

QUALITY IN LOGISTICS

Péter JUHÁSZ* and Alfonz ANTONI**

Department of Transport
Faculty of Transportation Engineering
Technical University of Budapest
H-1521 Budapest, Hungary

Tel: 36 1 436 10 54 Fax: 36 1 463 32 67

* e-mail: JPETER@kgazd.bme.hu

** e-mail: ANTONI@kgazd.bme.hu

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Abstract

In our world it is useless to try and continue using only traditional measurement tools to understand whether a company is performing well. This paper will try to underline the reasons why it has become necessary to use performance measurements and after that to present the quality in logistics. Based on the Norton-Kaplan and the Linch-Cross model a new logistics quality model was involved to improve the level of the distribution service. The second part of the paper presents the experience, the practical issues of the application of this model for two companies. The company made a serious mistake by not organising its processes, not harmonising its own and its partners' informatical system.

Keywords: logistics, quality in logistics, distribution.

1. Introduction

New information technologies allow firms to get into a different world where distance is a variable no more relevant. It becomes possible to reach partners to work with wherever they are located. Information can be exchanged easily, cheaply and in real time. Firms can work on ideas and create virtual products patching different 'parts of knowledge', they can get in the network to meet 'each' customer's needs. This means that product's structure changes: it becomes more reversible: Great opportunities seem to spring in this new world of communicating subjects, knowledge and competence are the only important resources one must own. Dimension of firms is no more the key for success: the way to manage know-how problems gets that role.

2. Comparison

In such a new world it is useless to try and continue using only traditional measurement tools to understand if the company is performing well. Among operators dissatisfaction with traditional measurement systems is growing.

It is necessary to look inside activities not considering them as standardised elements, but trying to understand how they are effectively to run. It is important to consider that everything done inside the firm is aimed at satisfying customers staying outside of it. So each activity and each process must be studied and understood in order to improve that result. Firms can no more think of them as sequences of actions not changing in time that everybody can do following instructions given *ex ante*.

The first part of the work analyses the new models of performance measurement.

3. New Methods for the Performance Measurement

First of all it is analysed with the Norton–Kaplan model. The balanced score card is a very interesting way to identify what a manager should have in mind doing his job. To manage considering explicitly the idea that there is a customer to serve and measuring continuously his perceptions and feelings (where to the expression ‘measuring feelings’ one must attribute a large meaning) about the products the firm offers – this is the customer dimension of the model – allows to better understand ‘where’ the production and the research ought to go. All the activities and processes should be directed at making the customer happier and happier. Consideration of activities and processes – this is the internal dimension of the model – permits to better understand how to reach the goal set in the previous step. Only creating, searching, producing new and different products it is possible to have smiling customers. Norton and Kaplan underline that firms have to search for quality and to be able to guarantee timing. Quality and lead time are the more important dimensions. Customers must have what they need, what the company has promised them, or the best the company could provide, and this must be done at the right time. To manage considering men and women working in the firm important, giving them the opportunity to find their work useful and necessary, to make them think that their ideas are the most important resource for the company, and to help them developing their capabilities – this is the growth dimension of the model – makes the company able to create the right relations among people. New ideas can spring out and be the real competitive advantage of the firm. Understanding what the firm is doing is fundamental in reaching this aim.

The second model analysed is the Linch–Cross one. The difference between them is that while the first one puts all the perspectives at the same level attributing them the same relevance, the second one is aimed at pointing out what are the relations between the different dimensions considered. It is important to underline that this model just like the other one obliges managers to have in mind at the same time different indexes: financial and non financial ones. But in this case the situation is very different as a great

relevance is given to the internal dimensions. It is not just a general idea of quality and time which is recalled, but at the first level of analysis the model points out immediately two internal dimensions: flexibility and productivity, and at the third level – the one of the factory – it demonstrates again quality, delivery, lead time and waste. The second part of the paper discusses quality in the logistics and a model developed to measure the quality of this.

4. Logistics Quality Model

In all fields of economy the competition is becoming more and more keen in order to keep market positions or to improve them. Virtually, in every manufacturing or catering process, through which the product reaches consumers, operations of logistics are applied to some extent. According to international statistics, the average logistical expenses of products amount to 20 to 40 per cent. This accounts for the assumption that the transportation, storage, finishing and distribution of products as internal logistical services, or as external ones, play an important role and have a significant effect on the overall quality of the product. This link, in certain cases, might be direct, e.g. in the following cases:

- transportation of goods without damage,
- storage with quality preservation,
- suitable e.g. customer-oriented wrapping.

In other cases, the connection is though indirect, but it is present, e.g.:

- transportation respecting the term,
- identification of cargo units,
- polite service and informing.

We can come to the following conclusion: the quality of logistics is important not only to those providing it, or to those who directly use it, but to all customers. Through the mediation of supplier chains, the quality of logistics involves a wide range of customers (*Fig. 1*). Effects spread quickly through chains generated by the juncture of basic logistical processes. The quality of the logistical process is the outcome of several influencing factors.

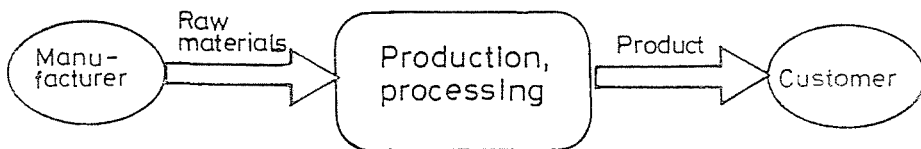


Fig. 1. Basic logistical process included in a product or service

In the three fields, different methods, techniques can be applied to measurement and improvement of quality standards:

- quality of real instruments, equipment (vehicles, buildings, tools),
- training and expertise of workers,
- process organisation (exchange of information, control).

We have set up a model to measure the quality of logistics on the basis of this.

5. Quality of Real Instruments, Equipments

Characteristically logistics requires extensive use of different equipments. Important factors in judging its quality are the quality, the reliability and the technical condition of the equipment. When analysing the reliability of a logistic process in terms of equipment one of the key issues is to what extent the given process is able to analyse details of technical condition of

- an essential part,
- a complete machine,
- a fleet of machines homogeneous in terms of analysis, suited to accomplish the same task.

Which of the above should we take as the basic unit of analysis?

Regardless of the chosen unit the proof of equipment quality will be whether the task can be accomplished with the equipment at hand or not. This will involve two further aspects:

- physical suitability of the type of the equipment (maximum load, length, width, height, temperature control, etc.),
- technical condition, reliability of the machine (cancelled or faulty service as a result of equipment defect).

A reliable description can be based on the reliability of the chosen units and the analysis of the links and relationship between them.

The quality of tool stock can be well characterised by the following technical and statistical parameters:

- age,
- probable life span,
- failure rate,
- probability of perfect operation,
- average time between two failures.

Maintenance and new equipment purchase are based on and planned by the application of distribution curves with appropriate parameters based on previous factual data. Fortunately the manufacturers apply statistics and probability calculus and inform the operators about the estimated lifetime, although not quite comprehensively. A reliable fleet of equipment can only be established by preventive maintenance. According to practical experience, failure rate in the case of traditional products resembles a 'bath-curve' (Fig. 2).

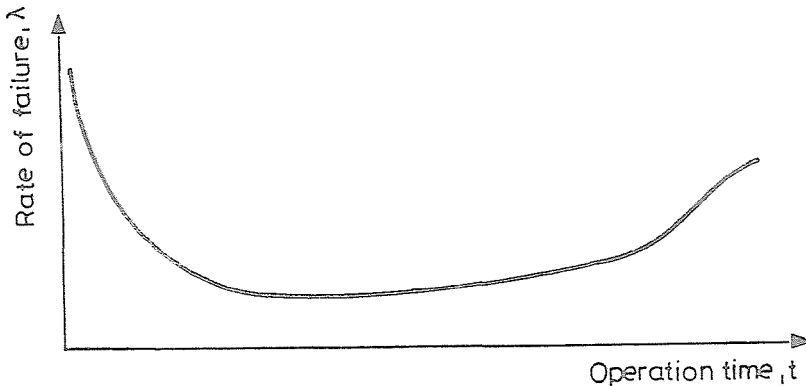


Fig. 2. Rate failure of tools plotted against operation time

This curve, with an appropriately chosen parameter, is well approximated by exponential distribution.

This paper is not aimed at going into further details in theory of reliability, because this is only one (although indisputably important) field within the analysed topic of quality, which was described by mathematics decades ago.

6. The Human Factor

The expertise of individual workers, good company atmosphere, and the cooperation of colleagues mean an influence, especially in the field of service, which is an indispensable element of quality orientation. Managers are to establish and improve components like them.

According to the famous Japanese quality expert, Kaoru Ishikawa:

'In management the main aspect should be the happiness of the company workers. If these people are unhappy, or cannot be made happy, the company does not deserve to survive.'

There are three conditions for quality worker staff:

1. Appropriate manner in management,

2. Personal motivation in good working atmosphere,
3. Training, formation (both professional and general).

The majority of quality projects focus on the introduction of some kind of further training commitment or company culture, image. All companies have to realise their workers' learning, thinking, and innovational capacities, but must also face hindering factors. Preparing workers for novelties is of vital importance.

7. The Quality of the Process

The improvement of company processes is the aim of quality insurance systems, and of quality improvement and measuring techniques (*Fig. 3*).

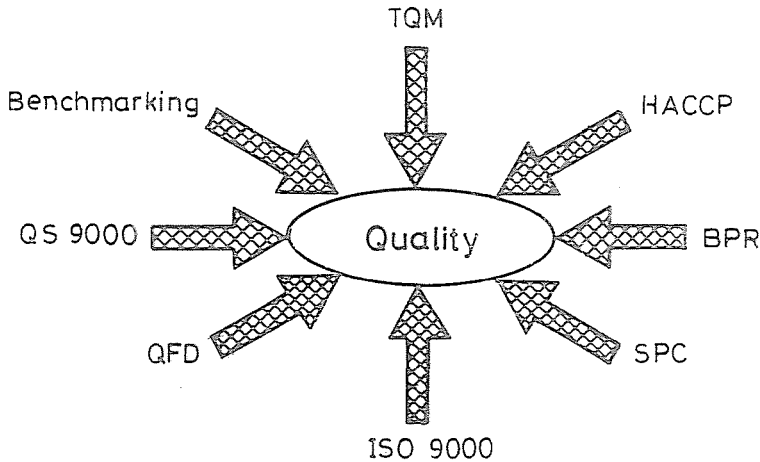


Fig. 3. Programmes aiming at quality improvement of company process

Modelling and simulation are possibilities to optimise up to date logistical processes. Using different kinds of modelling software in this field we can find the critical points, the bottle-neck, and the possibility to accelerate, to better balance and control, to improve the process. The most used software names for the logistical simulation are Witness, Taylor, LabView.

8. Practical Issue I.

One of the multinational groups (in the energy sector) in Hungary has decided to improve his distribution logistics. For this they were obliged to use performance measurement methods. At first, they decided to make an analysis with the help of the first model. In the customer dimension of the

model they found that the customers really needed to have energies always. (This is a general need). The answer for the question how the company is able to make the customer happier and happier is the following: assure always the energy at good price. In the internal dimension of the model they determine that the way to reach the goal established in the previous step is the exact lead time. In the quality they cannot be better than other companies. The reason is simple: the product is a basic product (LPG). There is no difference between the quality of the competing companies and this one. The only dimension to engage the customers is the lead time. In the energy sector this is always the most important dimension. In the third dimension of the model, there was a lot of problems. This dimension practically does not exist at this company. It means that there is no invention intern in this company, and the relationship among the people is not so good. There is not a good ambience. After this analysis we can tell that there is a fundamental problem: the growth dimension does not work absolutely. They need to have a totally new human resource policy.

9. Practical Issue II.

Another practical example is AWT Hungary Ltd. This is a food trading company which has been present on the Hungarian market for some years, but which does not have any local production capacities. This company also has to face the question in the field of logistics: make or buy?

It does not intend to rival its competition in prices, so in this company's case distribution logistics and quick and reliable warehousing operation, careful storage and exact order picking are the most important success factors. It has chosen a local logistical supplier, with which it has established strategic contact. It has outsourced its total logistical service. It was only the reception of customers' orders and filling up the stock that were settled by the company itself.

The company made a serious mistake by not organising its processes, not harmonising its own and its partners' informatical system. Despite all expertise and appropriate technical background large stocks have accumulated whose guarantee has expired during storage. Mistakes manifested in different forms, but by applying the logistic quality model appropriately we could come to the conclusion that high stock level can be reduced by well-planned dynamic data exchange between strategic partners.

Such logistical service is frequently bought in the Hungarian food trade market. So local logistical companies are all to prepare (technically and academically) for such strategic partnership. The quality of their service is measured by this kind of preparation and readiness to cooperate.

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