

24 THE BENEFITS OBTAINED BY THE IMPROVEMENT OF QUALITY MANAGEMENT SYSTEMS – AN ANALYSIS OF THE VALIDITY

24.1 Introduction

The implementation and improvement of quality management systems compliant with ISO 9001:2008 organization should bring benefits. They can address issues such as [1]: staff, organization, customers, suppliers, society. Recognising these benefits of implementing a quality management system requires a substantial knowledge about the system itself and its level of implementation [2].

So far, implementing quality management systems comply with ISO standards 9000 and making them self-esteem, nobody paid much attention to the obtained by the implementation of benefits. However, currently, ISO 10014:2006 allows for the self-assessment quality management system in terms of its ability to obtain economic benefits and financial services. An interesting question, to which in this case to be answered is to determine which benefits organizations expect, or what is the importance/significance. Subsequently, organizations can focus on those issues that are particularly important and have influence on the improvement of the quality management system.

This paper presents, based on research carried out in 753 Polish companies, the results of studies on evaluation of the validity of the benefits resulting from the improvement of the quality management system.

24.2 Possible benefits to be obtained as a result of improvement of quality management systems

The key aim of ISO 10014:2006 standards was a willingness to help the top management in facilitating a processes of improvement of actions in quality systems and for a quality system [3]. As a result, a system of self-assessment and a set of typical benefits gained as a consequence of self-assessment were created.

Many specialists in the world have been conducting many studies concerning company's benefits coming from the improvement of quality management system being in accordance with ISO 9001 (Seetharaman et al. 2006). These benefits are most often divided into three groups: financial, economic and organizational (which are also called organizational or concerning improvement). These studies also allowed selecting many empirically proved benefits. The following organizational benefits are most often pointed out [4, 5, 6]:

- The improvement of procedures in an organization,
- Better structure of an organization,
- Quality planning,
- The improvement of effectiveness of leadership,
- The improvement of process control,
- The improvement of choice of deliverers
- The improvement of cooperation with deliverers,
- The improvement of quality of a product,

- The improvement of product quality,
- Fulfilling requirements from outside,
- The protection of environment,

Lots of researchers see many market benefits of system. [5, 6, 7]:

- Decreasing a number of complaints,
- Better communication with a client,
- The improvement of company's image
- The improvement of client's satisfaction,
- Bigger trust for an organization,
- The growth of client's profitability.

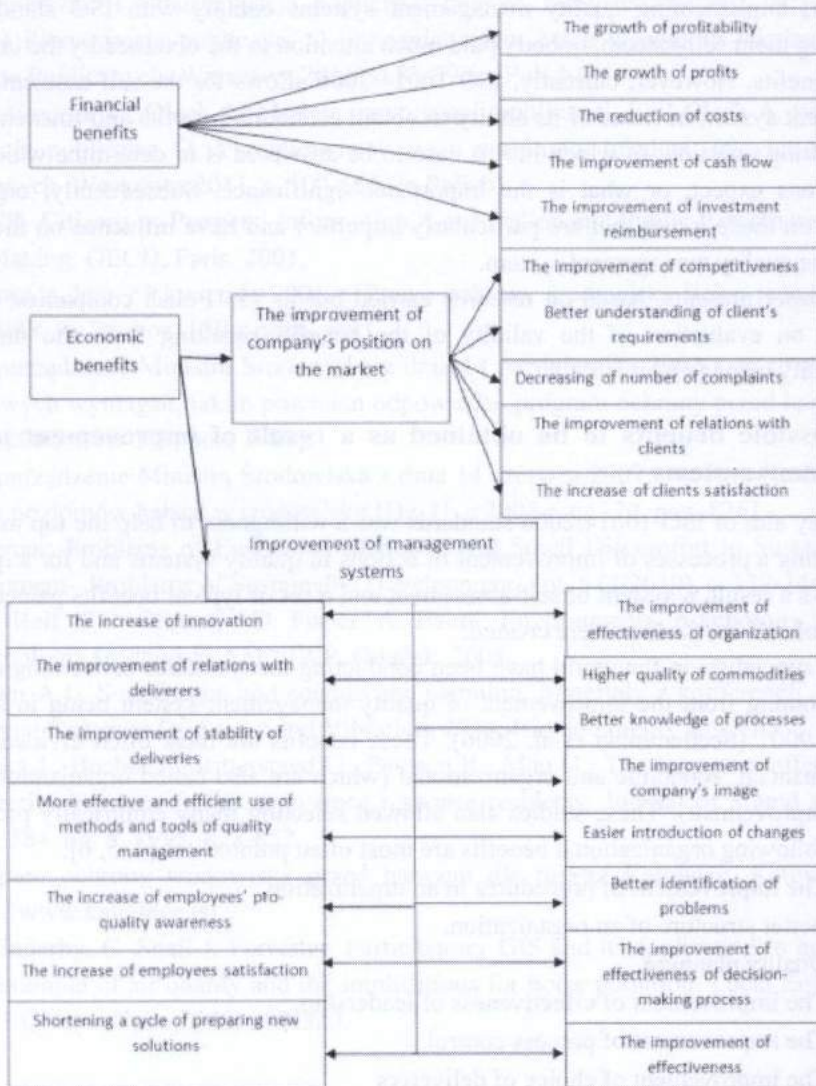


Fig. 24.1 Financial and economic benefits being a consequence of quality management
 Source: on base [14, 15]

However, the matter seems to be complicated in terms of financial benefits. This issue is not mentioned in ISO 9001:2008 standards. However, they can be achieved as a result of market benefits and they can be a part of realization of quality management rules. Scientific works connected with quality management rarely present specific financial benefits which are achieved by an organization which have a quality management system being in accordance with ISO 9001:2008 standards. It is due to problems with their measuring and pointing precisely that a given effect is caused by the improvement of quality management system. Nonetheless, literature query allowed to state the following benefits [5, 8, 9, 10]:

- The reduction of insurance costs and service of risk,
- The reduction of operating costs of a company,
- The improvement of profitability,
- Better financial planning,
- Higher profit per an employee,
- The improvement of financial effectiveness.

PN-ISO 10014 standard is created for the top managers. Its main aim is to provide an organization with a methodology which will help in successful implementation of quality management and in choice of tools which enable improvement programs and constant improvement of quality [11]. This standard was created on the basis of relations which were observed between processes and methods and tools which help implementing and developing quality management.

ISO 10014:2006 provides examples of economic and financial benefits which can be achieved by an organization as a consequence of improvement of quality management system but yet, they do not exhaust a full list of possibilities. On the basis of ISO 10014:2006 and expert method, the following benefits of improvement of quality management system were selected and whose significance was subjected to studies:

- The improvement of competitiveness,
- The growth of profitability,
- The growth of profits,
- The reduction of costs,
- The improvement of cash flow,
- The improvement of investment reimbursement ,
- Better understanding of client's requirements,
- The improvement of effectiveness of processes,
- The improvement of effectiveness of organization,
- Decreasing of number of complaints,
- The improvement of relations with clients,
- The improvement of effectiveness of decision-making process,
- Shortening a cycle of preparing new solutions,
- The increase of clients satisfaction,
- The increase of employees' pro-quality awareness,
- More effective and efficient use of methods and tools of quality management,

- Higher quality of commodities,
- Easier introduction of changes,
- Better identification of problems,
- The increase of innovation,
- The improvement of relations with deliverers,
- The improvement of stability of deliveries,
- Better knowledge of processes,
 - The increase of employees satisfaction,
 - The improvement of company's image.

All listed and studied benefits can be initially divided into financial and economic ones. [10, 12, 13]. Economic benefits can be divided into two groups: the improvement of company's position on the market and improvement of management system. These benefits are presented in fig. 24.1.

24.3 The characteristics of conducted research

In subject of empirical studies, are Polish organizations that have a certified quality management system. It was decided, to download from a simple random sample of the population. The population is over given the objective of the study – an assessment of the significance the benefits of implementing ISO 9001:2008 in your organization. Questionnaire for the study are based on expert analysis, resulting in the selected 25 major benefits resulting from the improvement of the quality management system. Then it was verified through a pilot study. The pilot studies were obtained 47 correctly completed questionnaires. Importance / relevance of the various benefits were measured on a scale of 1-10, where "1" means the benefit is not significant, while "10" a very important advantage.

In the next stage of the general population collected in a random sample 3000 the organization to which in 2010 sent a questionnaire by e-mail (do not send back the questionnaires to the organizations that responded to the pilot study because of small changes in the survey of stylistic only.) Questionnaire was active on the Internet on the site for four months. A total of 729 questionnaires were obtained survey which gives agility at 24.3%.

24.4 The significance of benefits

When analysing the significance of benefits being a consequence of quality management, it is worth remembering about a rule that the appearance of all benefits have always a positive influence on any organisation. Thus, it can be presumed that organizations will give them a higher number of points.

The studies of the significance of benefits being a consequence of quality management for management team of an organization which have a certified system being in accordance with requirements of standards PN-EN ISO 9001 have showed that most of benefits are highly desired by an organization (Table 1). The analysis of data suggests that organizations perceive benefits connected with financial and markets issues as more important while benefits connected with the improvement of management system are less important but, still also significant. It is proved by means of the analysis of data conducted by means of a method of k-means of agglomeration [16].

In the analysis of data clustering, it is not necessary to fulfil linear assumptions and normality of variables. It requires an assumption of lack of collinearity of variable as a collinearity hinders the assessment of 'real' influence of separate variables [17]. Grouping by means of k-means method is not hierarchic and eventually, results in disintegration in which any of data clustering is not a sub -data clustering of other one [18]. This method was created by MacQueen in 1967 and is the most often used taxonomic method.

When interpreting results of grouping by means of k-means method, a mean for each data clustering in each dimension should be counted in order to estimate how much our data clustering differ from each other. Ideally, very different means for most of dimensions provided in the analysis would be achieved.

Data, which was gathered during the analysis, is not collinear which in turn allows conducting the analysis of agglomeration by means of k-means. When using this method, two data clustering were set apart. Tab. 24.1 presents Euclidean spaces for separate data clustering. The conducted analysis of variation proves that at the level of statistical significance $\alpha = 0,05$, most of cases is statistically significant.

Tab. 24.1 Euclidean distance to cluster
Source: author's own research

Cluster 1		Cluster 2	
Variables	Euclidean distance	Variables	Euclidean distance
The improvement of competitiveness	1,032	The improvement of effectiveness of decision-making process	2,363
The growth of profitability	1,054	Shortening a cycle of preparing new solutions	1,889
The growth of profits	0,925	The increase of employees' pro-quality awareness	1,997
The reduction of costs	1,080	More effective and efficient use of methods and tools of quality management	2,587
The improvement of cash flow	1,969	Higher quality of commodities	2,348
The improvement of investment reimbursement	1,511	Easier introduction of changes	2,131
Better understanding of client's requirements	1,431	Better identification of problems	2,252
The improvement of effectiveness of processes	2,146	The increase of innovation	2,384
The improvement of effectiveness of organization	1,680	The improvement of relations with deliverers	1,956
Decreasing of number of complaints	2,074	The improvement of stability of deliveries	1,927
The improvement of relations with clients	1,181	Better knowledge of processes	2,265
The increase of clients satisfaction	1,481	The increase of employees satisfaction	2,240
		The improvement of company's image	2,403

Euclidean distance is presented by means of a formula:

$$d(x, y) = \sqrt{\sum_{i=1}^p (x_i - y_i)^2} \quad (24.1)$$

where:

$$x = (x_1, \dots, x_p) \text{ and } y = (y_1, \dots, y_p).$$

The first data clustering classifies variables connected mainly with financial and market benefits which result from the improvement of quality management. 12 variables were included in it: the improvement of competitiveness, the growth of profitability, the growth of profits, the reduction of costs, the improvement of cash flow, the improvement of reimbursement from investment, better understanding of clients, the improvement of effectiveness of processes, the improvement of effectiveness of a company, decreasing the number of complaints, the improvement of relations with clients and growth of clients' satisfaction.

While the second data clustering classifies variables connected with organizational benefits of the improvement of quality management. 13 variables comprises this clustering: the improvement of effectiveness of decision-making process, shortening a preparation cycle of new solutions, the growth of employees' pro-quality awareness, effective use of methods and tools of quality management, higher quality of products, easier implementation of changes, better identification of problems, growth of innovation, improvement of relations with delivers, improvement of stability of deliveries, better knowledge of processes, growth of employees' satisfaction and improvement of company's image (tab. 24.1).

Tab. 24.1 presents the evaluation of significance of the benefits of quality management training for executives of the organizations. The significance of the benefits are characterized by weak or moderate dispersion, which means that the arithmetic mean for the well-studied phenomenon reflects the average level. High precision estimation results, however, that results from the sample can be generalized to the whole population.

The most important benefit according to executives surveyed organizations were: growth in revenue (significance 9.84), the increase in profitability (significance 9.75), improved competitiveness (significance 9.74), cost reduction (significance 9.7) and improve customer relations (significance 9.53). Research has shown that organizations expect by implementing a quality management system complies with the requirements of PN-EN ISO 9001, first financial benefits as well as increase customer satisfaction and market position of the organization.

Organizations first want to implement a quality management system was financially viable or that brought higher profits and revenues. They also want to allow, through the elimination of waste, often called the Japanese muda, to cut costs. The results are understandable, especially considering the one hand, the financial plight of many Polish companies as well as the fact that the tested criteria for assessing the quality management system in terms of its ability to achieve financial and economic benefits created by the eight quality management principles. However, it is disturbing that the executives surveyed organizations attach less importance to the achievement of organizational benefits of improving the management system.

The literature also recognizes that managers closely oriented to the economic results tend to draw low ratings for systems compliant with ISO 9001:2008. Their concerns relate to financial results may be obtained from the implementation of a system based on the require-

ments of the standard. They often undergo real doubt on the financial effects, the ratio of benefits to costs for maintaining a certified system [2].

Tab. 24.2 The significance of the benefits of improving the quality management

Source: author's own research

Benefits	Average	Median	Range	Ranking	Benefits	Average
The improvement of competitiveness	9,74	10	5	9,4	0,6%	3
The growth of profitability	9,75	10	6	9,6	0,6%	2
The growth of profits	9,84	10	5	7,2	0,4%	1
The reduction of costs	9,71	10	5	10,0	0,6%	4
The improvement of cash flow	8,83	10	7	23,1	1,4%	10
The improvement of investment reimbursement	9,20	10	6	16,9	1,0%	8
Better understanding of client's requirements	9,45	10	7	15,7	0,9%	6
The improvement of effectiveness of processes	8,53	10	7	25,3	1,5%	12
The improvement of effectiveness of organization	9,09	10	6	19,5	1,2%	9
Decreasing of number of complaints	8,60	9,0	8,0	24,2	1,5%	11
The improvement of relations with clients	9,53	10	5	12,7	0,8%	5
The improvement of effectiveness of decision-making process	7,88	9	7	29,2	1,8%	15
Shortening a cycle of preparing new solutions	7,04	7	6	30,8	1,9%	19
The increase of clients satisfaction	9,35	10	7	16,9	1,0%	7
The increase of employees' pro-quality awareness	6,82	7	7	29,5	1,8%	20
More effective and efficient use of methods and tools of quality management	5,57	5	9	44,8	2,7%	25
Higher quality of commodities	8,05	9	7	27,5	1,7%	13
Easier introduction of changes	7,76	8	6	27,7	1,7%	16
Better identification of problems	7,95	8	7	27,4	1,6%	14
The increase of innovation	7,36	8	7	33,0	2,0%	17
The improvement of relations with deliverers	6,80	7	7	32,9	2,0%	21
The improvement of stability of deliveries	6,78	7	7	32,1	1,9%	22
Better knowledge of processes	6,10	6	8	40,2	2,4%	24
The increase of employees satisfaction	6,42	6	8	36,4	2,2%	23
The improvement of company's image	7,26	8	8	33,4	2,0%	18

Taking into account that the financial benefits have been recognized by the executives surveyed organizations may be the most important cause that they will only judge from the perspective of quality management system. In many cases this leads to an underestimation

of the impact of organizational benefits – related to the improvement of activities within the company. These benefits also translate into financial results, but this impact is not easy to measure directly and therefore executives attach less importance to them. The study shows that greater attention is paid to the factors of "hard", more easily measurable, mistakenly forgetting factors, "soft", whose influence, though more difficult to grasp in the form of figures, is in many cases complex and acts on all other aspects of functioning of the organization.

The least important benefits, according to the organizations, include: more efficient and effective use of methods and quality management tools (significance 5.57), a better understanding of the processes (significance 6.1), and increase employee satisfaction (significance 6.42). It turns out that the use of methods and tools of quality management and "soft" aspects of quality management are areas that are considered less relevant by the representatives of the organizations surveyed. In the case of a process approach, the results vary depending on the type of organization.

24.5 Conclusion

Implementation of research on the significance of the benefits of improving quality management systems in Polish organizations shows that the executives are the most important financial benefits, then the market but much less importance they attribute to the benefit of the organization. This leads to the neglect of "soft" factors of quality management relevant to the concept of TQM and getting attached too much importance to the hard factors – particularly financial. This attitude leads to a biased view of the quality management system which in turn leads to the fact that Polish organizations are poorly managed and not very innovative.

REFERENCES

- [1] Bauer J. E., Duffy G. L., Westcotts R.: *The Quality Improvement Handbook*, ASQ, Milwaukee 2006.
- [2] Majger A.: System zarządzania jakością w aspekcie kosztów transakcyjnych, „Problemy Jakości”, nr 9 2009.
- [3] Lisiecka K.: Ocena systemu zarządzania jakością wyrobów i usług. Wyniki ekonomiczno-finansowe firmy (według metodyki standardu ISO 10014/DIS:2005), „Problemy Jakości”, nr 5 2006.
- [4] Pisciari F.: *Ucinki pridobitve certifikata kakovosti slovnских podjetij in nadaljevanje njihovih prizadevanj na področju kakovosti*, Faculty of Economics, University of Ljubljana, Ljubljana 2003.
- [5] Magd H., Curry A.: The importance of internal aspects in quality improvement, “The International Journal of Quality & Reliability Management”, vol 20, nr 2 2008, s. 304-324.
- [6] Thawesaengskultai N., Tannock J. D. T.: Pay-off selection criteria for quality management and improvement initiatives, “The International Journal of Quality & Reliability Management”, vol 25, nr 4 2008, s. 366-382.

-
- [7] Karapetrovic S., Willborn W.: ISO 9000 quality management standards and financial investment services, "The Service Industries Journal", vol 21, nr 2 2005, s. 117-136.
- [8] Nisbet R., Fletcher J., Miner E. G.: Handbook of statistical analysis and data mining applications, Elsevier, San Diego 2009.
- [9] Mathews S.: ISO 9000 survey shows value of customer focus – and gives purchaser's viewpoint, "ISO Management Systems", vol 5, nr 6 2005, s. 15-19.
- [10] Rusjan B., Alic M.: Capitalising on ISO 9001 benefits for strategic results, "International Journal of Quality & Reliability Management", vol 27, nr 7, 2010, s. 756-778.
- [11] Lisiecka K.: Systemy zarządzania jakością produktów. Metody analizy i oceny, Wydawnictwo Akademii Ekonomicznej, Katowice 2009.
- [12] Poksinska B, Eklund J. A. E., Dahlgaard J. J.: ISO 9001:2000 in small organisations: Lost opportunities, benefits and influencing factors, "International Journal of Quality & Reliability Management", nr 5 2006; 490-512.
- [13] Blokdijsk G.: ISO 9000 ISO 9001 100 Success Secrets; The Missing ISO 9000, ISO 9001, Emereo Pty Limited, Boston 2008 105-106.
- [14] PN-ISO 10014:2008 Zarządzanie jakością. Wytyczne do osiągnięcia korzyści finansowych i ekonomicznych.
- [15] Cholewicka-Goździk K.: Cholewicka-Goździk: Opłacalność jakości, „Problemy Jakości”, nr 7 2009.
- [16] Tsiptsis K., Chorianopoulos A.: Data Mining Techniques in CRM: Inside Customer Segmentation, John Willey & Sons, Chichester 2009.
- [17] Stanisław A.: Przystępny kurs statystyki z zastosowaniem STATISTICA PL. Tom 3. Analizy wielowymiarowe, DataSoft, Warszawa 2007.
- [18] Fuentes C. M., Benevent F. B., Moreno M. A. E., Cruz T. F. G., del Val M. P.: ISO 9000-based quality assurance approaches and their relationship with strategic analysis, "International Journal of Quality & Reliability Management", vol 20, nr 6/7, 2003, s. 664-690.
-