

PARAMETERS OF THE QUALIFYING SYSTEM FOR LOGISTICAL ACTIVITIES

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[Received April 2002 and accepted February 2003]

Abstract. This paper introduces a qualifying parameter system for logistical service companies. The system is based on the chain of logistical activities. By means of this chain of activities and tailor-made parameter system companies can create a decision supporting system. This system cannot substitute for the well-educated specialists, but it could help them to accomplish their tasks. Thereby the decision making process can be easier, shorter than earlier and documented at the operative and the strategic field too.

Keywords: Quality assurance, qualifying parameters, logistic strategy

1. Introduction

In Hungary the use of quality insurance systems have come to the front recently, which is partly natural, and partly the consequence of artificially induced demand. The artificial demand was induced by the multinational companies by requiring the certificate of the standard of ISO 9000 family from their suppliers. Those companies, which got this certificate in the 90s, take the possession of this evident but most of them consider it unnecessary till today, forgetting what kind of refinement possibilities it includes.

The recession, which is characteristic all over the world, can be felt in the circle of multinational, companies more and more. It has different effects to various sectors but it has the most striking effects on the IT industry. The recession forces all the large companies to try to reduce their costs. It is an extremely difficult task to define the level of costs which still allows the proper quality service of customers to be achieved but does not lead to unwanted costs.

Simplifying the content of the definition of logistics according to the current practice it can be regarded as information, material and energy flow between two consecutive statements. There are approaches in the literature of course, which are more vague and comprehensive.

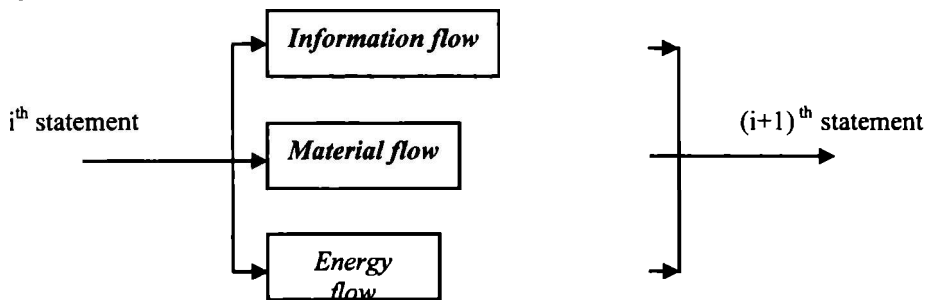


Fig. 1: The interpretation of logistics

During my research I have been focusing on only the information and material flow which is connected to logistics. The reason for this is that the study of the energy flow linking with logistics can be the basis of a new research interest because it is complicated and large-sized.

2. Matrix system of the logistical activities

In my PhD study I examined the connections and relations between logistics and quality insurance. First of all we have to define the quality insurance parameters, which can be used in the field of logistics to make any survey of the situation, any corrections or any measurements of results. To define these we have to apply some restrictions. In first approach to work out the system it is necessary to know what kind of logistical activities the company apply. The type of applied logistical activities depends on whether it is a manufacturer or a service company. The classification of logistical activities done by companies can be seen on Fig. 2. Logistical service companies usually carry out activities only outside and inside the company or maybe between workshops, where workshops can be called rather plants.

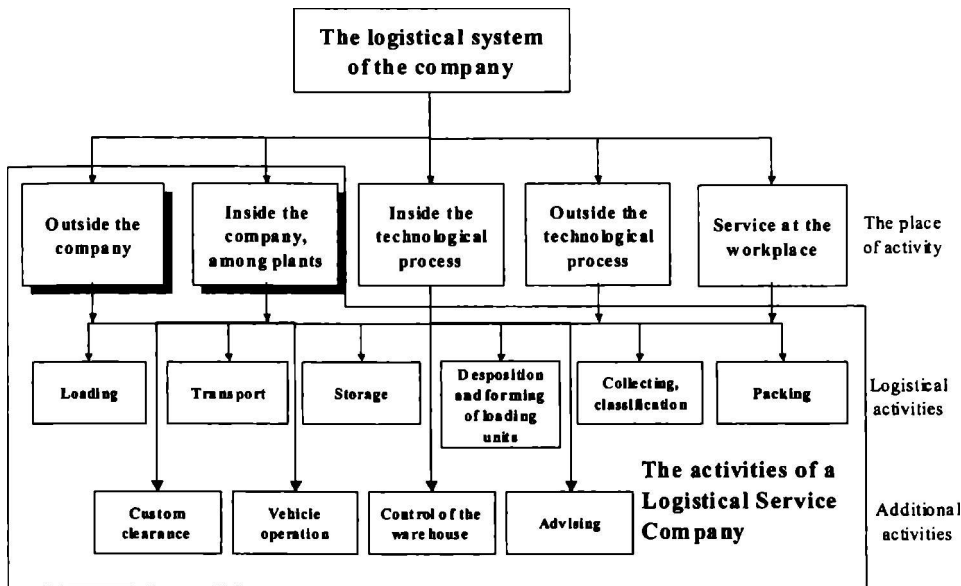


Fig. 2: The classification of logistical activities

In the course of my work I have worked out a method by means of which the changes of the quality features can be followed by attention and can be made numerical during the logistical processes. As Fig. 3 shows the starting point of the examination is the product. Theoretically the processes can be connected with the product indeed but in practice it is more complicated. The cause of this is that the company deals with several types of products and the number of customers is also significant in an ideal case.

That is why it is worth transforming the system in such a way that the processes are connected to the order of the customer (to the customer's number of order). As a result of this the logistical process is linked with the customer's number of order, which can be related to several ones from the wide range of products manufactured or brought in by the company. (Fig. 4)

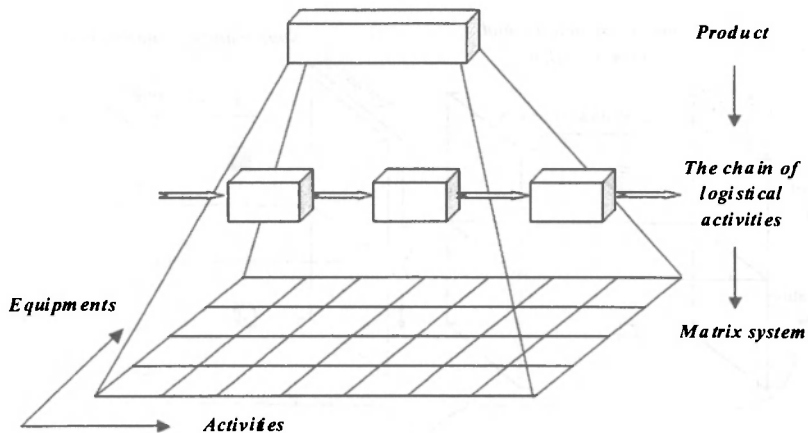


Fig. 3: From the product to the matrix system [2]

This type of approach does not modify the principles and results I mentioned earlier, only make them more exact. The connection between the order numbers and the products is shown by a quantitative matrix, which contains how many customers want to buy from the studied product in course of certain orders.

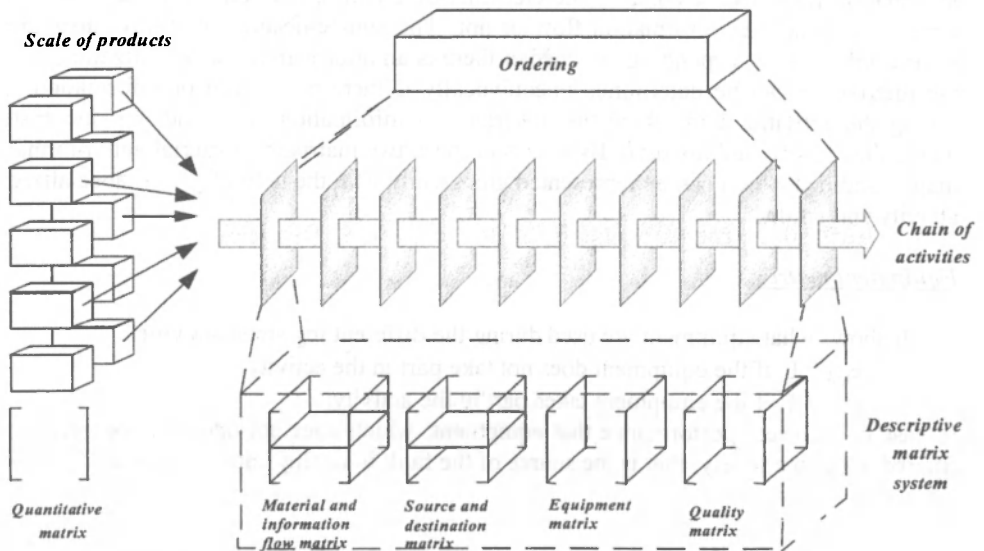


Fig. 4: The connection between logistical processes and the matrix system

The elements of the matrix system, which describes the processes determined by the order, are the following:

Material and information flow matrix and the source-destination matrix

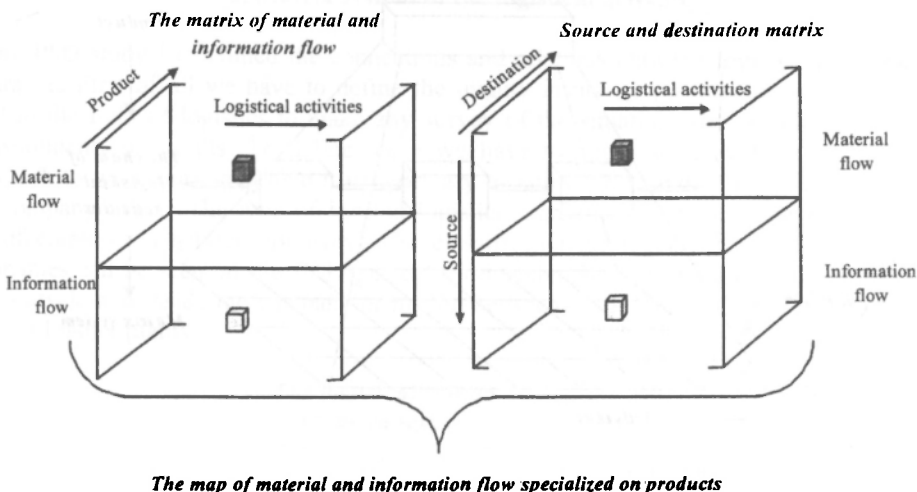


Fig. 5: The material and information flow matrix, the source-destination matrix

For a the simpler and clearer applying the matrixes are divided. The material and information flow matrix contains the elements of 1 and 0, the value depends on whether there is material and information flow or not. The source-destination matrix also should have 1 and 0 values depending on whether there is an information rise or utilization. Filling the matrixes it can be determined unequivocally if there is material or information flow during the activities and where the material and information enter and exit the system, where they appear and are used. By means of these two matrixes a material and information map is outlined which can be represented graphically with the help of graphs specialized on activity and product.

Equipment matrix

It shows what equipment are used during the different logistical activities.

$e_{i,j,k} = 0$, if the equipment does not take part in the activity,

$e_{i,j,k} = 1$, if the equipment takes part in the activity.

In case of incorrect performance that equipment, which does not operate properly, can be filtered out immediately, that is the source of the fault in quality can be stopped.

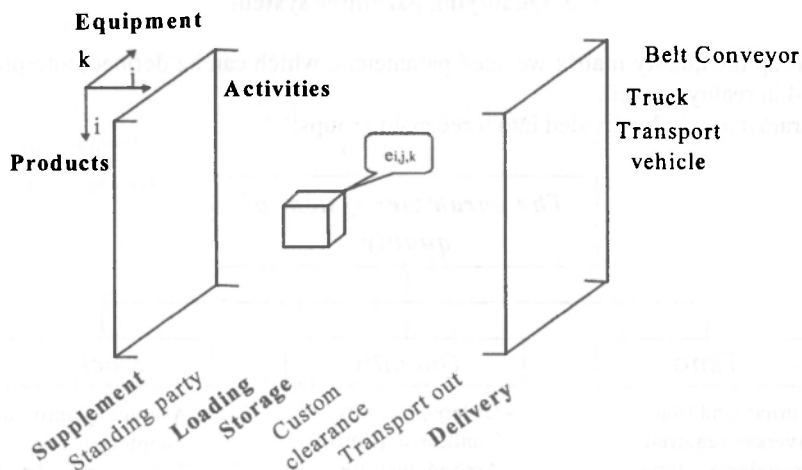


Fig. 6: The equipment matrix [2]

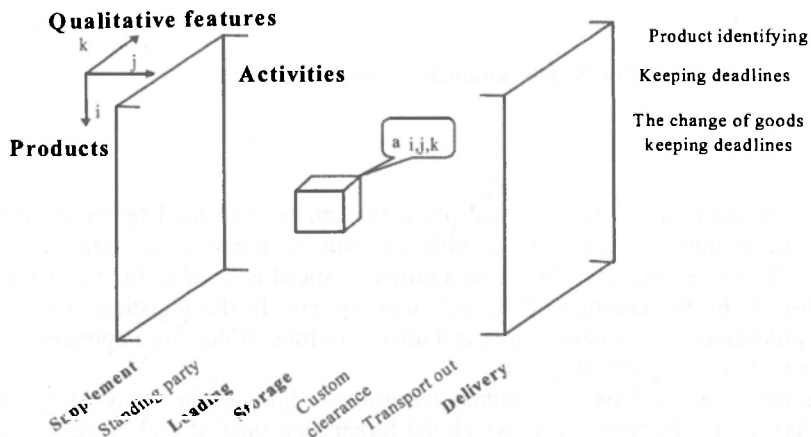
Quality matrix

Fig. 7: Quality matrix [2]

3. Qualifying parameter system

To fill up the quality matrix we need parameters, which can be defined, interpreted and calculated in reality as well.

These parameters can be divided into three main groups:

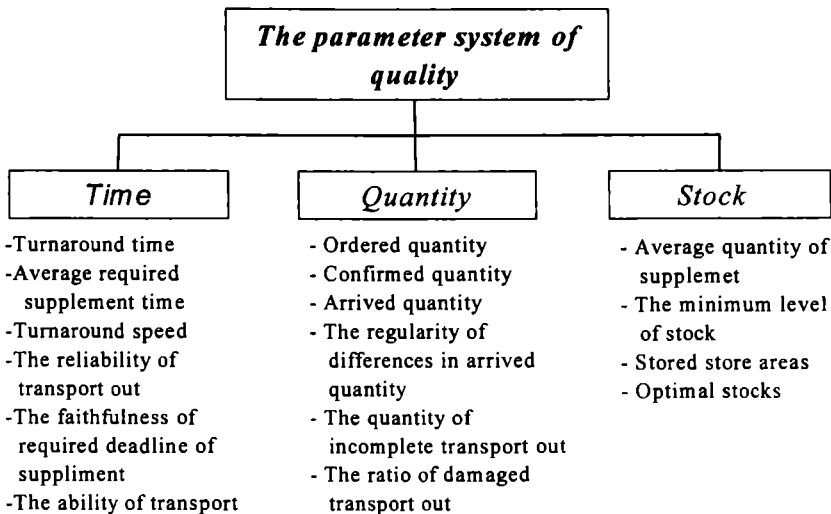


Fig. 8: The parameter system of quality

Time

The turnaround time of the logistical processes can be measured by parameters. We have to make comparison points to be able not only to measure the time but also to determine whether the measured turnaround time and speed is suitable for the company. It may be possible by the creation of the milestone system. In the logistical processes the individual milestones are situated before and after activities, which are important from the point of view of the company. (Fig. 9.)

During the investigations the optimal turnaround time of the individual logistical processes has to be determined with which the turnaround time of real processes may be compared later. The group of „time” parameters contains not only parameters with hour, minute dimension but all the ratios, which are related to the time of logistical processes, too.

Quantity

As in the case of time the quantitative parameters of processes and products, which take part in the processes, also belong here.

Beside the quantity of the transported product the quantitative features related to products are the followings:

The number and quantity of incomplete transports,

The number and quantity of surplus transports,

The number and quantity of damaged transports.

The ratios related to quantitative parameters also belong here.

The logistical process

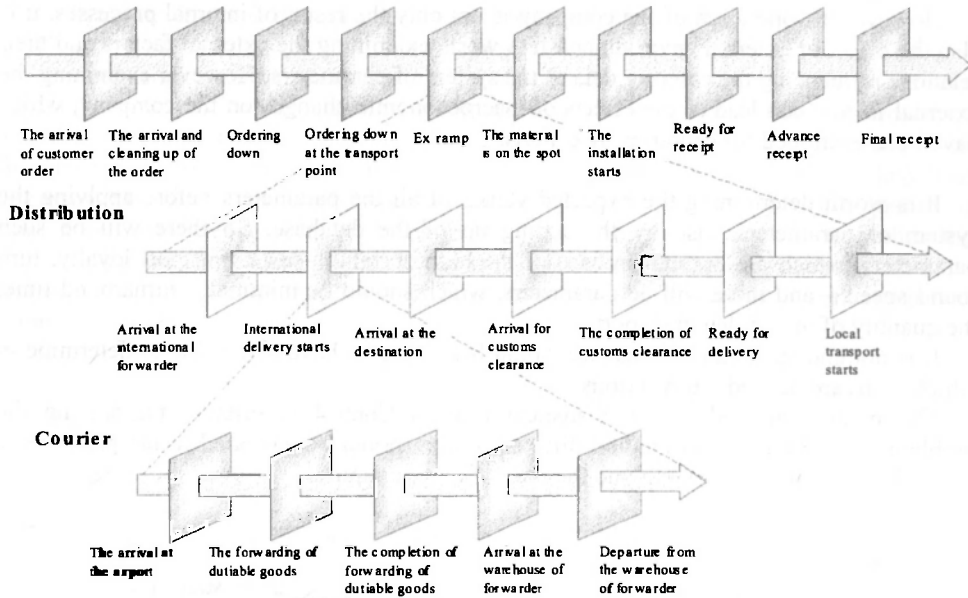


Fig. 9: The system of milestones

Stocks

Although the stocks are not direct features of the processes, they determine the operation of the logistical system basically. In case of a company, which has incorrect stock management the financial resources drain away or accumulate unnecessarily almost, unnoticed. In the event of high level of supplies because of the accumulated stocks the situation of the company from the point of view of liquidity worsens. But in the case of low level of supplies there is a constant force of order. As a result of this, the company is unable to take advantage of the larger quantities provided by the suppliers.

The parameters of stored, ordered, sorted out stocks and the demand for the territory of warehouse, which is necessary for storage, belongs to this group of parameters. This leads us to the field of costs but this topic is needless to examine in general because it is specified on the company.

We need to be aware of the demands and purchasing habits of the company's customers, and the turnaround time and operation of the processes of the company and the suppliers to be able to determine the optimal level of stocks.

In case of small companies where the number of customers and suppliers is also low the processes and the related critical length of route can be determined simply. In the event of a large company planning and examination can be solved only with the help of informatics. Where the system of parameters worked out by me can be one part of the system of data processing.

However the operation of the company is not only the result of internal processes, it is also the effect of external environment. It is worth examining the external factors and their relations influencing the entering data of the system of parameters. However examining the external factors can lead to the effects of macroeconomic changes on the company, which have been examined for centuries by experts.

It is worth determining the expected values of all the parameters before applying the system of parameters, also by the setting up of the database. So there will be such parameters, which are optimal in case of the highest value – e.g.: transport loyalty, turn round speed – and there will be parameters, which should be minimal – turnaround time, the quantity of incomplete transports.

It is not enough to know what we would like, we also have to be able to determine in which cases are needed interventions.

The method applied in the Statistical Process Control is suitable for solving the problem. According to this method different limits should be allocated to the parameters. Such limits are the critical limit and the limit of intervention.

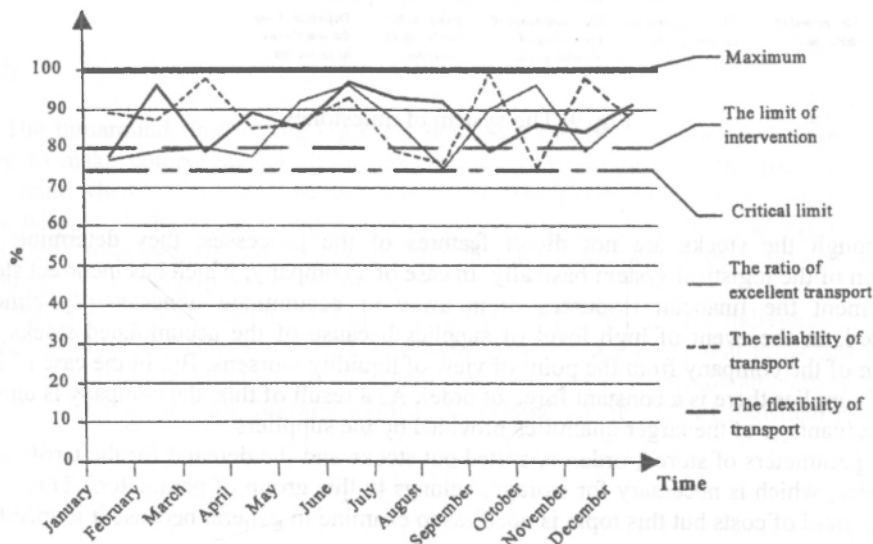


Fig. 10: The changes of the parameters in the function of time

Of course in the same diagram either only those features can appear which should be maximized or only those, which should be minimized. The critical limit means that if the feature decreases under this limit the satisfaction of the customer sustains a lasting loss. When the reliability of transport is not satisfactory the customer looks for an other supplier. None of the companies can afford such kind of loss of market in the sharp competition of today. To avoid such situations we should introduce the limit of intervention, which provides the opportunity of correcting negative trends.

Applying the limits in this form means only to keep up the quality, which is completely insufficient for a company, which is in a leader position on the market. The principles of constant refinement can be realized with the help of the system if we review the values of critical limit and the limit of intervention continuously and accept only those performances, which are better and better. Applying the system of parameters makes sense and is of importance only if we are really curious to know the state and quality of the logistical processes. Of course the matrixes and parameters are not able to refine the quality of internal and external logistical activities on their own. They can only help to outline the present situation. By means of this the critical points can be determined and also the necessary decisions can be made. It is the responsibility of the quality management whether it applies it or not.

After completing the analysis the quality management can determine the necessary steps to bring the activities of the company to perfection and to reduce costs. Another advantage of applying matrixes is that if the company contacts a new product then it is not necessary to create a new a matrix, it is enough only to complete the actual one.

The advantage of the measurement of time

The turnaround time of the logistical processes of the company can be shown by orders,

The place and the reason of the differences compared to the milestones and the person who is responsible for it can be determined unambiguously,

Expedient arrangements of correction can be done,

The deadlines of transports can be kept more accurately, the customers are more satisfied,

The logistical processes can be traced up-to-date,

We can plan more accurately how to place the orders in time,

It is possible to prepare for the auditing of quality insurance with the help of numerical quality features,

The possibilities of refinement can be shown and identified.

The results of monitoring stocks and quantitative parameters

The logistical system is completely clear-cut,

The qualification of suppliers is more founded,

The data of corrections related to quantity can be allocated to the auditing of quality insurance,

- A more rational stock management can be developed,

The surplus costs arising because of inadequate warehouse management can be shown unambiguously,
 The optimal level of stock can be set by products,
 Reorders can be scheduled more accurately,
 The order units can be optimized,
 The quantity of the materials which should be sorted out can be reduced,
 The surplus costs arising because of qualitative problems can be shown,
 The consequences of qualitative unsuitability can be reduced (penalty),
 The processes can be optimized expediently,
 The arising costs can be planned in time,
 The projects can be scheduled more tightly.

The advantage of creating the system of parameters is that the company does not have to develop a new information system; it only has to make use of the data of the actual system. In this way the cost of introducing is insignificant compared to the advantages we can profit by it.

4. Conclusions

Reading the article one may miss concrete parameters. The reason for the lack of them is that during my researches I was given the opportunity by the Siemens Company to realize my ideas in practice. According to the agreement with the company no data can be published in connection with its processes, thus the specified parameters of the company also cannot be.

At present the creation of the database is in progress, the survey of the logistical processes and the collection of documents and information sources are over. After finishing the stage of data collection, later on the estimation, then the setting of the critical limit and the limit of intervention follow. And after the trial operation comes the real operation which hopefully will be able to support the decisions of the leaders of the Siemens Company efficiently and to increase the satisfaction of the company's customers.

One may not forget, that this is only a system, which supports decisions; the leaders and experts should make the decisions.

REFERENCES

1. HALÁSZNÉ SIPOSS ERZSÉBET: *Logisztika, szolgáltatások versenyképesség*, Logisztikai Fejlesztési Központ, Magyar Világ Kiadó, 1998, pp. 73-75.
2. CSÉPES, O. S.: *The assessment of variations of logistic system at service companies from the point of view of quality assurance*, 2nd PhD Conference, Engineering Section, Miskolc, 1999, pp. 267-275.
3. KING, B.: *How valid are our QA assumptions: an examination of underpinning Axioms*, Accreditation and Quality Assurance, Vol. 4, Issue 8, 1999, pp. 326-335, ISSN 1432-0517.