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MONITORING, MEASUREMENT, ANALYSIS AND REVIEW IN POLISH AND MONTENEGRIN ORGANIZATIONS ACCORDING TO THE ISO 9004 MANAGEMENT MATURITY MODEL

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Abstract: *The paper is result of studies conducted at the Center for Quality-Faculty of Mechanical Engineering-Podgorica and it specifically includes a detailed study and analysis of literature sources concerning innovation, quality management systems, total quality management-(TQM). The main objective of this paper is to analyze the current research in the previously mentioned subject areas and to come to certain conclusions that would relate to the specific characteristics, trends and connections in the areas under consideration. The goal is to create a basis for further exploration and definition of hypothesis-based experiments that will be conducted in certified Montenegrin companies. Accordingly, this paper is the first that analyses literature sources about opportunities and benefits of QMS and TQM and development of innovation performance.*

Keywords: *QMS, TQM, innovation*

1. Introduction

Organizations may develop their ideas and practices according to the quality management standard such as ISO 9001 which is available and used in the market for almost 25 years. Moreover organizations can improve management system with the guideline provided in the excellence models (Bayo-Morines *et al.*, 2011; Martinez-Costa, 2008; Giemza, 2012; Vujovic *et al.*, 2010). It is considered that the most popular excellence model in Europe is EFQM Excellence Model. The EFQM Excellence Model was introduced in 1991 as the framework for the self-assessment of both

public and private sector organizations (Ansoleaga, 2007; Mariscal *et al.*, 2012). Other most recognized organizational quality awards are Malcolm Baldrige National Quality Award and Deming Prize. In 2009 International Organization for Standardization introduced in the ISO 9004:2009 model of self-assessment which provides a wider focus on quality management than in ISO 9001:2008 and leads to sustained success (ISO, 2009). Standard provides two self-assessment tools which help to conduct the assessment and calculate the level of management's maturity. Those tools are: self-assessment of key elements and detailed self-assessment of key elements. Table 1 presents the key elements of management maturity and questions in self-assessment model.

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The aim of this research was to analyze the level of management maturity in Polish and Montenegrin organizations as well as to

explore the best practices in the monitoring, measurement, analysis and review key element of management maturity model.

Table 1. Key elements of management maturity

Key element number	Key element	Key element – question
1	Managing	What is the management focus?
1	Managing	What is the leadership approach?
2	Strategy & policy	How is it decided what is important?
3	Resources	How is it decide what is important?
4	Processes	How are the activities organized?
5	Monitoring & measurement	How are results achieved?
5	Monitoring & measurement	How are results monitored?
6	Improvement, innovation & learning	How are improvement priorities decided?
6	Improvement, innovation & learning	How does learning occur?

Source: based on ISO 9004:2009

2. Methods and materials

There were four organizations selected for the study. The organizations had introduced and certified at least one standardized management system. It was assumed that the level of management maturity in investigated organizations was above average. The selection of the organizations subject to analysis was made on the basis of knowledge and experience of the authors of this paper.

The analysis has been conducted in the form of case studies. In all four organizations employees responsible for the functioning of management systems were interviewed. The case study was conducted in the form of in-depth interviews based on pre-prepared script. The scenario was developed based on the ISO 9004:2009 model.

Table 2. presents a brief description of studied organizations

Organizations number	Description
Organization 1	One of the largest ceramic tiles manufacturers in Poland providing products renowned by customers in Poland and in nearly 40 countries of the world; a group of 5 manufacturing plants located in Poland with 1700 employees. Value of assets: 163 million Euro in 2011, value of revenue: 147 million Eur in 2011.
Organization 2	One of Polish regional offices of public administration with 1000 employees. The organization has head office and seven branches in the south of Poland. It is one of sixteen public administration offices in Poland.
Organization 3	The most important and the only big viticulture-wine making company in Montenegro. It deals with production of wine and table grapes, peach, production and distribution of wine and grape brandies, fish farming, catering and retail trade. It is also the biggest producer of wine and table grapes in Montenegro and surroundings with the annual production of wine grapes about 22 million kilos and with approximately 17 million bottles sold annually.

Organization 4	Leading organization in bakery products in Montenegro. It has automated plant with modern equipment for the production of bread, pastries and fine bakery products; altogether over 150 products.
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Source: own study

All selected and tested organizations are considered as a leaders in quality management. Management systems implemented in these organizations can be divided into general management systems, which can operate in any organization, regardless of the nature of production and

standards dedicated strictly to specific industries. Table 3 presents management systems functioning in the surveyed organizations, in the compliance with which currently valid certificates are issued by independent certification bodies.

Table 3. Certified systems in the selected organizations

Organization 1.	Organization 2.	Organization 3.	Organization 4.
ISO 9001 ISO 14001 PN-N 18001 OHSAS 18001	ISO 9001 ISO 14001 PN-N 18001 ISO/IEC 27001	ISO 9001 ISO 14001 HACCP	ISO 9001 HACCP

Source: own study

Certified systems in both Polish organizations are deeply integrated. Organization 2 had a certificate confirming integration of the management systems (Kafel et al., 2012; Nowicki *et al.*, 2013).

Organization 1 had also implemented TPM - Total Productive Maintenance rules. Organization 2, has been certified in the compliance with Polish anti-corruption system. The system had been developed and certified by the biggest Polish certification body. This system is dedicated strictly for public administration organizations.

Both Montenegrin organizations (organization 3 and 4) are certified according to standard ISO 9001 and HACCP system. Among many prestigious awards organization 3 also has “Gold European award for quality and commercial prestige from Geneva and Rome”. They are also winner of Serbia and Montenegro Quality award (Oskar kvaliteta), which is an award of EFQM model at a national level. Organization 3 is also certified according to ISO 14001 standard. Organization 4 obtained an award „Well of Montenegro“, which is an award of Chamber of Economy

Montenegro granted to organizations providing products with highest level of quality.

Quality awards and certificates confirm high level of management system in all studied companies. All studied organizations had been awarded at national level. Organization 2 won Polish Quality Award in 2006, which is an award of EFQM model at national level.

3. Research results

Interviewed employees of the analyzed organizations were asked to conduct a self-assessment of management maturity. The results of self-assessment were presented in Figure 1 and Figure 2.

Results of maturity management in monitoring & measurement key element were presented on Figure 3.

4. Improvement, innovation and learning key element in studied organizations

The monitoring & measurement key element

in ISO 9004 maturity model is divided into nine subclasses: general, monitoring, general measurement, key performance indicators, internal audit, self-assessment, benchmarking, analysis and review of information from monitoring measurement

and analysis. The interviewed employees of the studied organizations were asked to assess the maturity level and provide examples of best practices in these subclasses of described key element.

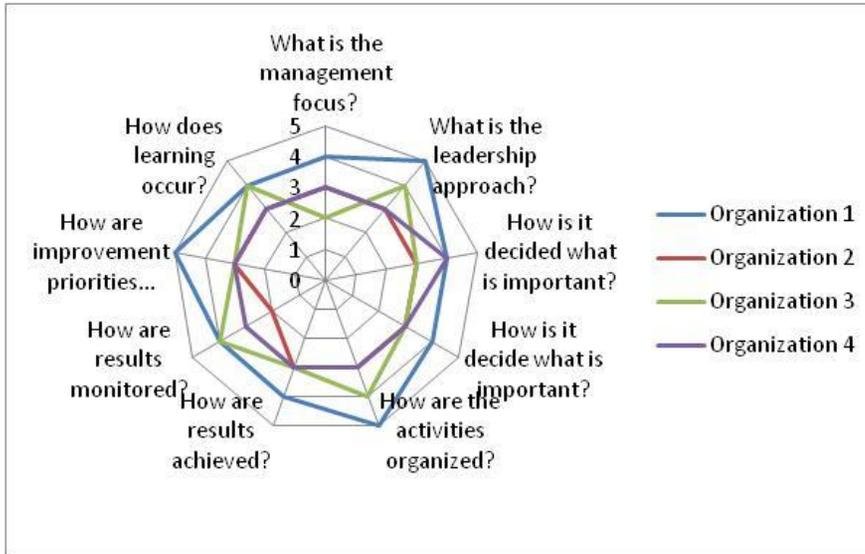


Figure 1. Key elements of maturity level of studied organizations
Source: own study

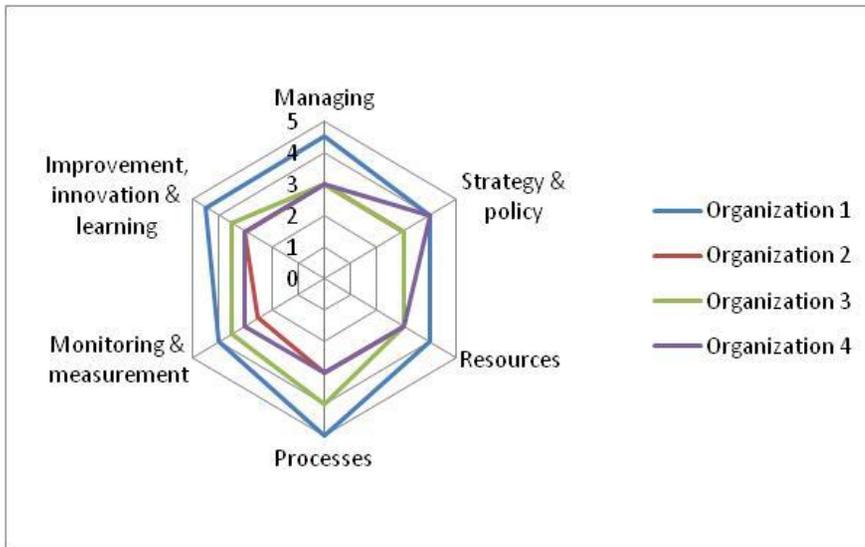


Figure 2. Results of self-assessment of studied organizations
Source: own study

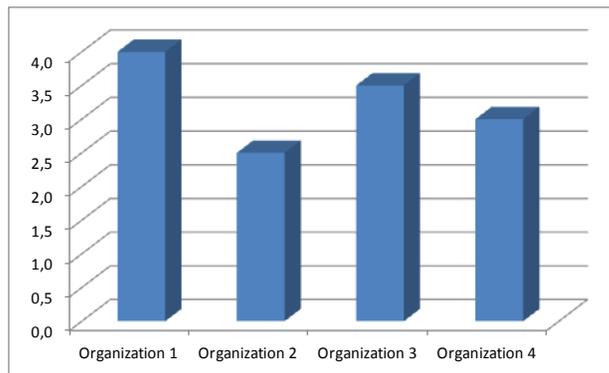


Figure 3. Results of self-assessment of studied organizations in monitoring & measurement key element

The best practices in particular subclasses are described below. In some cases the two subclasses were combined due to their similarity and common best practices.

5. Monitoring (8.1, 8.2)

Both Customer satisfaction survey and employee satisfaction survey are widely used in Polish companies. For example in organization 1 Employee satisfaction survey is done according to the principles such as:

- Survey done be an external independent/unrelated company. Workers in all 5 companies were asked about their satisfactions. Workers chosen to the research were selected by Survey Company).
- New works that finish a three-month trial in a company are surveyed by HR department (Both workers that get the permanency job and workers that don't get the job).
- Survey by HR department is always done, when employee resign from her job. (it is not done, when an employee was dismiss on disciplinary grounds).

Organization 2 operates in public administration sector. As a part of monitoring, complaints and requests process was analyzed. Complaints and requests process in public sector is very specific. To resolve the complaint is mandatory due to

the polish public law. In this organization (as a good practice) all correspondence with clients is written in simple and straightforward language which is easy to understand by clients (in other public administration organizations correspondence is written with a lot of low paragraphs which are understandable only for lowers).

In organization 3 monitoring process is focused on suppliers, customers and on stakeholders but with limited orientation. Feedback from key suppliers and stakeholders is collected in a planned manner. Feedback from customers is collected only if there are complaints. In this Montenegrin organization they also follow the ability of the existing processes. It is very important to mention that the monitoring process is permanently evaluated in order to improve its efficiency.

In organization 4 they performed continuous measurements and they recorded technical - technological parameters which are essential for the quality and safety of products. They do that for purposes of adjustment to the prescribed requirements for products. They also perform laboratory analysis of raw materials and finished products every day. In accordance with the Contract with IJZCG (Institute for public health of Montenegro) they occasionally perform, according to plan, a comparative analysis of the quality of products, raw materials, work surfaces and

personal hygiene of staff. Organization 4 also performs measuring of customer satisfaction on different ways: directly in daily contact with customers and consumers, through a book of complaints set in the shops, through direct complaints, performing planned surveys.

6. Measurement and key performance indicators (8.3.1, 8.3.2)

This part of key element is well developed in studied companies. Indicators are obligatory in all standards implemented and certify in researched companies. Other important indicators identified in organization 1. are related to kaizen programs, for example: the number of improvement actions proposals, number of implemented in company improvement actions. In organization 2 all key process indicators are correlated with "development strategy". Exemplars of indicators which are always discussed on Management review:

- Analysis of occupational accidents,
- Information security incidents,
- Customer satisfaction indicators,
- Main processes indicators (21 processes)

Moreover organization 1 was one of the first in Poland (in public sector) which implemented management by objectives and results. Performance budget was implemented (so the indicators are well developed).

Organization 3 defined a set of key indicators which are in relation to the strategy of the organization and key processes. Indicators are mainly based on the use of internal information. Decisions of top management are supported by the results of the review of QMS and additional key performance indicators.

In organization 4 all processes are defined using some parameters which are essential for achieving the set goals. All important parameters are measured and very important for defining preventive or corrective actions

of the process or its phases. Laboratory quality control of finished products is an important factor for determining the level of achieved quality and serves as a basis in determining the level of achieved performances of process. The obtained results are periodically used to compare with results of other manufacturers. They also monitor the sales and number of received complaints. On the basis of all these parameters they performed management processes and decision-making processes.

7. Internal audit and self-assessment (8.3.3, 8.3.4)

In all studied organizations internal audits are done as a routine. All of the companies have implemented quality system, where internal audits are obligatory. In polish organizations ISO 19011 is a guidebook in audit procedures. Internal audits of integrated management system are usually done as combined audits (all standards are audited together).

In organization number 1 are commonly used such principles like:

- Auditors are assessing once a year. As factors are taken: punctuality in preparing reports and quality of: inconformity, observations and improvement possibilities in the report.
- Reports are available for all managers in all 5 companies.
- Auditors are rotated between companies. For example: a production department manager goes to do an audit in production department in other 4 companies.

In organization 2, self-assessment is used according to the CAF (The Common Assessment Framework) methodology (it is EFQM model for public sector). It is the opinion of managers of this company this particular model was very helpful in management development.

Organization 3 permanently collects data of the key processes. Information about audits

is always used as input data for management review. Data and results of self-assessment are used in preventive actions.

Organization 4 also performs internal audits. Depending of the results of internal audit they perform corrective or/and preventive actions. After any such actions, they measure corrected parameters and also test and verify them according to prescribed procedures. Results of self-assessment are used to assess the maturity level of an organization and further actions to improve system performances.

All surveyed organizations, however, have reservations about the self-assessment model described in ISO 9004. Use of this tool of improvement of organization management system was recognized by managers as ineffective. In the opinion of the surveyed managers, methods and tools (such as 5S) in which implementation procedures are clear and obvious, are much easier and more effective in management system development than ISO 9004 self-assessment model.

8. Benchmarking (8.3.5.)

In both polish companies benchmarking is well developed. In organization no 1 internal benchmarking is used. All 5 companies in the group compare between each other. In organization 2 special benchmarking tools was developed to benchmark the organization, in such areas as:

- Management system,
- HR management,
- IT resources,
- Budget,
- Logistic.

With the use of this tool benchmark with other public administration organizations is performed. There is no competition between public sector organizations, so it is quite easy to do benchmark. As a result, good practices are described and implemented in all benchmarked organizations. There are also other benchmarking actions in this

organization such as:

- participation in international development actions,
- Cooperation with partner regions (Uppsala – Sweden).

In organization 3, top management supports the identification and publication of best practices. In accordance with that some products of key competitors are analyzed and compared with the aim to improve own products.

Organization 4 often performs a comparative analysis with other producers. The comparative analyses are related to the quality and range of finished products, the efficiency of production processes, saving in the field of energy and energy products. Having in mind the character of production and the limited market, comparisons are made mainly with producers in the region.

9. Analysis and review of information from monitoring, measurement and analysis (8.4., 8.5)

One of the ISO 9001 quality management principles is strictly connected with described key element, it is principle no 7: Factual approach to decision making. Application of this principle typically leads to analyzing data and information using valid methods (ISO, 2009). In organization ISPC (Statistical Process Control) program is implemented. Dates in time of the production are collected and analyzed. During the management review all important indicators are discussed. All 5 production factory are assess. On management review the best 3 kaizen practices from the company are presented and are discuss. The outputs from the reviews are shared with for example foreign design studio (information's about the technology and (raw) material are shared).

In company 2 as a monitoring tool it is used

IT applications that provides the possibility to control and monitor all cases (matters) that are done in organization. All cases are identified and recorded. Moreover public consultation is used as a monitoring tool. Special part of monitoring is connected with impact on the environment (ISO 14001).

Organization 3 performs periodically analysis of external and internal information using some basic statistical tools. They also analyze ratio of fulfillment of customer needs and expectations. Improving of products is based on all these analysis. They also perform periodical reviews with aim to assess progress in achieving the quality goals. All active projects and improvement measures are assessed during the review process with aim to evaluate progress in achieving the plans and goals.

In organization 4 is established a system for monitoring and analysis of all parameters relevant for efficiency of business. This is accomplished by establishing the necessary procedures, by detailed annual plan and by monitoring of its implementation in all relevant stages. The results of these analyzes are used for any corrections or changes of

implementation of any part of the plan. They use the plan for monitoring and analyzing quantity and variety of products, consumptions of raw materials and energy, labor force participation, product realization, management of human resources, distribution costs, rebates, taxes, levies and all other expenses. They permanently review the achieved results and according that they recommend further actions to achieve the planned objectives.

In all studied companies (Polish and Montenegrin) customer satisfaction data are important and are analyzed.

10. Conclusion

All studied companies assess their maturity level according to the ISO 9004 model above average. Implementation and certification of international management standards allow assessing the maturity on third level. Higher ranks in management maturity level require additional improvement of management system. The study confirmed strong commitment to improving management systems both in Polish and Montenegrin organizations.

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