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# The Cost of Logistics

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*Abstract-* The paper shows problems in the logistics and supply chains in the condition of enterprises in the Czech Republic. This subject was chosen because of the previous practice of the author.

The top priority is screening of cost born in logistics. The paper deals with the logistics and logistics controlling as a potential source of savings and finding new possibilities for better organization and functions.

It includes results of the research in the southern part of Bohemia. Data set was obtained from answers in questionnaires aimed to key issues of logistics and logistic controlling.

The results of paper proved that bigger enterprises paid more attention to investigated problems – creating information sources and setting specialised departments.

In the future there is a need to find the way how to establish the condition of controlling in small and medium sized enterprises.

*Keywords:* *cost of logistics, supply chain, logistics, controlling, questionnaire research.*

*GJMBR-B Classification:* *JEL Code: D3, M1, M4*

THE COST OF LOGISTICS

*Strictly as per the compliance and regulations of:*

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## I. Introduction

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

Due to emerging problems and current global recession, current procedures are not sufficient for successful management. Therefore, entrepreneurs and managers need to extend existing methods with new ones, which will lead to better management. There is a necessity to find new approach to solve economic crisis and it can be achieved by introduction new concepts and technologies that may help to achieve the main objectives, mainly to ensure profitability and liquidity of the company.

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 Strategy can be viewed as building defenses against the competitive forces or as finding a position in an industry where the forces are weaker. Changes in the strength of the forces signal changes in the competitive landscape critical to ongoing strategy formulation. In exploring the implications of the five forces framework (Porter, 2008).

An important factor is the involvement of workers themselves to meet corporate objectives, which can be achieved by building the appropriate corporate culture and promoting their professional and personal development.

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

The biggest problem is to find the right criteria for the screening. The next table 1 shows the evolution of logistic criteria in the USA in last 50 years.

*Table 1 :* The Preference of Logistic Criteria in Time

| Period | Indicator |
|---|---|
| 1960 | The total production costs |
| 1970 | The costs of the production and stock |
| 1980 | The transport costs |
| 1990 | The costs of distribution and logistics |
| 2000´+ | The costs of Supply chain and clients service |

*Source: Coyle, Bardi, Langley, 2003*

To the logistics is paid big attention from the eightieth. The break of century is time, when started the being of Supply chains and their number is growing, in the Czech Republic too.

The following figure shows the simplified structure of supply chain in the production company with two groups of suppliers in the flow of information, goods and eight processes of Supply chain management (which was described in the Global Supply Chain Forum at the University in Ohio, the USA).

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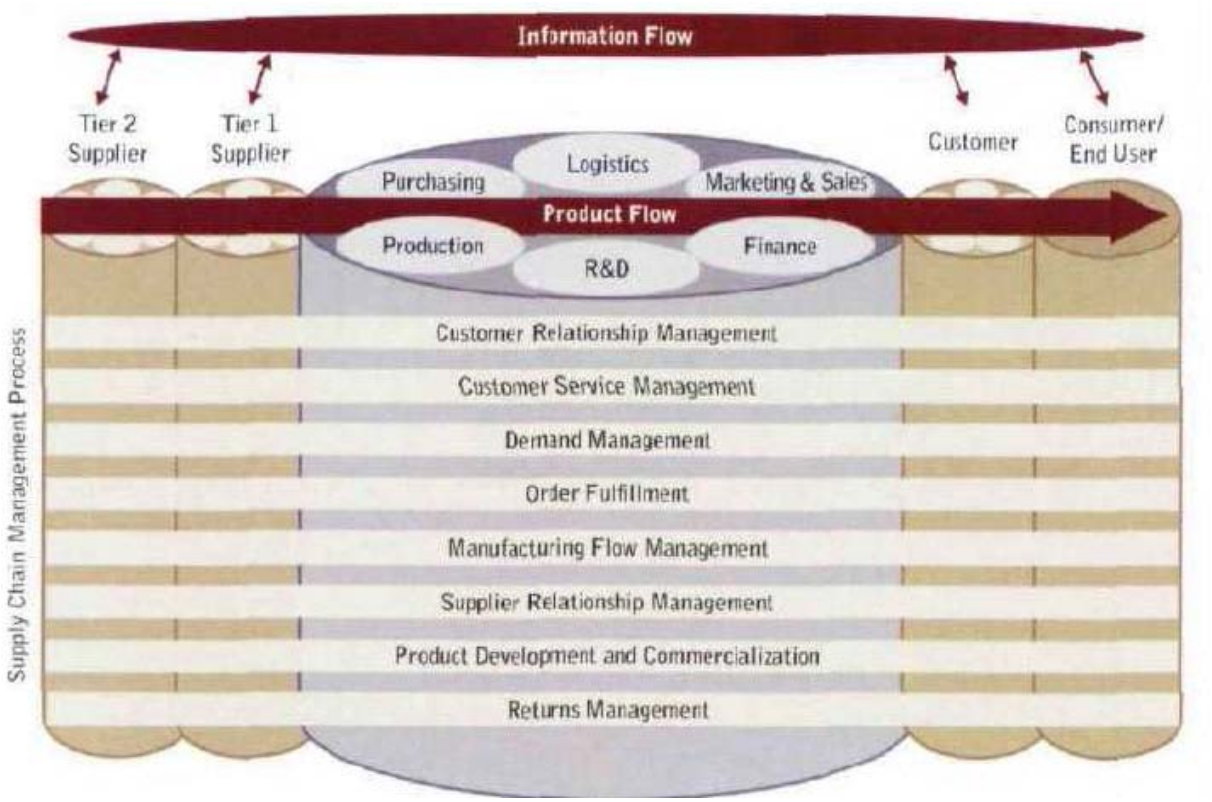
8 processes described in the figure are:

1. Customer relation ship management – the connecting part in negotiation with customer
2. Customer service management – the part building the relation with customers
3. Demand management – the management of demand of the market
4. Order fulfilling
5. Manufacture flow
6. Supplier relationship management
7. Product development – the production and introduction of products in the market
8. Return management – is concerning to empty packaging and destroyed goods which should be environmental.




*Source: Lambert, Cooper, Pagh, 1998*

*Figure 1 :* The Structure of Supply Chain

## II. Definition of Controlling in the Literature

By Freiberg (1996), this word originated in the USA and consists of two meanings of the English verb "to control". It means regulating and managing as well as checking and testing. The controlling activity limited to the checking process only would never bring any innovation in the business activity. The innovation is connected with the activity of managing and regulating in which controlling has become a specific concept of business management based on complex informational and organizational connection of planning and control processes.

Controlling also has to ensure the interpretation of predicative abilities of background information used by managers. The key task of controlling is to secure and prepare written source materials for planning and decision making. Controller (worker of the controlling department) has to be a co-ordinate partner of management workers without power to take decisions about concrete economic concepts of future business development (Sixta, Mačát, 2005).

Petřík (2007) noticed that nowadays controlling is concerned in a more complex way in foreign practice as a concrete integration method – management system. In this respect, controlling uses both financial and partly non-financial scales. The main idea of this conception of controlling is to set desired, clear, measurable, comprehensible acceptable targeted data and information as well as current and desired economic and financial situation of firms and organizations that are generally defined as basic aims of a firm.

Controlling should be also considered as developing system of economic subject management that is strategically oriented to future, closed, comprehensive, suitably connected and coordinated.

This paper deals with the logistics and logistics controlling as a potential source of savings and finding new possibilities for better organization and functions.

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 total number of employees

*Aims:*

1. to analyse the situation related to logistics in the sample of 221 enterprises;
2. to analyse a relation of the size of enterprises (rate of turnover and a number of employees to use of such criteria;
3. to discover how often – if so – enterprises deal with improving of relation between suppliers and consumers and discover the most usual way of assessment of the above mentioned relations.

## III. Methodology

The first step was to assess the current situation in the sample of 221 enterprises. 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 (65.6%); mostly aimed at production (42.1%), followed by services (32.1%), trade (16.7%) or combined. There were 3.6% of enterprises focused on production and trade; 3.6% of enterprises focused on production and services; 1.4% of enterprises focused on services and trade and 0.5% of enterprises focused on all three sectors (production, trade and services).

All data were processed by correspondence analysis (CA) - a unimodal ordination method. Main aim of this method is an overall review of such a huge data set (132 possible answers to the questions in the questionnaire). It is able to find 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. Points represent answers to the questions in the questionnaire. Any qualitative answer is shown as a point for each answer any quantitative is shown as a point for the maximum.

Ordination diagram we interpret by the following way : if the point „A“ in the diagram is close to the point „B“, then in the case of signing answer „A“ by the company (in the questionnaire), it means probably the signed answer „B“ simultaneously. If would be the point „A“ on the opposite side of diagram in comparison with localisation of point „B“, than the company signed in the questionnaire the answer „A“, but no „B“. If would be on one side of the diagram a point, which show some quantitative answer (turnover, number of employes or products, suppliers, etc.) than all points on this side of diagram we can suppose they relate to enterprises, which have the high level of this quantity . Points on the opposite side of the diagram are related to enterprises with low level of this quantity. If the point lies in the middle of the diagram, than we can say\, that all enterprises answered without any relation to main trends.

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

As I was especially interested in monitoring of logistic criterions, I examined it more carefully by logit regression. This was processed by statistical program R 2.9.0.

Finally, a percentage of enterprises that answered individual were calculated for some questions.

## IV. Results

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

In the ordination diagram CA (figure) is obvious trend that bigger enterprises were formed on the left side (3, 4) and smaller ones on the right side. Bigger, mostly enterprises with a logistic department (8a), also had often internal department of controlling (21b) and logistic activities were regurarly monitored (14a). They usually had some of certificates of quality (7A) and often used some of logistic or managerial methods (e.g.. Quick Response – 13b, KANBAN – 13e, MRP – 13f, ABC – 13g, benchmarking – 13k, Balanced Scorecard – 13l or searching of bottleneck 13m). This professionál approach is necessary for bigger companies, because of huge quantity of products, finances and employees there is not any other choice. They used for transport of products roads or combined transport (31c).

On the other hand smaller companies did not have any logistic department. They did not deal with logistic activities continously (.4b), do not inform their suppliers about results of their investigation (20PN, 20NN) and did not have any certificate of duality (7N). They supplied goods mostly to final consumers and used roads or other transport (31d).

The profile of companies was corresponding with this trend. Bigger companies are mostly oriented to production (V) and smaller were aimed at service (S). Business companies are left beside (O), because they are not marked in size of turnover or number employees. More or less, i tis possible to noticethat they tended to be smaller. They were defined by larger assortment (1), which is often changed (32), and by higher part of goods in stock (2b). Enterprises in the sample were oriented to services had small assortment (1) and it change only little (32) in the diference of production or business companies.

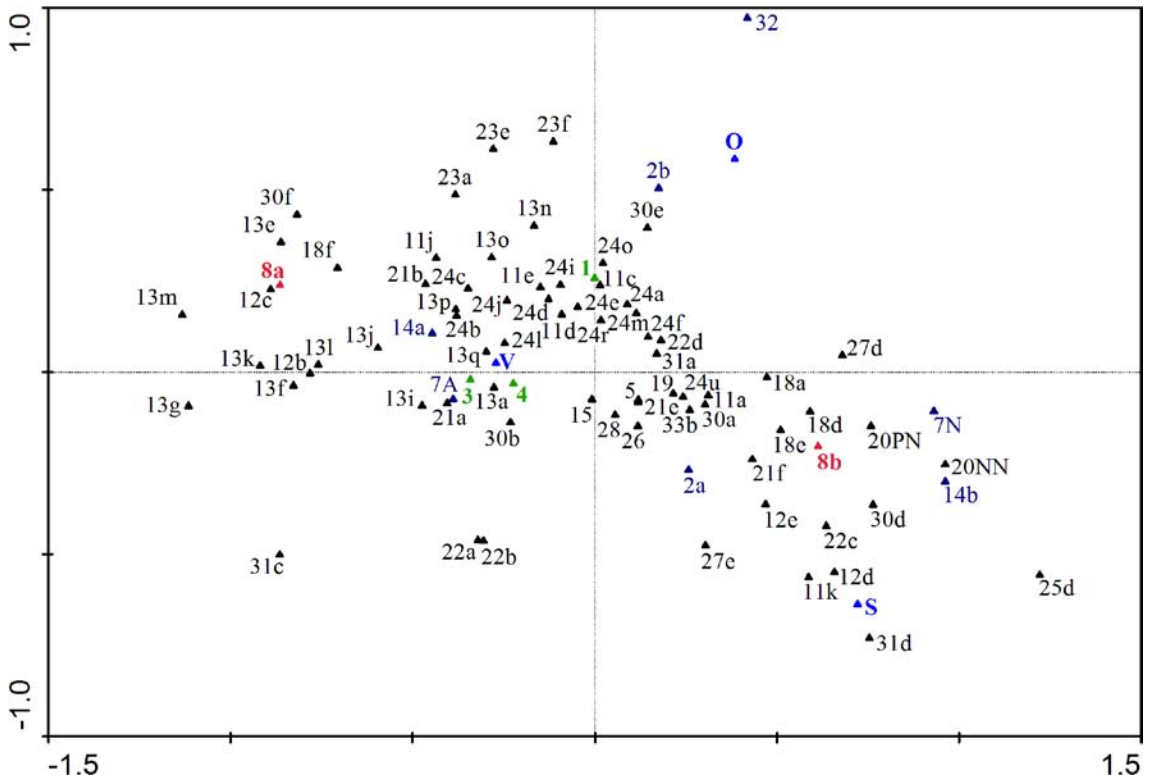



*Figure 2 :* ordination diagram of correspondence analysis. The first two axes represent 20.3% of variability (horizontal axes represents 12.2% of variability). Points denote 85 answers that most fit to the first two axes. Key points are highlighted. Author's own work

This ordination diagram shows main trends in relations of questions but some details may be hidden. As I was especially interested in which logistic criteria do the enterprises monitor, I have carefully proven the relationship of this question (24) to the number of employees in an enterprise (3). I have chosen this variable according to the ordination diagram as a representative of the main trend.

The majority of logistic criteria are monitored by significantly higher proportion of bigger enterprises. There were only few exceptions that did not depend on enterprise size, such as stock costs (24f), an average inventory (24m) or monitoring the maturity of invoices (24u). Criteria, monitored by mostly small companies, were closely connected with their cash flow. The fact, that all criteria were more monitored by bigger companies is related with the existence of specialised departments, for which these enterprises have more funds and they need to be better oriented in the problems. Figure 3 and Table 2 summarise the results.

Figure 3 also shows logistic criteria mostly screened in Czech companies. 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.

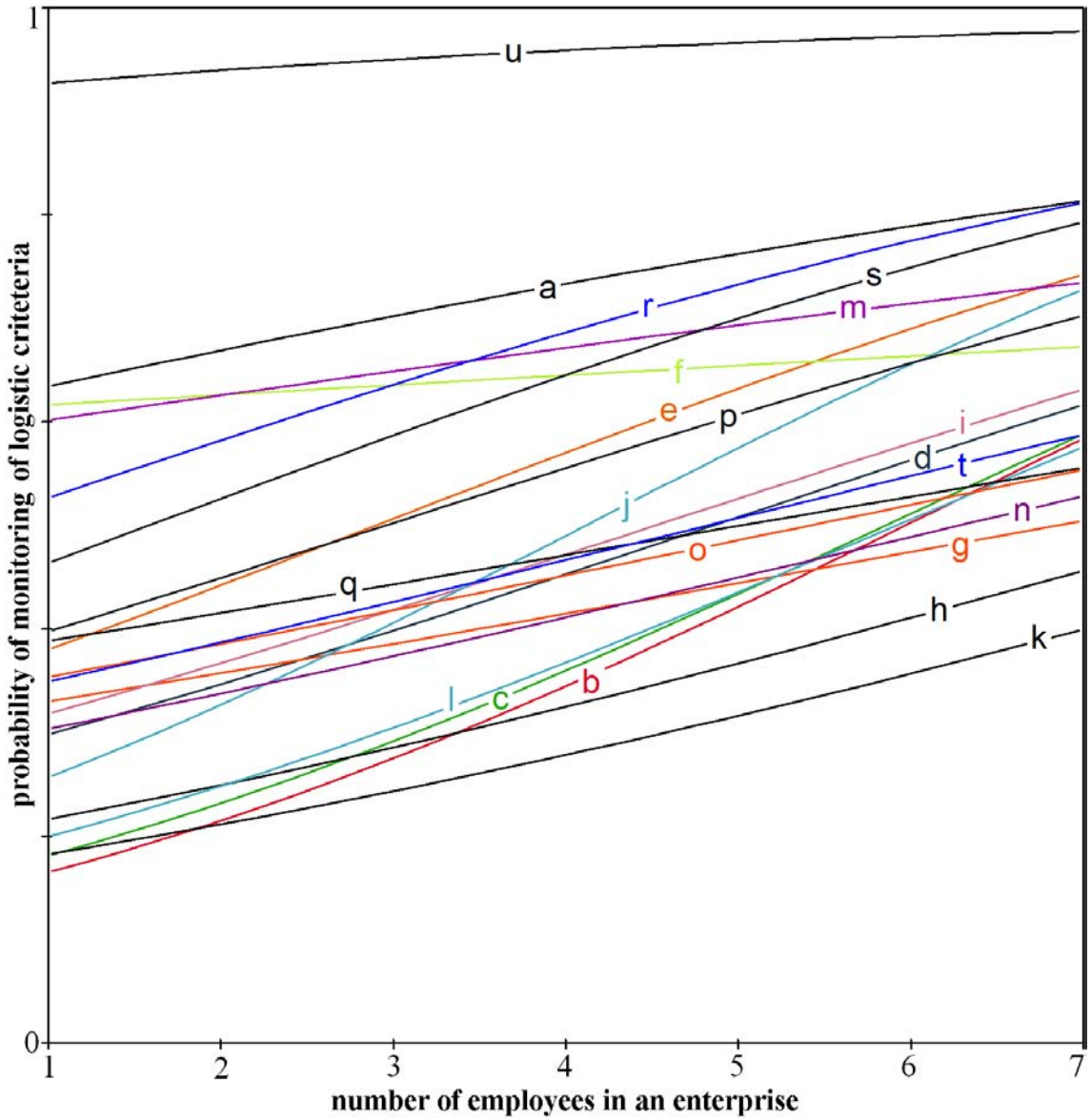



*Figure 3 :* Logit regression of individual answers on question No. 24 (monitored logistic criteria) on variable No. 3 (number of employees in an enterprise). Author's own.work

*Table 2 :* Results of logit regression of individual answers on question No. 24 (monitored logistic criteria) on variable No. 3 (number of employees in an enterprise). r: correlation coefficient; p: significance level (p<0.001: ***, p<0.01: **, p<0.05: *, p<0.1: .). Percentage of each criterion is also shown (%)

| Criterion | % | r | P |
|---|---|---|---|
| Monitoring the maturity of invoices | 91.0% | 0.10 | |
| Capital bounded in inventories | 67.4% | 0.12 | * |
| Average inventories | 62.4% | 0.09 | |
| Costs for purchasing of stock | 61.1% | 0.04 | |
| Following the time of dispatch | 61.1% | 0.18 | ** |
| Share of sales returns | 56.6% | 0.20 | *** |
| Storage costs | 49.3% | 0.21 | *** |
| Transport capacity use | 48.9% | 0.18 | ** |
| A number of errors in deliveries in overall volume | 43.0% | 0.10 | . |
| Costs per unit of purchased/dispatched goods | 41.6% | 0.14 | * |

| | | | |
|---|---|---|---|
| Number of turnovers per year | 41.2% | 0.18 | ** |
| Inventories turnover time | 40.7% | 0.28 | *** |
| Storage capacity use | 40.7% | 0.12 | * |
| Average transport costs per 1 t of goods | 39.4% | 0.19 | ** |
| Costs due to logistic activities capital acquisition | 37.6% | 0.11 | . |
| Revenue from saved costs due to a change of transporter | 36.7% | 0.14 | * |
| Average costs per storage unit | 30.3% | 0.24 | *** |
| Share of storage costs in total costs | 31.2% | 0.26 | *** |
| Working capital in logistic activities. | 29.0% | 0.27 | *** |
| Costs due to a decrease of the inventories value | 28.5% | 0.16 | * |
| Number of dispatched items/day (or other time unit) | 24.4% | 0.15 | * |

221 enterprises in the sample revealed that 25.8 % had a logistic department and 10% had a department of logistic controlling or internal audit (29.9 %). The following table present what kind of activities is dealt with at such departments (table 2) or at departments, to which are these activities transferred (Table 3).

*Table 3 :* Activities Performed at Departments of Logistics

| Aktivity | % |
|---|---|
| Order processing | 85.5 |
| Operational management of production | 28.2 |
| Management of supplies | 47.0 |
| Storage | 50.4 |
| Package and expedition | 47.9 |
| Quality check | 29.9 |
| Transport | 56.4 |
| IT | 21.4 |
| Logistic controlling | 17.9 |
| Reverse logistics | 12.0 |
| Other activities | 3.4 |

If there doesn't exist specialised department of logistics, some other department should practice logistic activities. Which departments adopted these activities shows table 4.

*Table 4 :* Departments that Practice Logistic Activities too

| Department | % |
|---|---|
| Business | 42.7 |
| Economic | 19.7 |
| Production | 6.7 |
| Transport | 12.5 |
| Other | 21.5 |

Transferring of logistic activities to business department seems to be an appropriate solution. 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.

Activities that are bought from external companies are shown in table 5.

*Table 5 :* Outsourcing of Logistic Activities

| Outsourced activities | % |
|---|---|
| Transport | 54.7 |
| Storage | 11.9 |
| Package | 3.4 |
| Other | 5.9 |
| No activities | 24.1 |

The system of logistic activity monitoring is usually unsatisfactory (25) in smaller enterprises. This system is not used (25d) in small enterprises without logistic department. Questions 25e (change in a system of document flow) and 25f (results has improved after identifying a logistic problem) were answered positively by enterprises with greater return without a logistic department (see figures 4 and 5).

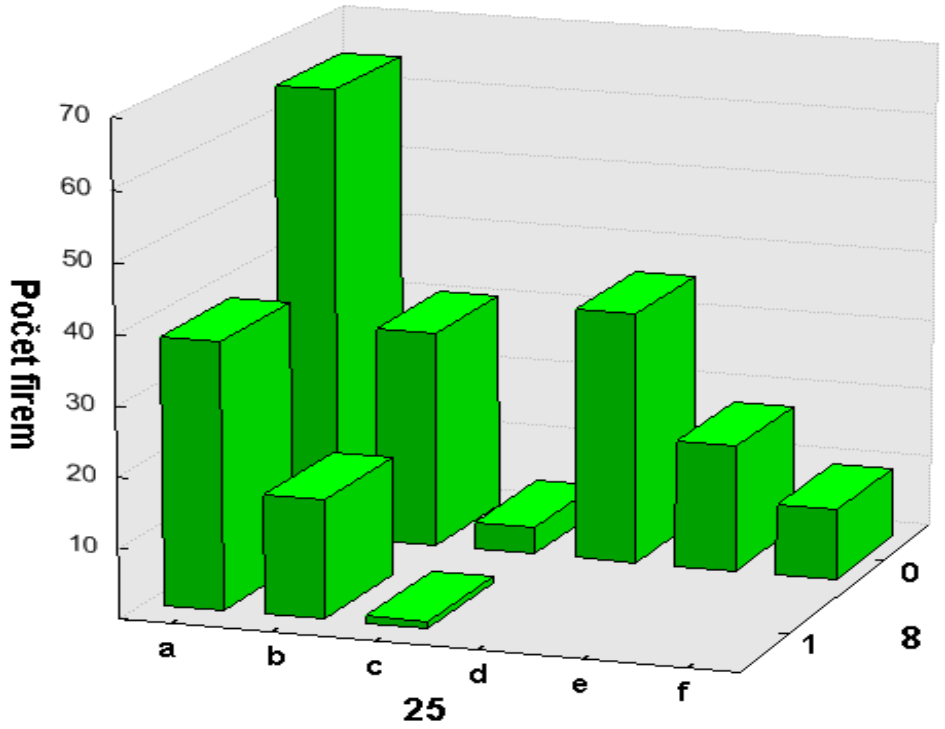



*Figure 4 :* The relation of satisfaction with the system of screening of logistic criterions (25) to the existence of logistic department (8). Om the left axis there is number of enterprises

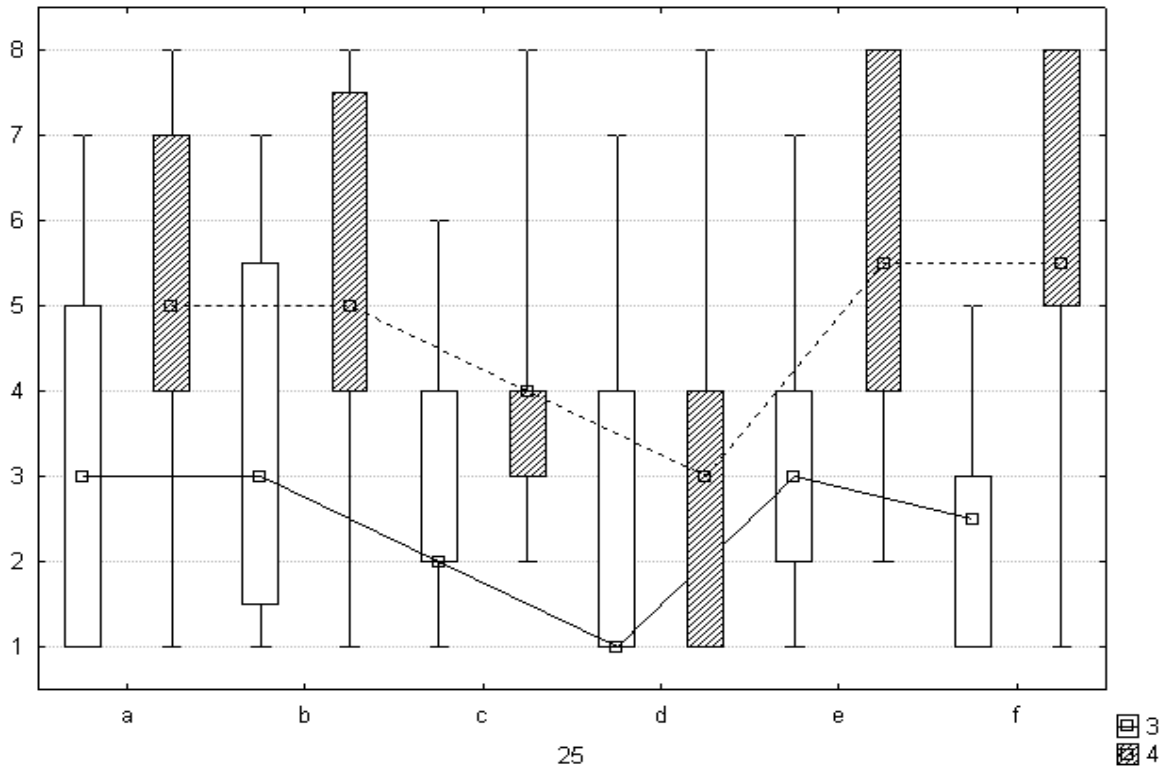



*Figure 5 :* The relation of satisfaction with a system of screening of logistic criteria (25) to size of company (.3 and 4). For explanatory notes see enclosure. (Point–median, box-quartile range, bar – range of value, source-author's own)

## V. 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 find a potential cost savings or a source of increased performance. 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.

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. Information technologies looks as very important in these processes, because are in all areas of management and all control processes, which are decision-making processes, subsequently influencing the processes and control processes while all the mentioned processes are realized through information processes. The company information system should satisfy all the company functions while ensuring them with the necessary amount, structure and quality of information. The quality of management decision – making depends on a number of factors influencing the situation. Inadequate response in the solution of any situation or factors in any external or internal process may lead to occurrence of partial or more comprehensive crisis situation.

Incorporation of audit and controlling in a company are shown in the following figure.

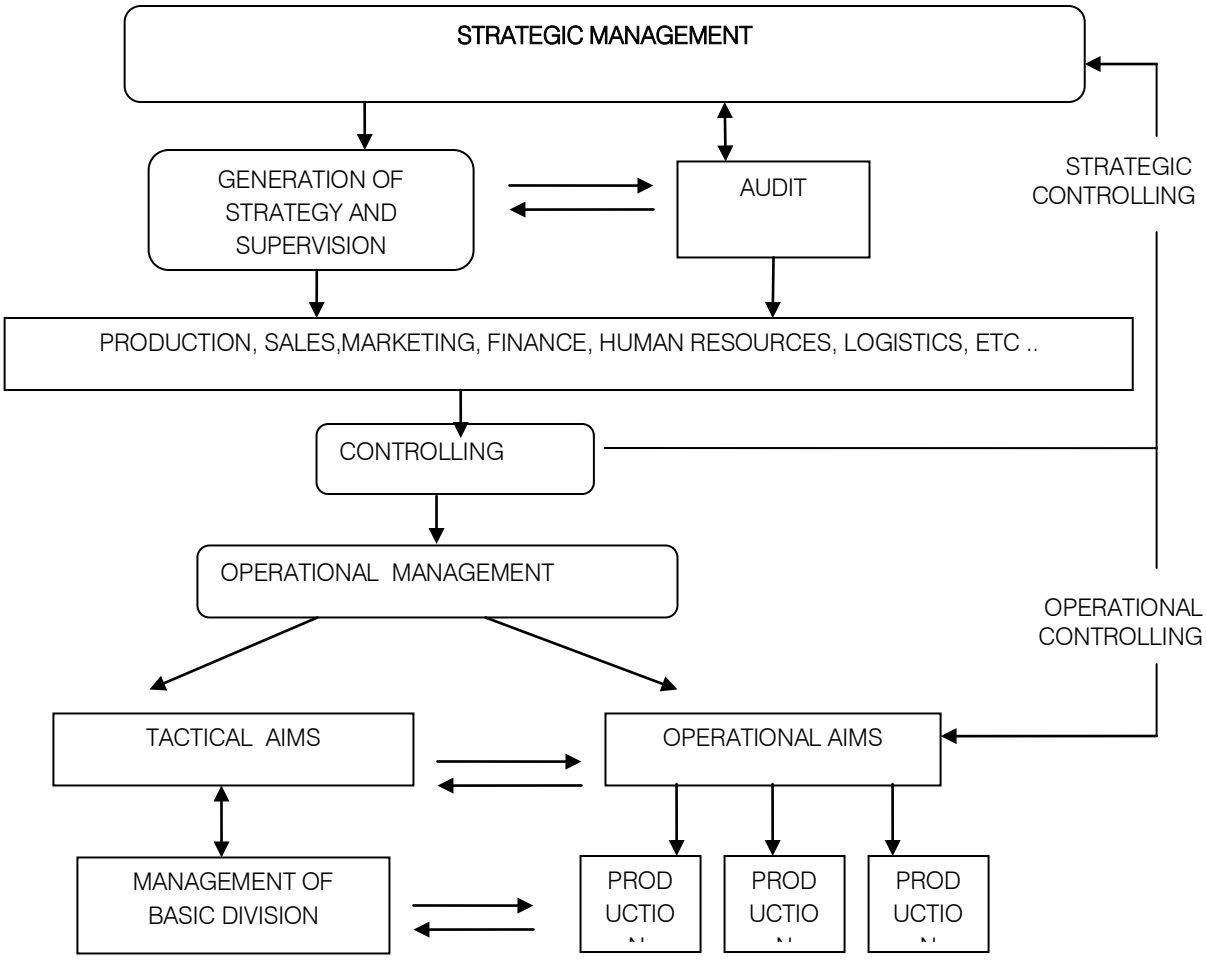



*Figure 6 :* Incorporating of audit and controlling in a company – author's own

Figure 7 shows concrete influence of controlling and its indicators to all spheres in the business in any company.

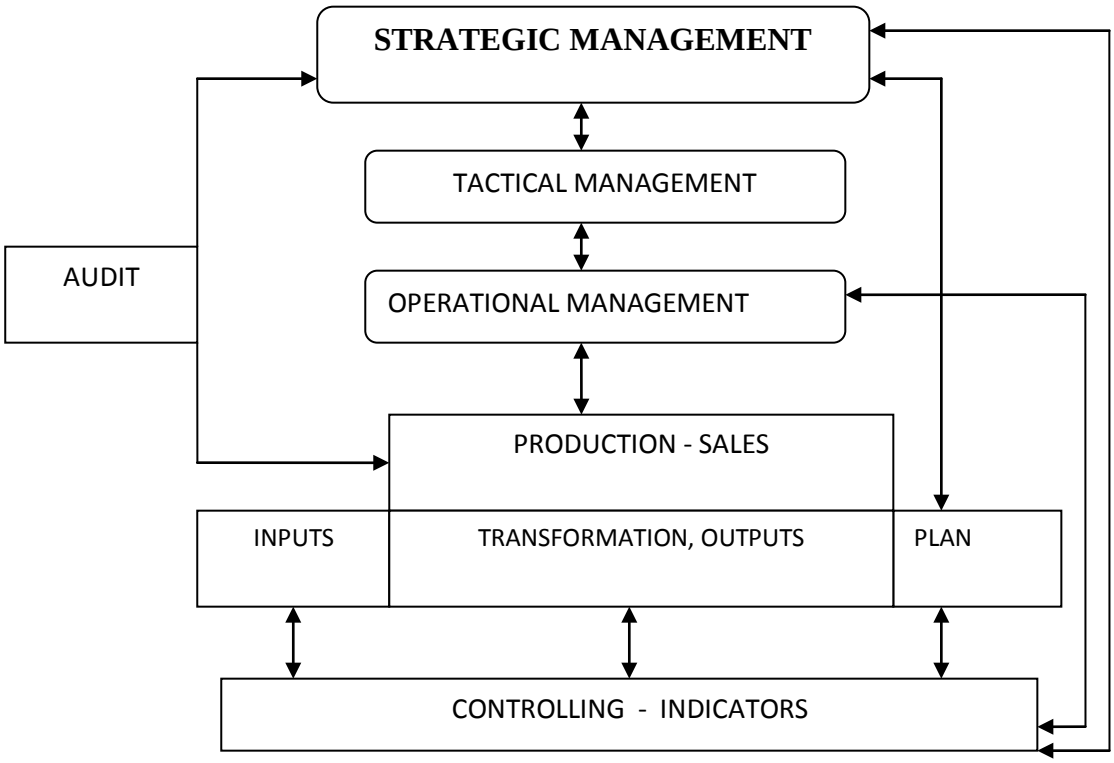



*Figure 7 :* influence of controlling and its indicators to all spheres in the business – author's own work

The importance of information is shown in figure 8.

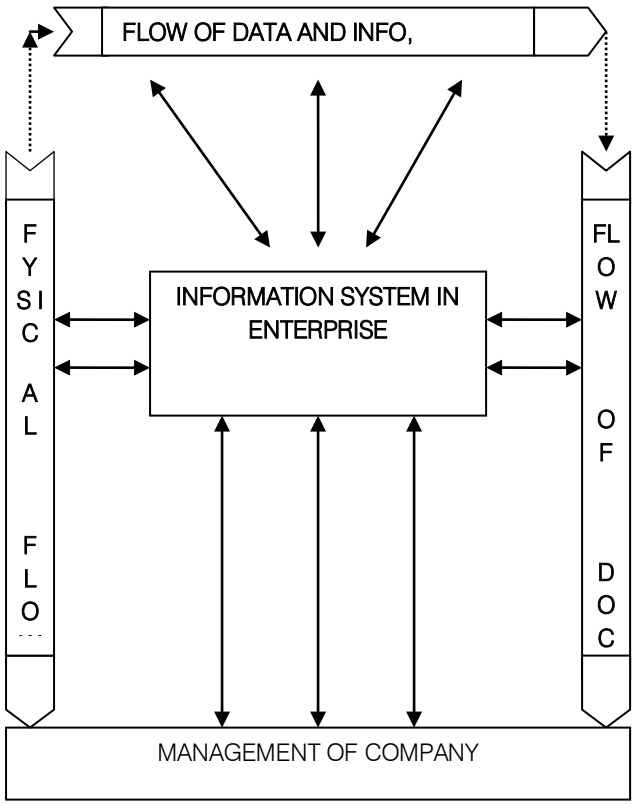



*Figure 8 :* Importance of right flow of information – author's own work

## VI. Summary

This paper deals with the logistics and logistic controlling as a potential source of savings and finding new possibilities for better organization and functions of any enterprise, the most for the supply chain. Why? Because the Supply chain plays the same role in the market as big company. They have more funds and power to based special departments screened the right function of the system. It looks to be the aim for smaller companies to entry in such chains and to use advantages being consequent from such activities.

The results of the paper proved that bigger enterprises paid more attention to investigated problems – creating information sources and setting specialized departments. Such enterprises also paid more attention to keeping and improving relations with their suppliers. Such relations are related to logistic activities as a source of additional advantages and profit.

The author focused on using logistic metrics in companies, which become components of supply chain. During this stage of the research were found some more frequent logistic criteria. Logistics and logistic controlling may also use common methods of management focused on the above mentioned categories. In the paper author stated some practical experience of companies and particular approaches on how the respective situations can be approached and used in a practical manner. The integration processes characterizing the current state and prospects of changes in Europe and worldwide, i.e. include the economy in the Czech Republic as part of the EU. It is important to be ready protecting company in the process of globalization and find special advantages how to penetrate in some other markets.

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