Application of Quality Management Systems in the Logistics Sector in Bulgaria

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Summary:

The interest in the quality management systems in the Bulgarian enterprises has been increasing in recent years. The main reason for this is related to the recognized need for organisations to improve their management processes, including logistics, and therefore allow the formation of competitive advantages. (Chankova, 2005) As a result, it is interesting to study the logistics companies in Bulgaria in terms of the introduction and certification of quality management, as well as the practical application of quality records and those responsible for the quality of the product/ service. The aim of the study is, first, to outline the principles and requirements of the international standards for quality management, and to present the results of the system application by the documented procedures in the logistics companies in Bulgaria.

The object of research interest is the organisations in the logistics industry in Bulgaria that encompass: transport companies, forwarding organisations, transport-forwarding, courier, consulting, logistics to warehouse services, customs services, information services.

A methodology for measuring the degree of implementation of the quality management systems in the logistics industry has been developed. It is based on the use of four indicators, among which the following: the availability of certificate and quality documents, the persons responsible for the quality and availability of trained personnel aware of the issues related to quality. Through these indicators it is aimed to assess the implementation degree of the quality management systems in the organisations of Bulgaria's logistics industry.

An evaluation of the status of quality management systems in the logistics industry was made through a comparative analysis of the degree of application of the quality management systems by the commercial and industrial enterprises in Bulgaria and the research findings are presented to improve the implementation of quality management systems in the logistics industry in Bulgaria.

Key words: logistics industry, quality, certification, quality management systems

JEL classification: M21, L15

1. Introduction

The quality management systems represent rules guiding "stacking" the basic processes in the organisation so that individual elements can operate successfully in the overall structure. Thus achieving systematic management approach, in which all actions and responsibilities are clearly and precisely prescribed. The quality management system can be understood as a set of organisational structure, responsibilities, procedures, processes

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and resources for implementing quality management. (Vodenicharova, 2015)

The implementation of a quality management system is a matter of management's strategic decisionmaking. A viable system of quality management can help organisations in the logistics industry improve their overall performance and increase customer satisfaction. International standards can be applied to both the organisation and external parties to assess the organisation's capability of meeting customer requirements, as well as the legal and regulatory requirements applicable to products and services.

Due to growing customer demands and the expansion of services and competition, quality has become a factor for assessing companies' performance in the logistics sector. The well established and maintained quality management system in the organizations is becoming one of the major criteria for determining companies' market position and performance.

Hence it is evident that international quality management systems have a highly relevent role in the industry, and that these should be known and be actively pursued in the logistics industry. This paper aims to address the following objectives:

1. To present a literature overview of the management quality systems;
2. To develop a methodology to examine the implementation of the international standards in the logistics industry;
3. To compare the application of the international quality management systems of the companies in the logistics industry and the industrial and commercial organisations in Bulgaria;
4. To present the ranking of enterprises in Bulgaria's production, trade and logistics sector by application of quality management systems and employees trained in the methods of quality.

2. Literature overview

In order to establish internationally relevant quality criteria, based on worldwide experience in the field of consumer protection, the ISO international quality standards were adopted. ISO 9000 is a set of management standards and quality assurance developed by the Technical Committee of the International Organisation for standardisation, the International Organisation for Standardization headquartered in Geneva, Switzerland. The series of management standards and quality assurance standards (ISO 9000) were published in 1987 and revised in 1994. In 2015 ISO 9001: 2015 was introduced. They contain a comprehensive vision and guidelines on quality management, and also models the requirements for its security. A characteristic feature of ISO 9000 is the intervention of "independent third party" in the relationship between manufacturer and customer, i.e the certification organisation, certifying that the products meet the set of this series of quality standards.

The ISO 9000 family of standards naturally summarize the experience gained to date and are compatible with other management standards. The ISO 9000 addresses the basic principles of management and defining some basic concepts and terms. The basic management principles are: customer orientation, leadership, involvement of staff, process-oriented approach, system approach to management, continual improvement, making decisions based on facts, mutually beneficial relationships with suppliers. Some of them are exclusively related to logistics (systemic management approach, mutually beneficial relationships with suppliers, purchasing, etc.). (Vodenicharova,)

Since the mid 1990s, a series of standards ISO 9000 has been perceived and implemented into the national laws in more than 70 countries worldwide. Certification of

the quality management systems under ISO 9000 of the companies in the developed countries acquired a mass character, which is a natural process prompted by high competition and increasing globalization of both production and markets. In these conditions, companies have come to realize the role of a quality management system and its certification with regard to market success. (Chankova, 2005)

The ISO standards are becoming increasingly sought after by organisations in Bulgaria as a tool for adequate management approaches, systems and methods. The improvement of the management processes of the companies is one of the important guidelines to achieve adequate competitiveness in the domestic and international markets.

The most popular standards introduced in the Bulgarian organisations are ISO 9001: 2015, ISO 14001: 2015, OHSAS 18001:2007, ISO 27001:2013. The most comprehensive type of quality management system is ISO 9001:2015 since it covers the entire process from design through development, production, installation, servicing. Increasingly more organisations are interested in the management of processes and activities in accordance with the requirements of the environmental protection and providing eco-friendly products, which is defined by the ISO 14001:2015. In studies of international systems, the specification OHSAS 18001:2007, which contains the requirements of the management systems of health and safety at work, also gained considerable popularity. This specification is not developed by the International Organisation for Standardization (ISO), however, it has been recognized and applied in over 50 countries. ISO 27001 '' Information Security Management Systems" in recent years managed to establish itself as a tool for effective management of the entire system of protection of the information assets of the companies.

In Bulgaria there is a limited number of studies that are directed towards international quality management systems. One study conducted among industrial companies in Bulgaria is directed to the management of logistic activities and processes. The aim of this study is to present the expectations of the application of international standards for the quality management in the practice of the industrial companies in Bulgaria. The findings of this study are presented by the fact that the motivation of the majority of the companies surveyed for the introduction of the international system standard for quality management (ISO 9001) is related to the desire to improve their management processes. The rest (over one third) are guided by the interest to acquire external effects, most commonly to gain advantages in terms of attracting more customers as well as participation in tenders, contests, etc. The results of the survey among industrial firms in Bulgaria,which have introduced the quality management system and have received a certificate for its compliance with the international standards, show positive effects in terms of improving work organisation. (Chankova, 2005)

In 2010, a study (Vasileva et al. 2012) concerning the certification of management systems quality in Bulgaria was conducted in 110 companies. Results were presented regarding the types of certificates held by companies and their products as well as the attitude of manufacturers and retailers to process certification and their evaluation concerning the benefits from it. In this study are shown the reasons why companies go through the process of certification. The most important of these reasons are striving to improve product quality; satisfaction of requirements of partners; improving competitiveness. (Vassileva et al., 2012)

In the field of logistics in the country numerous studies have been conducted (Dimitrov, 2013), which reveal the status and

trends of logistics in trade and manufacturing businesses. In 2013-2014 a study for the development of logistics in the Bulgarian processing and marketing enterprises was conducted. (Rakovska, 2014).

There are also a number of international studies (Mentzer 2001, Kee-Hung Lai et al. 2004) for quality systems. Some of them are focused in the logistics industry. In Bulgaria, however, research on international quality management systems in the logistics industry has not been conducted. In the foreign literature there are several studies on the quality of logistics services. Panayides (2004) explored the impact of product-market and resourced-based competitive strategies to measure the performance of logistics service providers with four multivariate techniques. The result shows market segmentation, service differentiation and inter-functional coordination have positive effect of performance while cost advantage does not have significant effect of performance. Kravovics (2008) point out the outsourcing of TPL needs close monitoring of logistics system and service level. He empirically explores 4PL provider appointed by chemical company in Brazil to monitor the work of the 3PLs with important performance indicators. Another part of the research for quality of the logistic service is conducted by Mentzer, J.T., Flint, D.J and Hult, G.T.M. (2001), who in the pursuit of competitive advantage identified needs and values of current and potential customers, have developed a scale for the logistical serves quality. Hamilton (2010) stress the creation of 4PL would provide customer a competitive service by detecting related business risk, giving KPI and alliance network rather than traditional TPL.

The main objective of large retail chains is to ensure traceability and transparency throughout the supply chain by carrying out audits to obtain information about the way suppliers comply with their requirements. For this purpose the international system IFS Logistic which aims to reduce the cost of audits and to introduce transparency in the whole chain, providing logistics for the trade with food products. The standard is applicable to all modes of transport: road, rail, river and sea, air, both temperature-controlled and simple. This standard is designed for food and non-food products and covers all logistics activities of delivery, loading, transport, unloading, storage, handling and further distribution. IFS (International Food Standard) is a standard for auditing producers who produce under the so-called "Private Labels''. These are brands owned by large retail chains as manufacture of the products is entrusted to certain producers. The IFS is supported by many German retailers such as METRO, REWE, EDEKA, ALDI, the French Carrefour, Monoprix, Picard Surgelés and others.

The quality management systems can be viewed exactly as the minimum requirement for setting a sustainable internal working environment and management that preserves the established best practices, but at the same time encourages the implementation of innovations.

From this perspective, this study provides an overview of certification in the country as a form of investment by companies in the logistics industry in the improvement and management control, which in turn serves as an engine for creating sustainable innovation in logistics.

3. Methodology

The study was conducted through a survey among 136 companies in the logistics industry in Bulgaria in the period 2014-2015. Activities related to logistics represent external services performed by logistics service providers. The execution of activities related with transport and storage committed by employees in the service sector and industry are not included in the study.

The study is focused on the practical aspects of quality management in organisations in the logistics industry in Bulgaria. The study used Bulgarian and foreign literature, results of research projects, statistics and analysis of surveys conducted for the application of the tools of quality in organisations in the logistics industry, as well as commercial and industrial enterprises in Bulgaria.

In accordance with the aim a study of organisations in the logistic sector was conducted through a questionnaire. The questionnaire includes a total of eight sections, as this study used two sections: "Company Characteristics" and "Quality Management". "Company Characteristics" includes questions related to the type of logistics and the logistics services it provides. The section "Quality Management" includes questions about the system certification, the existing quality documents defining its policy on quality, person / department / company who are responsible for quality as well as the personnel trained in the quality management systems. All questions are designed in a way that allows to evaluate the existing situation and expected changes in the coming three years. The questions included in the survey are dichotomous of closed type and allow the study of the implementation of the quality management systems. In statistical processing of the survey data are used one-dimensional and two-dimensional distributions for each variable.

In the development of the questions were used elements from previous research in the academic literature that are adapted and further developed for the specifics of this study. This allows for comparison with the industrial and commercial organisations in Bulgaria. In the comparison a study was used conducted between 2012-2014 among 159 companies, of which 78 are processing ones and 81 are commercial organisations. In the study (Vodenicharova, 2015) an assessment of the status and trends in the quality of logistics in commercial and industrial enterprises in the country has been made. A statistical group was used in the systematisation, arrangement and compilation of the obtained results. This process makes it possible to determine the distribution of units of the object of study for the meanings of indicators studied and to establish the content and structure of the composition according to the pedefined classification signs. The tables and charts are forms and means of further systematization, and compact visual representation of the data obtained by the group.

Four indicators are used to obtain a summary evaluation of the extent of application of the quality management systems in Bulgaria at present. These indicators were chosen as for monograph and to make a comparison. The data for the indicators was obtained by specific questions from the questionnaire and are presented in Table 1.

Table 1. *Indicators of the degree of application of quality management systems*

№	INDICATORS
1.	Availability of certification standard
2.	Availability of quality documents
3.	Persons responsible for the quality control
4.	Availability of trained employees

Source: author's concept

The indicators reveal the practical application of the quality management systems. In order to determine degrees of application of the quality management systems in the organisations in the logistics industry in Bulgaria, an analysis of certification on various standards will be done, quality documents, policy makers in the field of quality will be examined, the individuals / department / responsible for quality issues will be examined so

that to be established if the company provides employees trained in the quality management system.

According to the four indicators for assessing the status of the quality management systems in the organisations in Bulgaria distribution of the production, trade and the organisations in the logistics industry in Bulgaria is presented.

In addition to the basic statistical methods for processing and analyzing the information from the survey the Cluster Analysis is applied, which allows to assess the degree of implementation of QMS in the logistics industry in Bulgaria. The cluster analysis is a multivariate statistical method of classifying units into groups based on multiple characteristics relating to these units. To this paper a non-hierarchical cluster division is attached with C-averages (C-means Cluster Analysis). This method is based on sorting the nearest centroids, taking into account the distance of each unit to the centers of the individual clusters. The nearest distance determines the affiliation of the unit to the appropriate cluster. The initial cluster center is a vector with the values in the variables that relate to clusters as the items are distributed across clusters. The process of redistribution and update stops when the changes in the cluster centers do not exceed the convergence criteria or reach a predetermined maximum number of iterations. The matrix of distances between cluster centers allows to form conclusions about the degree of differentiation between cluster profiles.

4. Application of the quality management systems in the logistics industry

The survey covered companies in the logistics sector, providing logistics services. Firms in the logistics industry are generally

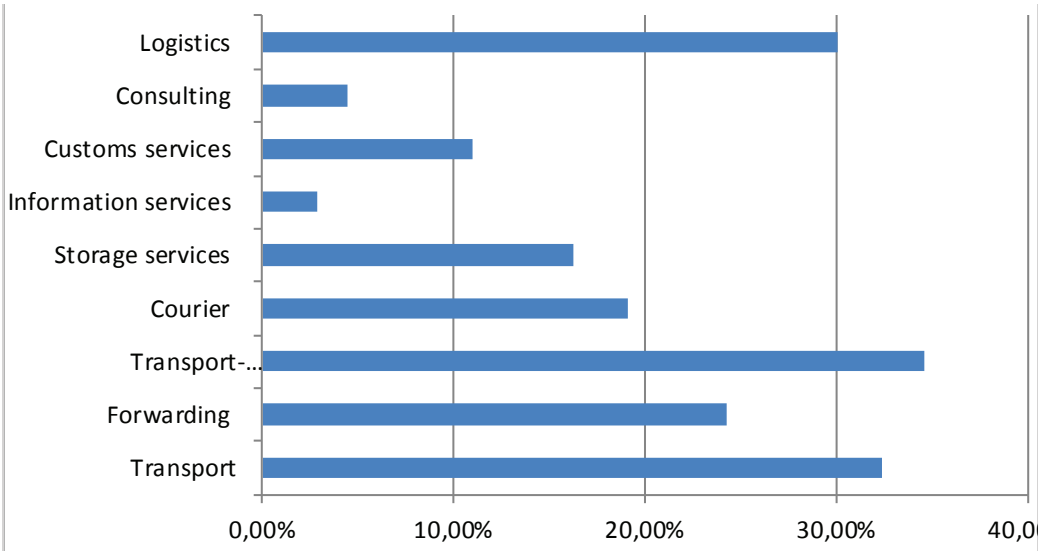

Figure 1.Distribution of the companies surveyed in the logistics industry

Source: author's calculations[1]

[1]The total exceeds 100% as the companies have identified themselves in more than one category

regarded as logistics service providers (LSP's). An LSP can be defined as an external supplier that performs all or part of a firm's logistics function (Coyle et al., 1996), or any firm providing a good or service that is not owned by the purchesers of the good or service (Stank & Maltz, 1996).

Figure 1 shows the distribution of organisations in the logistics industry included in the study. The companies have identified themselves in more than one category, so that the total of surveyed organisations exceeds 100%.

Three of the companies are state-owned. The foreign companies are twenty, i.e. 14.8%, and one of the surveyed firms is with mixed participation. Most of the companies started their operations after 2007.

The philosophy of the series of standards ISO 9000 is connected to the system requirements for quality management concerning the organisation's orientation to customers, namely building up the capacity to develop and deliver the product (good and service) in accordance with the customer requirements and gradually form trust in potential customers in the future. The degree of customer satisfaction is determined by the suppliers' capability to deliver on time and in line with the arrangements made, as well as by the products meeting the quality requirements. Only 27.2% of the surveyed organisations in the logistics industry are certified under ISO 9001 ,Quality management systems'. Given that, ISO 9001 is the most popular standard for quality management that helps businesses to be more effective and more efficient in terms of management. Furthermore, it shows a low level of implementation of the certification of the quality management systems. Compared to the survey conducted for the production and sales enterprises (Vodenicharova, 2015) in the same period, 43.6% of the manufacturing plants are certified under ISO 9001, while 21.6% of the commercial companies have been awarded certificates under this standard.

According to the obtained data, the companies in the logistics industry show a far lower level of ISO 9001 certification compared to the production plants in the country.

This can be attributed to the fact that requirements for manufacturers in terms of the production-related processes and post-sales services are higher. Another possible reason is manufacturers' intentions of and aspirations to enter foreign markets by product traceability throughout the process of creation, protection in accordance with customer requirements during internal processing and delivery to the destination. The data show that organisations in the logistics industry have a greater degree certified under ISO 9001 than commercial organisations (Vodenicharova, 2015). The poor implementation of international quality management systems in the commercial and logistics companies may be attributed to other factors. With regard to supply, standard requirements are generally formulated. They relate mainly to supplier evaluation and selection depending on their ability to deliver the required product and control it in order to ensure that it meets the specified requirements. Insufficient attention is paid to the requirement to comply with the set delivery terms, which plays an important role in carrying out the processes of supply and production of efficient mutual management. This in turn affects the company's capacity to meet previously agreed delivery requirements with its clients and reduce overall costs. (Chankova, 2005)

Service enterprises generally do not compete with foreign companies. In fact, the choice of transport, courier services, restaurants, is limited. Few companies in the service sector are able to create new products for the global market. The carrier can only ensure the delivery of

what is produced by other companies but cannot possibly create a new product. Opportunities for the development of the shipping company will improve the service quality at the expense of cost reduction. Most organisations in the service sector run the risk of making mistakes. Only 12.5% of the companies in the logistics industry are certified under the ISO 14001:2015 standard environmental management. Compare to the manufacturing companies, this percentage is 20.5%, which is significantly higher.

This tendency was observed in much of the QMS, which is shown in Figure 2. The system for managing health and safety BS OHSAS 18001:2007 is used by 17.9 percent of the manufacturing companies and by a mere 5.9% of the firms in the logistics industry. Certification of the systems of quality management, environment, health and safety can confirm the good results of care management and all employees in order to ensure healthy and safe working conditions and environmental protection.

Certification under ISO 27001 (Information Security Management Systems) is rarely applied by companies in the logistics industry. Recently information security systems have been established as a tool for the effective management of the entire system of protecting company information assets, only six of the studied companies are certified, which makes 4.4%, while 7.7% of the manufacturing companies have introduced the 27001 information security management system. This is a crucial prerequisite for the logistics companies that work towards managing the supply chain.

Standards that cover the ability to manage logistics processes and traceability within the food supply chain are standards

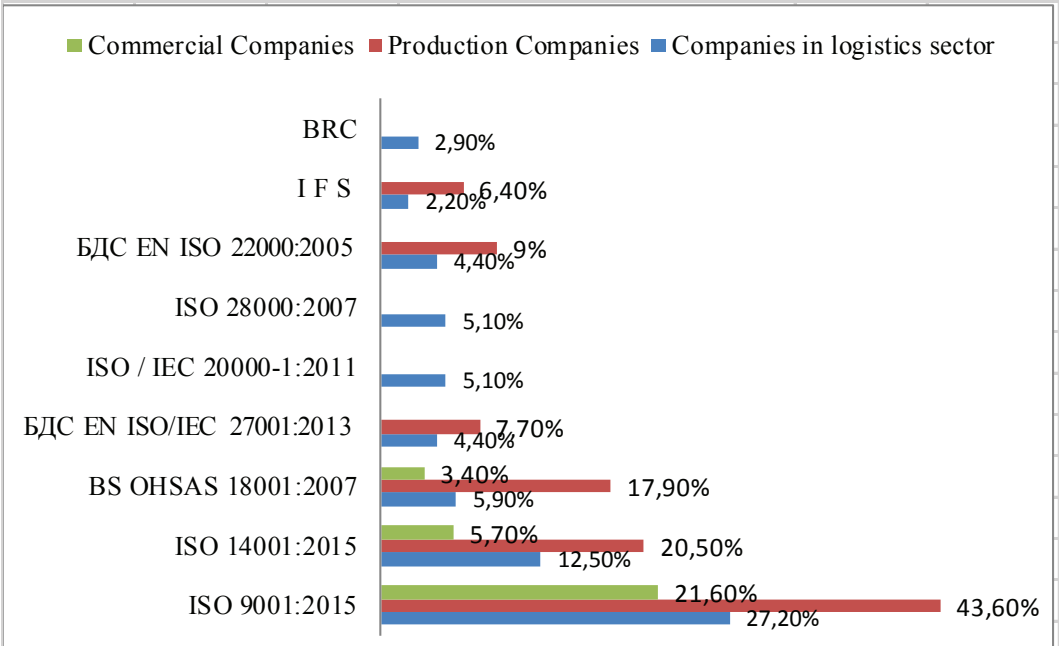

Figure 2. Certified businesses by standatds

Source: author's calculations

IFS, BRC and ISO 22000: 2006. Though they provide for a special certification in logistics, they are nonetheless poorly represented in the enterprises in the logistics industry. Of all surveyed organisations in this sector, a mere 2.2% have the IFS certificate, whereas 6.4% of the manufacturing companies have been granted such certification.

All other standards are used in virtually lesser extent by the surveyed organisations in the logistics industry. Under the ISO 28000:2007, 5.1% (7 companies) in the logistics industry have been certified. This is a system to improve the security of the supply chain organisation by assessing the safety of the working environment and the appropriate security measures and establish whether other legal requirements should be further met. The ISO 28000:2007 standard ensures that the organization's supply chain operates in a safe environment, and demonstrates substantial evidence of the achieved level of security to all stakeholders, including potential customers. The advantages of this standard are related to minimization of the number of security-related accidents and the reduction of the damage. Furthermore the number of mistakes is reduced by increasing the level of awareness and security training, introduction of new approaches to managing security of the supply chain; optimization of the cost of maintaining the necessary level of the supply chain security (or portion thereof).

Good impression makes the fact that 7.4% (10 companies) of the surveyed organisations in the logistics industry have a certified integrated system. There share is likely to grow in the coming years. Companies around the world are largely oriented towards an integrated

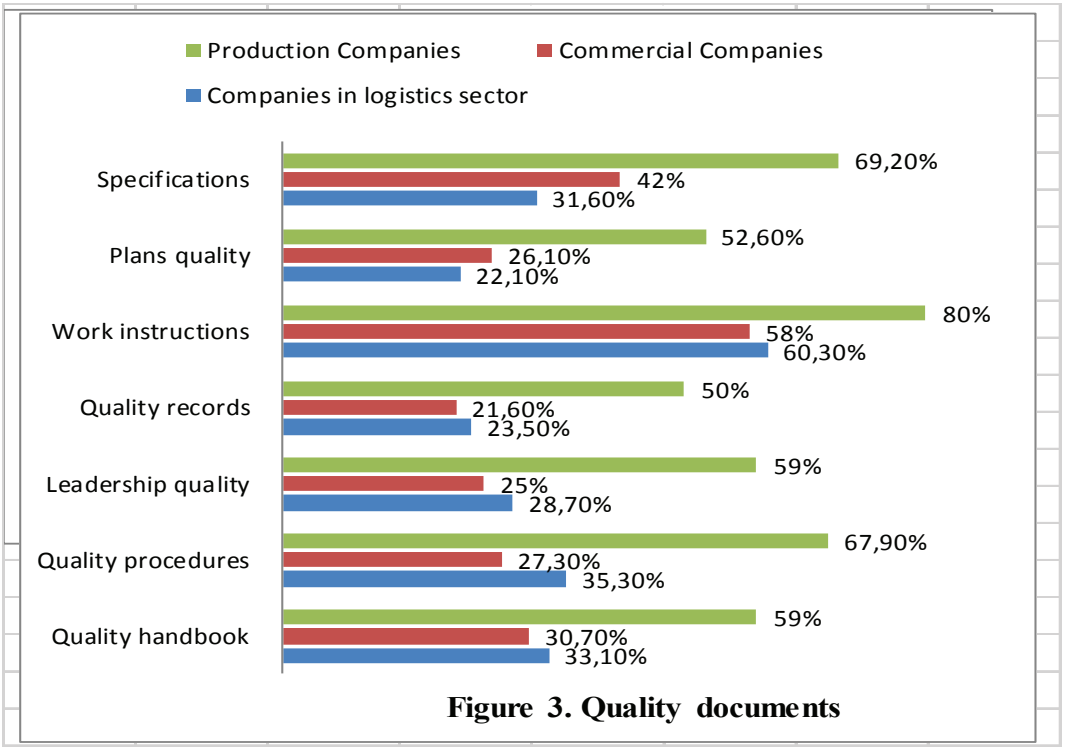

Figure 3. Quality documents

Source: author's estimates

approach to management. This approach allows organisations to focus on achieving objectives related to different aspects of management - customer satisfaction, control of the impacts on the environment or control of the risks to health and safety. In terms of process and approach, the ISO standards are based on the Deming cycle (Plan-Do-Check-Act) which sets requirements for their integration into a single management system. These solutions are becoming more popular, and based on Guideline 72 to ISO rationale for the development of standards for quality management systems, practical guidance for the integration of the management systems are developed by offering optimal models for this as well.

Documentation of the quality management system is essential for achieving quality and maintaining feedback from customers. According to data obtained in the logistics industry, companies largely maintain quality documents, despite the lack of a certificate of a quality management system.

Logistics organisations have focused their efforts on developing key documents in the quality of activities. This reveals the need for a quality management system that will improve processes and accordingly ensure the provision of high-quality products (goods and services). The results of the quality documents of the organisations in the logistics industry are presented in Figure 3.

More than half of the surveyed respondents use working instructions. However, a mere 27.3% of the organisations in the logistics industry have quality procedures, whereas 67.9% of the companies in the manufacturing industry have quality-procedure documents. The survey finds that the companies in the logistics industry come closer to commercial organisations with regard to quality-related documents. Perhaps requirements for manufacturing companies are higher in terms of the production quality.

In the organisations in the logistics industry quality documents pertain to order processing, warehousing, product storage and distribution, shipping, etc. In storage procedures for receiving and shipping of products to and from the warehouse are provided. It is necessary to impose control on the processes of packaging, repackaging, labeling in accordance with the requirements and activities related to ensuring traceability.

Quality Manual is the basic document in the ISO 9000 quality management systems. The study has established that 33.10% of the companies in the logistics industry have introduced such a document. This exposes a high level of application of the quality documents in the logistics industry.

Even though certified quality management systems are underrepresented in the surveyed organisations, almost half of them (44.1%) have quality management departments as well as full-time employees in charge of quality-related issues (36.8% of logistics organisations).

The share of companies with a department dealing with quality-related issues comprises the largest share - 44.1% of the organisations in the logistics industry. This is typical of the enterprises in the sector only. As surveys conducted among manufacturing enterprises show, most of them have taken on full-time employees responsible for quality issues. Interestingly, the majority of the surveyed companies in the logistics industry (80%) maintain a department or have a full-time employee responsible for the quality of service.

As for employee training, QMS logistics industry data shows that their largest share is among the officials trained in quality management systems. The same results have been obtained among the industrial enterprises, while results among commercial companies show that they prefer to train the

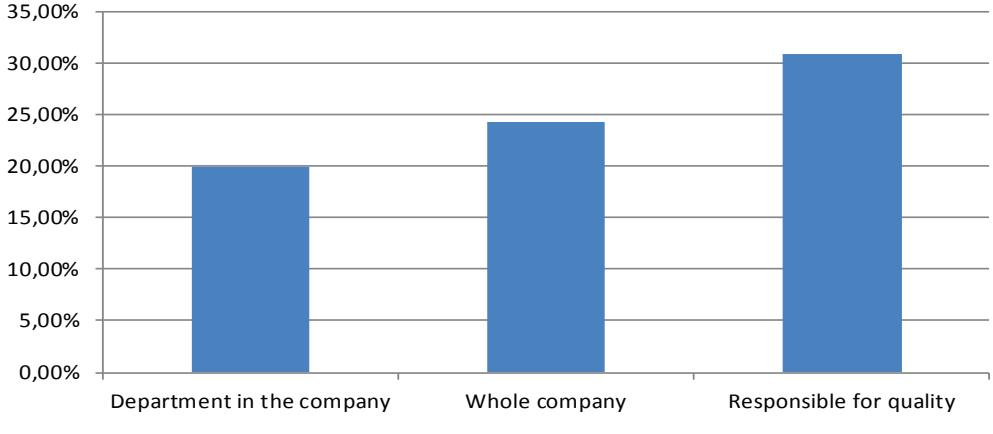

Figure 4. Training of employees in QMS in the organisations in th loistics industry

Source: author's calculations

entire company, not just a single department (figure 4).

Data from this study have shown that enterprises in the logistics industry have increased their interest in certification of quality management systems. The surveyed organisations deem as important the effective training not only of the employee/s in charge of quality, but also of the entire company.

Application of quality management systems is a criterion for boosting customer confidence, improving management processes and forming competitive advantages.

In the present study were derived indicators to assess the status of quality management systems in Bulgarian organizations, through which the extent of application of these systems in the surveyed organisations.

The chosen method of cluster analysis is C-medium that requires prior determination of the number of clusters. An attempt was made with a different number of clusters -- initially with five groups. The results of the analysis show that the surveyed organizations can be grouped into three clusters. Figure 5 shows the indicators according to which the organizations in the logistics industries are distributed.

According to the first indicator ‚Availability of certification', the organisations in the logistics industry show low level of certificates of QMS standards. Organisations that have no certificate for quality management standards fail to realize the role of and do not think they need a certificate for meeting the international standard.

With regard to the second indicator ‚Availability of quality documents', organisations in the logistics industry have the highest level of work instructions, despite the low level of quality-related documents.

With regard to the third indicator ‚Persons responsible for the quality', the organisations with no employee/ department of quality management rely mostly on their practical experience in quality control and expose a significant need for the improvement of the company management system, in particular their quality assurance system.

Fig. 5. Indicators of the degree of application of quality management systems in logistics industry in Bulgaria

Source: author's calculations

With regard to the fourth indicator ‚Availability of trained employees', the quality management systems of the companies in the logistics industry show a low level of trained staff. It is necessary that these organisations invest greater resources in staff training on the application of methods for the assessment of product/service quality. The findings of the analysis suggest that in terms of the use of quality management systems in Bulgaria, the organisations in the logistics industry are lagging far behind the manufacturing enterprises.

The first cluster encompasses organisations that do not implement QMS. These are logistics organizations that are not aware of the role of QMS in company management. They tend to believe that international quality certification, the quality documents and staff training is not relevant for the quality of services.

The second cluster includes organisations that have a growing interest in QMS. It encompasses organisations that are familiar with QMS and realise their role in company management, but do not yet apply enough quality documents and do not have staff trained in QMS. Even though they are well aware of the importance of QMS, these companies have not yet reached a high level of its implementation. This suggests that their internal company integration should be further improved.

The third cluster encompasses organizations that are well aware of the essential significance of QMS. This cluster includes organisations that boast of a high level of quality systems and highly skilled

quality measurement staff. Presumably these companies have come to realize the role of QMS by comparing their performance with regard to service quality and their competitors' performance.

5. Conclusion

In recent years the grounds for building a competitive economy have been established. The latter requires that a new management culture based on the fundamental principles of good governance and the philosophy of continued improvement should be developed. In accordance with the findings made in the course of the study, the following important conclusions regarding the application of quality management systems in the logistics industry can be :

- Companies in the logistics industry in Bulgaria have opportunities to improve the application and certification of the quality management systems. It should be noted that manufacturing enterprises boast a higher level of quality management systems as part of their corporate policy and have introduced a certified quality system.
- Even though they are well aware of the relevance of the quality management systems, organisations in the logistics industry have not yet introduced to a sufficient degree certified QMS;
- Even though they underestimate the importance of QMS, the companies in the logistics industry have employees responsible for quality-related issues. This suggests that there are opportunities to increase the integration of these organisations;
- On the basis of cluster analysis, three groups of clusters in terms of the aforementioned indicators have been identified, which divide the organisations in the logistics industry.

It is essential that the logistics enterprises in Bulgaria should recognize the implementation and certification of quality management systems as a need and take on the commitment to compliance, rather than see them as a formal requirement. Only thus would they enjoy high returns on investment and ensure sustainability and competitiveness. In this context, it is important that future research should further examine the reasons behind the low level of certification in the logistics companies in Bulgaria and their expectations about the implementation of the quality management systems.

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