



## FEASIBILITY STUDY ON TRANSPORT ENTERPRISES' QUALITY IMPROVEMENT

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**Abstract.** Striving for competitive advantage Transport Enterprises are obliged to determine and improve its performance quality. The article analyzes the concepts of Quality Management and processes, the main methods of Quality improvement and its applications in Transport Enterprises. The content analysis of Transport Enterprises' web pages made it possible to identify the most popular Quality Management Systems applied and other means of Quality assurance. The article provides an analysis of Transport Enterprises' Quality Improvement possibilities and a tool designed for performance improvement and evaluation on the basis of EFQM model. The provided tool undergone approbation in Transport Enterprise by the means of several iterations, which provides prerequisites for determination of usability and applicability of designed method in Transport sector.

**Keywords:** Quality Management System, Lithuanian transport enterprises, EFQM, performance evaluation.

**JEL classification:** M200, D20, D7, L29.

### 1. Introduction

The European Union recognizes that development of transport and services infrastructure is a significant and integral part of Regional Development (European quality promotion policy for improving European competitiveness 2000). The European Union's Policy in the field of Transport is implemented by two main directions: the first – Liberalisation and Commercialization of Transport Sector, i.e. The Elimination of State Monopoly, Decentralization, Separation of infrastructure management from the Carrier, The promotion of Competitiveness, Privatization, Elimination of quantitative restrictions; the second – Improvement of Transport Services' Safety and Quality, Reduction of impact on the environment.

Striving for competitive advantage Transport Enterprises (TE) are obliged to determine and improve its performance quality.

TE must evaluate and improve its performance in order to function effectively, satisfy the clients' needs and gain competitive advantage over competitors. Together, these measures will help to maintain a competitive Lithuanian transport sector

while pursuing to implement Government's strategic objectives of quality transport service.

Global Quality Management System (QMS) and standards often become one of the measures for quality improvement and competitiveness reassurance (Mathews *et al.* 2000). However, certain undisguised experience reveals that successful maintenance of QMS is relatively expensive and not all transport enterprises can benefit from advantages that such systems may bring. This situation led to carry out investigation and provide results of feasibility analysis of TE performance improvement and suggest a tool enabling simple self-evaluation as well as determination of performance process improvement possibilities. The designed tool undergone approbation in Transport Enterprise on the basis of two stages: the first one was conducted in 2012 and includes analysis of internal processes within an enterprise as well as provision of process rearrangement recommendations (Vasilis Vasiliauskas *et al.* 2013). The second stage in 2013–2014 encompass performance evaluation and observation of the change before and after the process rearrangement. In order to maintain the confidentiality enterprise's name is coded as JSC, GC'.

## 2. Theoretical Concept of Enterprises' performance Quality Assurance

The main motivation for an Enterprise to establish Quality Management Systems is the fact that Quality Management System helps to ensure the quality of the services or products supplied in compliance with client's and legal requirements in order to increase customer satisfaction (Mikulis 2007; Serafinas 2011). Application of Quality Management System is based on Process Management (Iden 2012). Citing the Sousa and Voss (2002) Mellat-Parast (2013) argues, that traditional approach towards Quality is such, that Quality Management helps to improve Enterprise's efficiency, but the impact of Quality Management on specific business results (products or services) is not always of high importance. This finding suggests that a higher level of performance cannot be achieved only by improving business results (products or services), rather it is necessary to improve internal processes as well (Mellat-Parast 2013).

Process performance – is a system that helps to implement business goals by creating a sequence of logically associated actions. (Furstenau 2008). Process Performance Management - is a unity of consistent, interrelated processes, which helps the managers to achieve effective and high-quality operation of an enterprise.

Business processes exist in each enterprise, however in some enterprises they are managed and in others they are left for self-solution. Clearly, such an attitude of the managers that everything will happen by itself, is rather naive. In this case the owners of enterprises are dealing with superficial issues, which tend to increase. On the other hand, in an enterprise where performance processes are managed, the task of managers is to analyze reports, clarify the inconsistencies and look for ways to make the company work as efficiently as possible with the minimum offsets from the plans (Klimas and Ruževičius 2009). Wider application of Quality Management tools and techniques would facilitate comprehension of processes' problems and increase the efficiency of internal processes in the long run (Bamford and Greatbanks, 2005). According to Iden (2012), implementation of Quality Management System encompass two main stages:

1. Company must first invest and document its processes;
2. Company must determine process management in order to ensure continuous development and management.

The creation of a value within an Enterprise occurs when information or material enters the transformation process. This is the main task of process performance (Pociūtė *et al.* 2005). Process

Performance Management is characterized by the fact that it helps to analyze and improve it. Upon noticing that value is not generated by one or the other process performance or that designed product is not useful, it is either improved or eliminated from the system. Each process of an Enterprise must be directed to value creation, consumer preferences and satisfaction. If the process performance within an Enterprise creates a low-added value, the consumer is not going to buy this service or product. Therefore, Enterprise manages and creates processes inexpediently.

Scientists and practitioners argue that process performance is not just about automatizing Enterprises' activities. Only the first stage, where the processes are being determined and consistently arranged, can be referred to as automatized. The most complicated part in the Process Management is the elimination of bottleneck effect and determination of optimization possibilities. The process performance is at the centre of the whole Enterprise Architecture. Process Performance enables an Enterprise to focus on objectives and work itself. Due to such impact, business processes become as a support to carry out tasks and achieve goals.

It is required to define performance processes if an Enterprise is pursuing to obtain ISO 9001 standard certification (ISO 2008). This Standard is associated with a sequence and interaction of processes. If an Enterprise is willing to get certified to ISO's management system standards, it is necessary to implement the following requirements: development of process control, which controls the efficiency of procedures; storage of documents describing the processes; inspection and adjustment of inconsistencies; continuous overview of process performance efficiency; continuous improvement of process performance.

An Enterprise, certified to ISO's management system standards, is officially recognized as efficiently managed and continuously improved. Process approach is emphasized in the criteria of EFQM Excellence model (European Foundation for Quality Management). Emphasis of Process approach is one of the main principles in Total Quality Management. Diverse Quality Management Systems are applied in Business practices, including ISO 9000, EFQM, LEAN, etc. The main goal of each system is to assure the quality of organization performance in pursuing its objectives. Each enterprise selects a particular Quality Management System on the basis of its possibilities and preferences. In a general sense, LEAN Quality Management System is usually applied by Production Enterprises. In these enterprises, Six Sigma method is more easily applied, thus the errors, occurring in the process, are easily calculated and the cause of corrup-

ted production is eliminated. However, LEAN Quality Management System is being increasingly applied in Service Provider Enterprises.

ISO 9000 Quality Management System requires a great deal of bureaucracy. Application of this System in an Enterprise also requires considerable time and financial expenditures, therefore an introduction of this system is usually practiced by large enterprises. EFQM Quality Management System is one of the easiest and least resource demanding system, which is designed for enterprises, seeking to self-evaluate its performances. Improvement directions are provided on the basis of the acquired results.

Despite of the fact, that all of the Quality Management Systems implement the principles of Total Quality Management, these systems are different, demanding different resources and directed to different segments.

Each enterprise, including TE, must decide upon which Quality Management System is most suitable for its performance optimization and integrate it into internal elements and processes within an enterprise.

### **3. Application of Quality Management Systems in the performance of Lithuanian TE**

In Lithuania and the world, Quality certification is divided into Voluntary and Required. (Ruževičius 2006). In Lithuanian Transport Sector, Regulatory Framework for Quality covers basic regulations and requirements, which are obligatory to all members of the EU. Quality Management Standards are general and widely used in foreign enterprises and Lithuania. Application of Quality Management Systems is a voluntary initiative, which is not regulated at national or European levels. However, even voluntary initiative increasingly becomes popular due to diverse internal and external motivators.

A content analysis of Web Pages was carried out in order to determine to what extent TE apply Quality Management Systems and how these enterprises highlight quality in its performance. The object of Analysis – Lithuanian licensed Freight Forwarding TE. According to the State Road Transport Inspectorate under the Ministry of Transport and Communications, there are 3409 enterprises licensed for freight transportation in Lithuania. In Calculating Samples (the number of objects to be included in the analysis) 95 % probability and 0,05 error of calculation was selected. It was determined that representative body of research comprises 358 TE. A list of TE was created by the means of random sampling. It was assumed, that it is important for TE with web pages to be noticed by potential clients. On the

other hand, it is very likely that enterprises that do not have a web page are reluctant to invest into marketing, new client search. Consequently, these enterprises are not very interested in Applications of Quality Management Systems in their activities. Information, published on the TE web pages, was analyzed. The main focus of analysis includes the ways in which an organization determines its application of Quality Management System and other Certificates, which acknowledge, that an organization is reliable and of high-quality in its performance.

Content Analysis of 84 Enterprises were conducted on the basis of two criteria: TE is licensed for freight transportation; TE has a Web page. The analyzed enterprises indicated the following categories in the field of Quality Management: installed Quality Management Systems, membership in associations and other certificates.

Quality Management Systems:

- ISO 9001 – family of standards for Quality Management System.
- ISO 14000 – family of standards for Environmental Management System.
- ISO 22000 – family of standards for Food Safety Management System.
- OHSAS 18001:2007 – family of standards for Occupational Health and Safety Management System.

Associations:

- LINAFA – Lithuanian National Road Carriers Association
- LINEKA – Lithuanian National Freight Forwarders and Logistics Association.
- ECG The Association of European Vehicle Logistics

Other:

- AEO (Authorised Economic Operator) – certificate declaring that the carrier is reliable and complies with all customs operations.
- Reliable Carrier Certificate – certificate provided by „Birža TRANS“ declares that the company guarantees high quality of service and meets established criteria.

Upon completion of the content analysis, it was determined, that 64% of the Enterprises apply Quality Management Systems or are otherwise recognised as quality service providers (Fig. 1).

The majority of analyzed Enterprises belongs to different associations (61%), 34% of TE apply Quality Management systems in its activities. (Fig. 2). This tendency can be explained by the fact, that the membership in associations means fewer requirements than self-implementation of Quality Management systems.

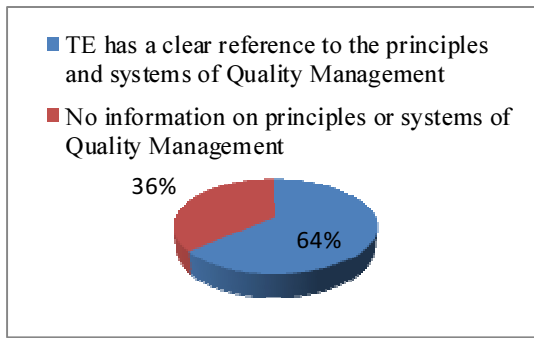


Fig. 1. Quality Management Applications in TE

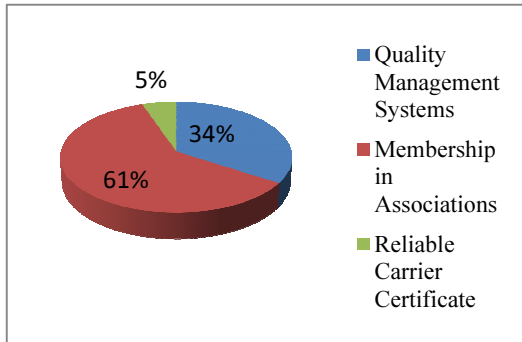


Fig. 2. Categorized Quality Management Applications in TE

The most popular Quality Management System in Lithuanian Transport Sector is ISO 9001 (Fig. 3). More than half (61%) of the selected for investigation Lithuanian TE, improve their performances by applying aforementioned Quality Management System.

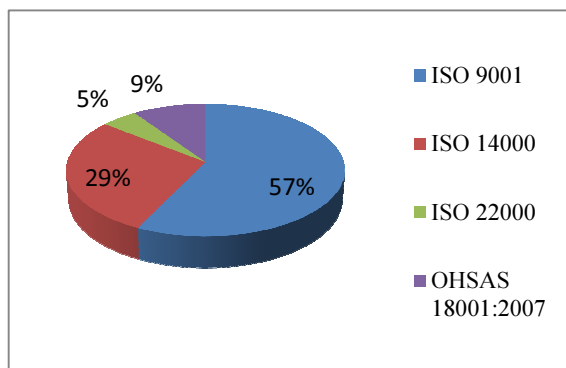


Fig. 3. Quality Management Systems in TE

To summarize the content analysis, it is possible to conclude, that among 34% of Enterprises that base its performances on Quality Management Systems, are mostly engaged in ISO 9001 standard applications. It is obvious, that TE in Lithuania do not benefit from advantages of EFQM system, therefore this system is selected for further investigation on the basis of very practical considerations: this model accumulates experiences of the best enterprises; model was established by EFQM foundation in 1989, founders –14 European

business leaders. Studies confirm, that enterprises, that adopt EFQM System achieve better results. Among the 25 largest enterprises in Europe 60 per cent employs EFQM model. EFQM model is being applied by more than 30 000 organizations in Europe. More than 18 European Quality Management awards are based on EFQM model, which is also supported by the European Commission.

#### 4. EFQM model in the Improvement of Organization Performance

The objective of EFQM foundation – is to develop a non-prescriptive framework that would enhance a competitive advantage of European organizations by effective applications of General production processes and Service Quality Management improvement methods. (www.efqm.org). Vision – a world, where European Organizations excel. Mission – to be the driving force for sustainable excellence in Europe (Maslov 2008).

EFQM claims, that excellence and quality share a lot of similarities, but the notion of excellence is broader. The notion of Quality outlines results and outcomes (eg., customer satisfaction), and excellence comprises process factors and additional consequences, like financial and social results. (Gontaitė, Klimas 2007). National Quality Prize is being held in Lithuania since 1998 in accordance with EFQM Excellence Model (Fig. 4). People Results and Society results are achieved through Leadership driving Policy and Strategy, People, Partnerships and Resources leading ultimately to excellence in Key Performance Results. (Čiutienė *et al.* 2009).

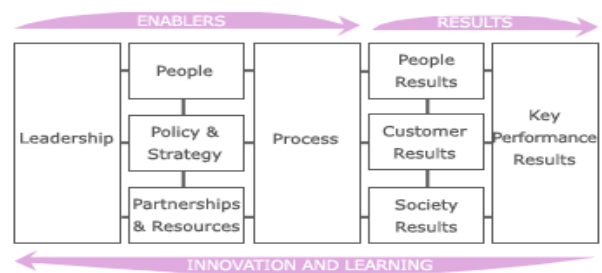


Fig. 4. The Excellence Model Framework

EFQM Excellence Model is based on the principles of Total Quality Management: leadership, customer – focus, continuous improvement, facts – focus, total participation. A closer inspection of the model shows, that it is based on the following concepts – Results orientation, Customer focus, Leadership and Constancy of Purpose, Management by Processes and Facts, People Development and Involvement, Continuous Learning, Innovation and Imp-

rovement, Partnership Development, Social Responsibility (Arjomandi *et al.* 2009).

EFQM provides a holistic view of the organization and is focused on customers and continuous improvement of the processes by engaging all employees. This model acknowledges, that Human Resources are the possibilities enabling for results achievement and the processes are used as tools that release employee talents (Carrillo, Fernandez-Ortiz 2005).

EFQM is treated as tool providing organizations with the ability to assess their degree of development in comparison with an ideal benchmark, as well as to identify its own strengths and areas for improvement (Maslov 2008).

Criteria in EFQM model are assigned with certain number of points, which are later used for RADAR diagram. RADAR diagram shows the scores of an enterprise under self-assessment and compares the acquired results with the ones from the previous year.

To summarize the EFQM model, its results provide a multidimensional assessment of the organization - the nine criteria and a detailed causal structure, which is described by the use of cause and effect chain. EFQM model is a Quality Management System, which is designed for performance evaluation, comparison of the acquired results and determination of improvement possibilities. The model is focused on possibilities and acquired results, thus enables an organization to implement a comprehensive Quality Management Policy in line with basic principles of Quality Management.

## 5. Methods of Quality Improvement in TE

Quality in transport system involves customer service, freight or passenger transportation under the most favourable price, on-time delivery, safety, polite staff and appropriate vehicles. The conducted analysis of scientific literature revealed a

spectrum of Quality Management Systems, however, these are not specifically designed for TE due to universality of systems. Each organization (TE is not an exception) must employ Quality Management System in their performance processes. Content analysis revealed, that a small number of TE in Lithuania install Quality Management Systems with ISO family of standards being the most popular. EFQM System is not fully employed.

According to Palšaitis (2010), currently most of the TE cannot assure high-quality transportation services, even though that they are trying to. In the future, the best TE will be required to raise the quality of services due to large capacity reserves, competitiveness in the market and low prices. Organizations must understand, that current profitable business is not the most important. The main principle in organization's management becomes service quality improvement comprising separate processes. Thus, in order to achieve a higher level of quality, it is necessary to implement a consistent improvement programme. (Kaziliūnas, 2006). The Installation of Quality Management Systems in organizations facilitates not only development of service quality level, satisfaction of client preferences, but also assists in efficient management of organization, optimal use of resources and maximal profit achievement.

Upon completion of analysis on TE demand to improve performance quality, a tool for performance improvement and evaluation (in accordance with EFQM) was designed. The tool is suggested to be applied at least once per year in order to determine the level of service quality and areas for improvement. Model criteria are formed on the basis of a Questionnaire (Table 1) and are mostly qualitative and assessed in accordance with the scale from 1 to 5 ( Tables 2 and 3). The Questionnaire was developed on the basis of EFQM criteria and in collaboration with experts of Transport Enterprises.

**Table 1.** TE Performance Evaluation Criteria

	Elements	Evaluation Criteria
<b>POSSIBILITIES</b>	1.Leader Performance	1. Does the leader develop vision, mission and values corresponding to demands of Transport Sector? 2. Is the leader pre-occupied with the latest trends in Transport and Logistics? 3. Does the leader develop his qualification by participating in Transport and Logistics Conferences? 4. Are there any developed organisational structure with subordination links in your enterprise? 5. Is the leader capable of identifying opportunities to expand in the existing transport services market? 6. Does the Leader try to become involved in the activities of associations, participate in the discussions of relevant topics for transport sector?

	Elements	Evaluation Criteria
<b>POSSIBILITIES</b>	2.Strategy and Planning	<ol style="list-style-type: none"> <li>1. Does the leader assess the development of TE in accordance with the latest possibilities of Logistics?</li> <li>2. Is the development of TE planned by considering the legal framework of neighbouring countries?</li> <li>3. Is the development of TE planned by considering the political situation of neighbouring countries?</li> <li>4. Is the policy of TE planned by considering partner-competencies?</li> <li>5. Is the strategy of TE developed by assessing countries' strategic plans?</li> </ol>
	3.Human Resources	<ol style="list-style-type: none"> <li>1. Do the employees of TE have determined goals in contributing to overall performance of organization?</li> <li>2. Are the human errors eliminated from TE performance?</li> <li>3. Do the employees have an opportunity to develop their qualifications in the field of Transport and Logistics?</li> <li>4. Do the employees have the right amount of knowledge for freight transportation/organization?</li> <li>5. Is there a motivational system developed in TE?</li> </ol>
	4. Partners	<ol style="list-style-type: none"> <li>1. Is there an attempt to create a lasting relationships with the partners in TE?</li> <li>2. Is the market being analyzed in the search for new possible partners of TE?</li> <li>3. Is the information being gathered on partner-reliability?</li> <li>4. Are the partners being segmented in accordance with the spectrum of provided services?</li> </ol>
	5.Material Resources	<ol style="list-style-type: none"> <li>1. Is the analysis of remaining resources being conducted prior hiring?</li> <li>2. Are the resources used in line with the needs and knowledge of TE employees?</li> <li>3. Is the volume of the vehicle fully exploited?</li> <li>4. Is the loading of the vehicle fully exploited?</li> </ol>
	6.Process	<ol style="list-style-type: none"> <li>1. Are the responsibilities of the staff determined in organization of freight transportation?</li> <li>2. Is the process directed towards the result of TE performance?</li> <li>3. Is the process directed towards the customer satisfaction?</li> <li>4. Are there determined documents, required at each step of freight transportation/organization?</li> <li>5. Are there determined step of the process at which the partners are involved?</li> <li>6. Are there determined process of freight transportation/organization?</li> </ol>
	<b>RESULTS</b>	7.Client Results
8.Employee Results		<ol style="list-style-type: none"> <li>1. Are the performance results directed to customer satisfaction?</li> <li>2. Are the employee performance results directed to development of added-value?</li> <li>3. Is the analysis of TE employee performance results being conducted?</li> <li>4. Are the employee performance results accomplished by optimal way?</li> <li>5. Are the innovative solutions applied in achievement of TE employee performance results?</li> <li>6. Is the average delivery time being analyzed? Is the average time of vehicle loading/unloading being analyzed?</li> <li>7. Is the vehicle turn-around time being analysed?</li> </ol>
9.Society Results		<ol style="list-style-type: none"> <li>8. Are the performance results directed to socially responsible business?</li> <li>9. Are the performance results directed to 'Green policy'?</li> </ol>
10.Performance Results		<ol style="list-style-type: none"> <li>1. Is the added value to the client being analyzed?</li> <li>2. Is the overall price of transportation being analyzed?</li> <li>3. Is average transportation cost (in accordance with the distance, volume, weight) being analyzed?</li> <li>4. Is the ratio of transportation cost and added value being analyzed?</li> </ol>

Performance Evaluation is carried out on the basis of the point System, which allows the clear assessment of each criterion. Performance Evaluation point System consists of two assessment units: unit, designed for TE possibility evaluation and unit, designed for TE results evaluation.

Results of TE Performance evaluation and improvement tool are displayed by the means of RADAR diagram. RADAR diagram is able to display the implementation of each element upon completion of evaluation. Results are visually compared with that of previous year.

The criterion fulfillment coefficient is calculated on the basis of collected points. The criteria

fulfillment coefficients are aggregated into general criteria fulfillment coefficient. RADAR chart is developed on the basis of the general criteria fulfillment coefficient. Complete criterion fulfillment is equated to 1, however it can be multiplied by 100 in order to obtain results in percentages.

## 6. Approbation of TE performance evaluation and improvement tool

The designed TE performance evaluation and improvement tool was applied in conducting a performance evaluation of JSC „GC“. In the first stage, the performance, processes of JSC „GC“ were analyzed. The provision of suggestions for the areas of improvement. In 2012 the determined areas for improvement (Vasilis Vasiliauskas *et al.* 2013) are as follows:

1. Re-design the process flow diagram, in order to eliminate duplication, which occurs by sending customer bills;

2. Reschedule the stage, where the client is provided with the details on further processing of the freight. This stage is to be arranged earlier; not before the last day of delivery to the port;

3. By the means of logical distances supplement the process flow diagram with delays and downtime explanation to the client;

4. Design the general and improved process scheme of support and management.

The received value is estimated upon completion of process optimization.

The TE Performance evaluation and improvement tool was applied prior assessing the areas for improvement in JSC „GC“. The performance evaluation of JSC „GC“ was conducted after one year upon receiving suggestions for improvement. Table 4 provides TE element fulfillment in percentages. On the basis of these evaluations, the performance of JSC „GC“ are displayed by RADAR diagram (Fig. 5).

**Table 2.** Specification of Possibility Evaluation points

Points	Point Specification
0	No evidence or sporadic evidence of operation
1	Mode of operation is planned
2	Mode of operation is planned and implemented
3	Mode of operation is planned, implemented and revised
4	Mode of operation is planned, implemented and revised by comparison of the data and adjusted accordingly
5	Mode of operation is planned, implemented and revised by comparison of the data, adjusted accordingly and fully applied in organization.

**Table 3.** Specification of Result Evaluation Points

Points	Point Specification
0	Results are not evaluated
1	Only the major results are evaluated. Negative tendencies or stable results.
2	Modest progress of results.
3	Significant progress of results.
4	Excellent results, higher than expected.
5	Excellent results, higher than expected and higher than results of similar organizations.

**Table 4.** Performance evaluation results of JSC „GC“

Element of General Evaluation Model	Evaluation Coefficient: prior	Evaluation Coefficient:after	Change
Leadership performance	45.00%	53.59%	8.59
Policy and Strategy	26.97%	36.87%	9.90
Human Resources	34.38%	49.38%	15.00
Partners	45.25%	57.25%	12.00
Material Resources	22.00%	25.30%	3.30
Processes	42.71%	53.55%	10.84
Client Results	42.10%	49.10%	7.00
Employee Results	30.00%	35.12%	5.12
Society Results	15.83%	19.75%	3.92
Performance Results	37.60%	54.00%	16.40



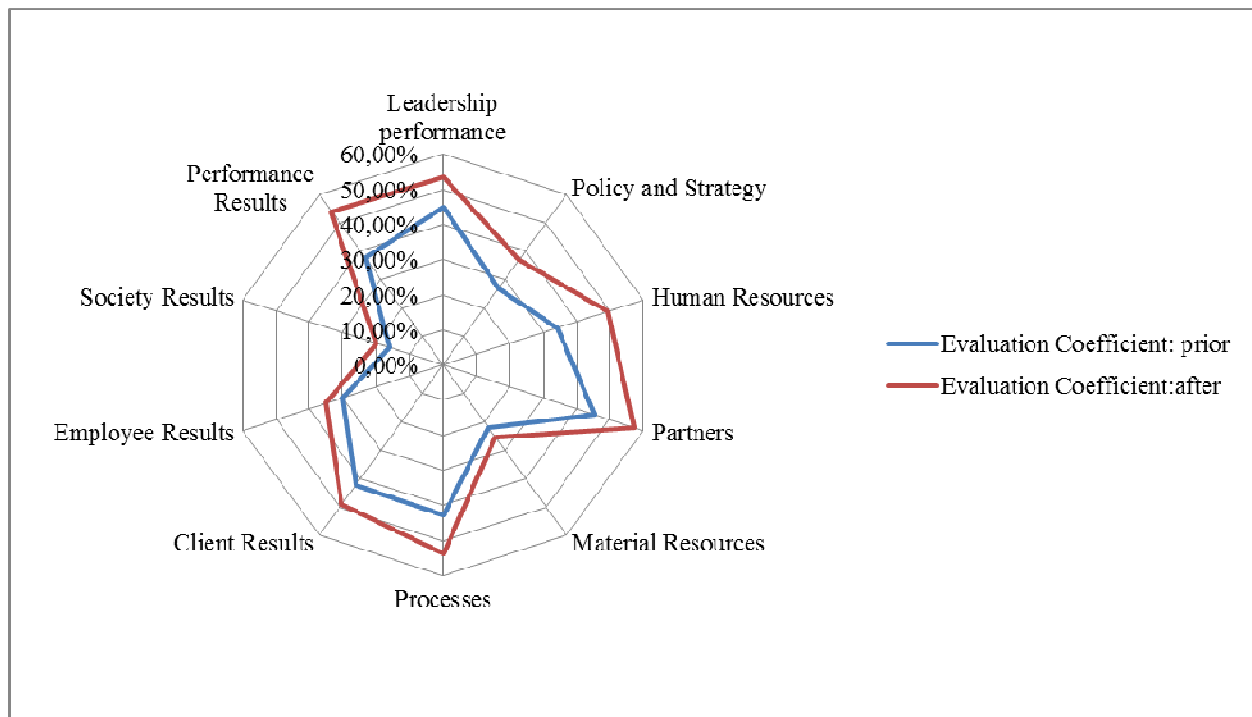


Fig. 5. RADAR diagram of JSC „GC“ prior and after the optimization of performance process

Upon conducting JSC „GC“ performance evaluation, company executives were asked whether this type of performance evaluation is appropriate for TE performance evaluation and determination of improvement possibilities. The Executives claimed, that the tool is convenient for performance evaluation, questions are comprehensible and easy-to-answer. In addition to criteria evaluation, the ideas on performance improvement to achieve better results, were generated. TE performance evaluation and improvement tool was positively evaluated with the promise to apply it in the future.

## 7. Conclusions

After conducting an analysis of the concepts of Quality Management and Processes, it was concluded, that Process analysis and improvement are the basis for Quality Management System installation. The content analysis of Transport Enterprises' web pages made it possible to determine, that the minority of Lithuanian TE are involved in Quality Management System applications. However, those enterprises that do apply Quality Management Systems are mostly certified to ISO 9001 management system standards. The criteria developed on the basis of EFQM model were evaluated by the means of Expert Survey Method. The general opinion of the Experts shows that the quality of TE performance mostly depends on the main performance process, Human and Material Resources. The main result that the overall organi-

zation's performance should be centered is the preferences and satisfaction of clients. In order to assess the benefits of TE performance evaluation and improvement tool, an approbation in JSC „GC“ was conducted. TE performance evaluation and improvement tool was positively assessed; according to the observations of evaluators, the tool is comprehensible and easily applied.

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