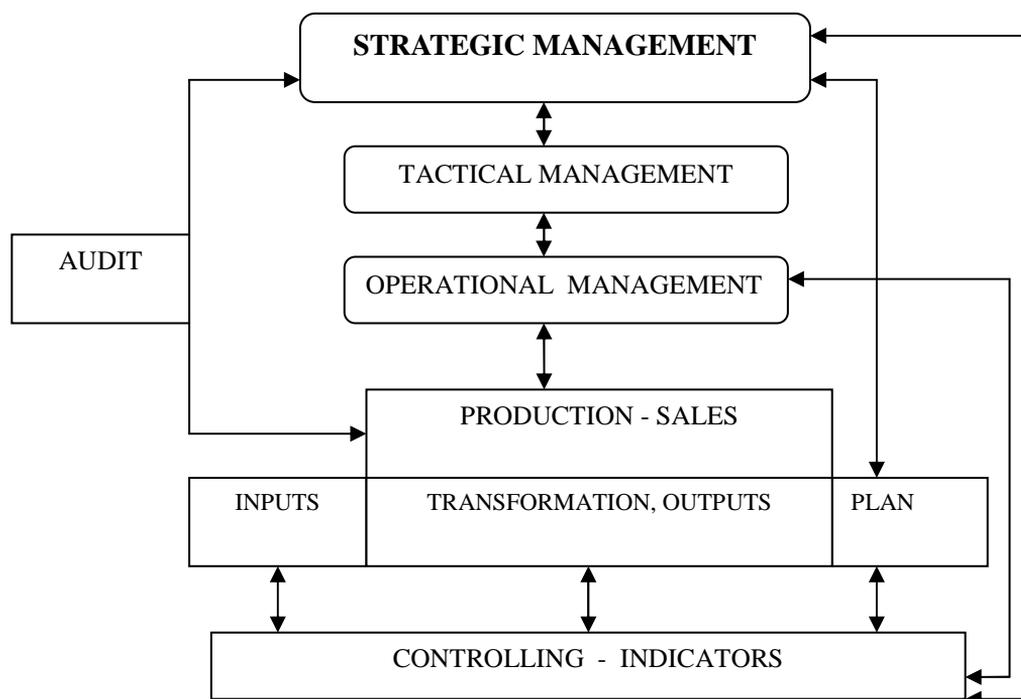


*Source: Author's own*

## Conclusion

This paper deals with the logistics and logistics controlling as a potential source of savings and finding new possibilities for better organization and functions. A questionnaire research consisting of two phases was chosen as a method of investigation. Results published in this paper were revealed by the first phase of this research. The sample consisted of 104 enterprises from various sectors.

In the Czech Republic, SMEs are defined as companies with up to 250 employees and the turnover up to 43 million CZK per year. There are about 1 million of such companies, which represent 99.8 % of the total. SMEs represent 61 % of the total number of employees (Stejskalová, Rolínek, 2008).

The study revealed that bigger enterprises paid more attention to the investigated issues – creating information sources and setting specialized departments. Such enterprises also paid more attention to keeping and improving relations with their suppliers. Such relations are dealing with logistic activities as a source of additional advantages and profit. They are more oriented to two logistic areas – production logistics and outbound logistics.

Several differences in the understanding of the term "logistics" were found between the participating companies ranging from "logistics means transport and warehousing" to

"logistics is nearly everything". The first idea is typical for SMEs, the second one for the corporations, mostly foreign branches.

We hoped that this study could investigate the theoretical linkages between characteristics relating to generic capability, management practices, challenges and business performance by answering the research questions. The research has been a pioneering piece of work in many ways, at least in the Czech Republic. The results indicate that increased efficiency and speed in logistic processes improve a company's profitability. We can see it as signal that this area is good for continuing efforts and would give good returns. One may get a profit from the investment in the logistic controlling in a period of months, or a few years at maximum.

Logistics and logistic controlling may also use common methods of management focused on the above mentioned categories.

**The research revealed the following results:**

1. If there is no logistic department, its function is usually adopted by trade or economic departments (69.2%).
2. These departments primarily deal with executing orders, transport and storage.
3. Transport is the most common outsourced activity.
4. The EDI and barcodes are the most frequently used logistic methods spread after 2000 in the Czech Republic.
5. In the sample, 36.5% of enterprises had their own internal audit; 25% had their own controlling department and 11.5% used logistic controlling.

The aims of the paper may be stated as achieved.

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**Appendix**

### Explanatory notes to diagrams (used Nos. only)

| | |
|---|---|
| 1 | Number of products |
| 3 | How many employees does your company have? |
| 4 | Your turnover in 2007 |
| 8 a | There is a logistic department |
| 8b | There is not any logistic department |
| 9a | Business department |
| 9b | Economic department |
| 9c | Production department |
| 9d | Transport department |
| 9e | Other department |
| 11a | Ordering |
| 11b | Operational management of production |
| 11c | Stock management |
| 11d | Warehousing |
| 11e | Packaging, expedition |
| 11f | Quality control |
| 11g | Transport |
| 11h | IT |
| 11i | Controlling |
| 11j | Reverse logistics |
| 11k | Other activities |
| 12a | Outsourcing of transport |
| 12b | Outsourcing of storing |
| 12c | Outsourcing of packaging |
| 12d | Other |
| 12e | No |
| 13a | EDI |
| 13b | Quick Response |
| 13c | Efficient Consumer Response |
| 13d | Hub and Spoke |
| 13e | KANBAN |
| 13f | MRP |
| 13g | ABC |
| 13h | Benchmarking |
| 13i | Balanced scorecard |
| 13j | Searching of bottleneck |
| 13k | SWOT analyse |

| | |
|---|---|
| 13l | Analyse of competition |
| 13m | SAP |
| 13o | Bar codes |
| 13p | RFID |
| 14a | Logistic activities implem. into strategy |
| 14b | Logistic activities solved only in problems |
| 18a | Orders by phone |
| 18b | Orders by fax |
| 18c | Orders by email |
| 18d | Orders personally |
| 18e | Orders by EDI |
| 18f | Orders by other way |
| 19a | Re-evaluation of relation 1/year |
| 19b | Quarterly |
| 19c | Monthly |
| 20a | Info. for suppliers neg., yes |
| 20b | Info. for suppliers neg., no |
| 20c | Info. for suppliers pos., yes |
| 20d | Info. for suppliers pos., no |
| 21a | Monitoring of logistics – internal audit |
| 21b | Monitoring of logistics – dept. of controlling |
| 21c | Monitoring of logistics – logistic controlling |
| 21d | Results of external firms |
| 21e | Results are used on meetings |
| 21f | Results change plan, strategy |
| 24a | Capital in stock |
| 24b | Value of working capital in logistic activities |
| 24c | Average costs for 1 one stock place |
| 24d | Average transport costs / 1 t of goods |
| 24e | Warehousing costs |
| 24f | Costs of buying stock |
| 24g | Costs of capital of logistic activities (interest of credit) |
| 24h | Costs due to a decrease of stock value |
| 24i | Number of turnover per year (costs of sale/average value of stock |
| 24j | Inventory turnover (average stock/ costs of sale *number of days in the period |
| 24k | Number of dispatched items per worker and day (other period) |
| 24l | Share of stocking cost in total costs |
| 24m | Average level of stock |

| | |
|---|---|
| 24n | Profit from saved costs due to a change of a carrier |
| 24o | Storage capacity use |
| 24p | Transport capacity use |
| 24q | Number of mistakes in deliveries in overall volume (%) |
| 24r | Following the time of dispatch |
| 24s | Share of sales returns |
| 24t | Costs per unit of purchased/dispatched goods |
| 24u | Monitoring the maturity of invoices |
| 24v | Other |
| 25b | Satisfactory |
| 25c | Unsatisfactory |
| 25d | We do not perform it |
| 25e | A change is necessary |
| 25f | A problem in monitoring has ever been found |
| 26 | Average number of buyers |
| 27a | Supply to production enterprises |
| 27b | Supply for whole sellers |
| 27c | Supply for retailers |
| 27d | Supply to end-consumers |
| 27e | Supply to other buyers |
| 30a | Buyer's orders by phone |
| 30b | Buyer's orders by fax |
| 30c | Buyer's orders by mail |
| 30d | Buyer's orders personally |
| 30e | Buyer's orders by Internet |
| 30f | Buyer's orders other |
| 31a | Transport of supply on roads |
| 31b | Transport of supply on railway |
| 31c | Combination of transport |
| 31d | Other transport of goods |
| 32 | % of change in offer |
| 33a | Changes of quantity in the agreements with buyers |
| 33b | Changes of price in agreements with buyers |
| 33c | Changes of quality in agreements |
| 33d | Changes of payment conditions |