

Determination Of Qms Principle Coefficients Of Significance In Achieving Business Excellence

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Abstract: This paper has been developed as a tendency of researchers in the Center for quality-Faculty of mechanical engineering in Podgorica to establish a model for improvement of business processes performances based on quality management system through comparison with top organizational performances characterized by criteria i.e. particularities of the business excellence model. Correlation of principles of the quality management system with QMS principles has been established to that effect. Weight coefficients have been also determined for each principle individually. Thereby key principles were identified, namely priorities in terms of achieving business excellence i.e. areas (principles) were given priorities, that is to say principles that play the biggest part in achieving business excellence. In that way, preconditions were made to define preventive measures of a certain intensity depending on the weight coefficients, with a goal to improve performances of a certified and process-modulated quality management system in direction of achieving top organizational performances.

1. INTRODUCTION

Globalization, as an extremely pronounced process during last decades, results in migration of market boundaries even to the most isolated and poor world regions. Big systems of production and service control conditions of business dealing and force everyone else to accept processes of standardization i.e. to apply standards to their products and management systems with a view to achieve uniformity and gain trust, and with a need to protect goods and customers. Export oriented companies have to adopt generally valid standards in their fields as the best global practice, as to be competitive and gain trust and often to meet export conditions. New conditions of business ask for a swift reaction, big flexibility and adapting to changes that are very frequent.

In an ambience defined like this and with a constant tendency to overcome competition, organizations must resort to finding unique

ways to improve performances of their processes, and thereby to improve quality of their products in terms of division into four categories defined by a standard. To that effect, certification of the quality management system is just a necessary condition, but not a sufficient condition for survival on the market. That is why other models for improvement of quality were defined as well as TQM (Total Quality Management) model, i.e. approach to achievement of excellence. Many awards have been established for appraisal of business excellence at national and multinational levels as well as specific awards for business excellence by top organizations in specific fields of business.

This paper is based on those grounds too as a tendency to establish a correlation i.e. relationship between basics of ISO 9000 standard, namely principle of quality management system, and criteria of national award or business excellence, Oscar for quality. In that way, preconditions are created

to define measures of preventive character that should be acted upon areas in the quality management system. That is an approach according to which weight coefficients are defined for every principle of quality management system in relation to achievement of business excellence and

2. QUALITY MANAGEMENT SYSTEM, TQM AND BUSINESS EXCELLENCE AS A GUARANTEE OF IMPROVEMENT OF ORGANIZATIONAL PERFORMANCES

There are numerous studies that deal with research of benefits and disadvantages in systems with implemented quality management system. Premises on insignificance of the system of quality regarding improvement of performance are based on allegations that by that system, procedures are over-emphasized through excessive care of implementation or non-coverage by procedures, and real quality is neglected [1,2,3]. Lack of optimistic premises, but not fully pessimistic either, in terms of influence that ISO 9001 implementation has on organizational performances was represented also within [4,5,6,7] and is mostly based on negative influence of excessive procedures. These negative premises on influence of ISO 9001 on organizational performances are cited just for arousal of scientific research spirit and to point to pessimistic premises of certain authors regarding efficiency of QMS.

However, most researches point to real benefits of ISO 9001 implementation, contrary to those who claim that the price of implementation and maintenance of QMS is bigger than profits realized by it [8,9]. Authors [10,11,12] agree with these premises, and they observe benefits from ISO 9001 mostly in the part of defect management. In order to meet requirements of this paper, we point to significance that ISO 9001 has for company performances and favor the approach of significance of ISO 9001 for the improvement of organizational performances.

There are pessimistic premises in the literature regarding TQM model, about the influence of this model on improvement of organizational performances, as well as it is the

thereby clearly identifies significance of the principle. Thereby are also identified areas (principles) by priorities in terms of achievement of business excellence. It alone results in indicators for definition of preventive action intensity in accordance with quantity of the weight coefficient.

case with ISO 9001 model. Such premises point to its inapplicability, and therefore, in this paper and in an idea of association of ISO 9001 and the model of business excellence in direction of improvement, comparison with performances of organizations that are winners of the award for excellence as a measure of level of TQM implementation, was also pointless. Therefore the author has chosen to indicate here pessimistic attitudes and to promote optimistic premises through review and analysis of literary sources related to that subject.

Premises that point to inefficiency of TQM strategy with a view to improvement of organizational performances are mostly based on assertions that this concept creates bureaucracy and egoism in organizational structure. [13,14] Include premises that TQM has no efficiency regarding organizational performances. This premises are accompanied by researchers that indicate how it is very hard or almost impossible to establish a relation between TQM and organizational values and believe that such a relation is unreal [15,16].

There are many studies that indicate how TQM model implemented into organizational management is not just effective but also efficient even in terms of financial results of the organization [17,18,19,20,21]. Researchers [22] agree with that observation and emphasize that main reason for participation in the award of quality are initiations of actions for improvement of organizational performances.

Besides different aspects of observation of these two models, even those that are pessimistic about the relationship, the most common attitude is that the new version of a standard, strictly oriented towards process management model, leads a system towards TQM and Business excellence with a lot of hope [23]. Likewise, it is considered that relationship and dependencies between TQM model and ISO 9000 model are very poorly described and studied. That is the reason why it is very hard and uncertain for many companies

that have an ISO certificate to achieve TQM conception [24]. That statement precisely justifies the essence of this paper and tendency to establish the unique approach for association of these two models with a purpose to identify measures for improvement. Conclusions that

3. IMPLEMENTATION OF AHP METHOD FOR DETERMINATION OF QMS PRINCIPLE SIGNIFICANCE COEFFICIENTS IN ACHIEVING BUSINESS EXCELLENCE

In order to establish an approach for comparison of performances of organizations with certified QMS with performances of organizations that participated in competition for the Oscar for quality award, literary sources and expert analyses were used as well as capacities of the software for expert decision-making. Direct relationship with clearly indicated weight coefficients whereby strength of correlation between requests of ISO 9001 standard and criteria for the awards of business excellence is defined, according to information that were available to the author, can not be found in the literature. Certainly, that fact represents the result of research of literary sources and consultations with experts from our regions, which deal with models of business excellence. In attempt to establish a relationship between principles of ISO 9001 standard and criteria of business excellence, we have considered a relation between postulates and criteria of business excellence [25] as well as a relation between concept of European award for quality and principles of QMS [26]. We have also considered a level of incorporation of criteria for EFQM award for business excellence with ISO 9000 standard [27] as to get an impression of significance of a relation. With these elements, as a support to attempts in direction of establishment of a relationship between the model of business excellence ISO 9000 standard, and clear relations established between criteria of EFQM model themselves were also taken into account (all criteria are related although those strong or clear relations stand out), as follows [28]:

- Management of human resources and satisfaction of employees,
- Management of processes and satisfaction of a buyer,

describe influences of each model on improvement of organizational performances also indicate that any improvement in one or the other model results in improvement of organizational performances too, even those of financial character.

- Politics and strategy and first five criteria and
- Politics and strategy and business results

It should be emphasized that during analysis of this relations, we used literature related to European award for quality and literature related to the award Oscar for quality. That is justified because these two models coincide in big percentage (90%) [29]. This paper presents coefficients of significance in relation to the award Oscar for quality because of their further application and availability of information required for development of a model for improvement of organizational performances.

Based on:

- Stated literary sources,
- Analysis of ISO 9001 standard,
- Analysis of QMS principles and comparison with criteria and sub-criteria of the award Oscar for quality model and
- Through intensive consultations with experts from the field of QMS and business excellence during several iterative (repeated, frequent) cycles,

Correlation table (Table 1) of QMS principles and criteria of the award Oscar for quality model has been realized.

Moreover, on the basis of established relations we enter AHP (Analytic Hierarchy Process) methodology in order to determine percentage ration or in other words to determine a level of significance of certain principles of ISO 9001 model in achieving business excellence according to the model of Oscar for quality. Application of AHP methodology is supported by software for expert decision-making wherein a goal is defined as a starting point. Expert Choice is the most commonly used software as a support to AHP methodology [30] and it has been used in production of this paper also [31].

This paper sets a goal of achieving business excellence that is theoretically characterized by criteria of the Oscar for

quality award and related points (Table 2).

		Oscar for quality Criteria									
		QMS Principles									
		Leadership									
		Politics and strategies	Management of human resources	Management of other resources	Management of processes	Satisfaction of the buyer	Satisfaction of employees	Social influence	Business results		
User-related orientation	2 (E1) 5 (E2)	2 (E1) 2 (E2)	3 (E1) 5 (E2)	4 (E1) 5 (E2)	1 (E1) 5 (E2)	1 (E1) 1 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	3 (E1) 5 (E2)	2 (E1) 3 (E2)	
Leadership	1 (E1) 1 (E2)	1 (E1) 5 (E2)	1 (E1) 5 (E2)	4 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	3 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	
Involvement of employees	1 (E1) 5 (E2)	1 (E1) 5 (E2)	1 (E1) 5 (E2)	3 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	3 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	
Process approach	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	3 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	
Systematic approach to management	2 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	3 (E1) 5 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	3 (E1) 5 (E2)	
Constant improvement	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	3 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	3 (E1) 5 (E2)	
Decision making based on facts	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	3 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 5 (E2)	2 (E1) 5 (E2)	
Mutually useful relations with suppliers	3 (E1) 5 (E2)	2 (E1) 2 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	2 (E1) 5 (E2)	1 (E1) 2 (E2)	1 (E1) 2 (E2)	2 (E1) 5 (E2)	

Legend:

- Grade - Refers the grades given by expert 1 on the scale from 1-5 where 1 has the biggest significance
- Grade - Refers the grades given by expert 2 on the scale from 1-5 where 1 has the biggest significance

Table 1. Correlation of QMS principles and criteria of the award Oscar for quality model

No.	Criterion title	Points
1	Leadership	100
2	Politics and strategy	90
3	Human resources	100

4	Partnership and resources	110
5	Processes	150
6	Satisfaction of a buyer/user	150
7	Satisfaction of employees	90
8	Social influence	60
9	Business results	150
	Total	1000

Table 2. Model of the Oscar for quality award

Therefore, organizations tend to win presented points in the field of criteria represented in table 2, and thereby achieve business excellence. Figure 1 presents a starting form for AHP methodology and accompanying software, wherein a goal and criteria are defined for achievement of that goal. This form also includes alternatives (QMS principles in

this case). Grading of alternatives is done individually in relation to every criterion (criteria of business excellence) and they are especially graded in relation to the goal through points given in the model of the Oscar for quality. There is also some place left in the form for a textual description of a model's goal.

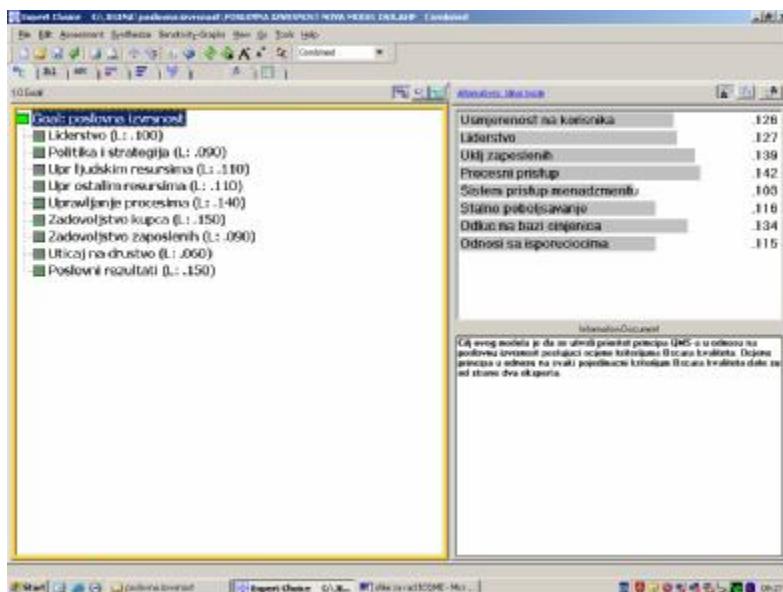


Figure 1. Starting form for definition of a goal and grading of criteria for goal achievement

Procedure of grading of problem hierarchy elements (goal, level of criterion – criteria of business excellence and one level of alternatives – QMS principles) relates to grading of elements in pairs that belong to the same level in relation to the element from the previous level. Grading for an actual problem wherein a three-layer hierarchy is present (goal, 1 level of criteria, 1 level of alternatives) was done top down, meaning grading of criterion in

relation to the goal first, and then in the next pass grading of alternatives in relation to every criterion individually. That is, the goal is on top and it is not being compared with any other element so comparison starts from the second level of hierarchy.

Comparisons in pairs are performed by grading according to Saaty scale given in Table 3, which is considered a standard in application

of AHP. Of course, grades (points) according to criteria of the Oscar for quality were

completely validated throughout procedure of first grading.

Scale of comparison (Saaty)	
$S=\left\{\frac{1}{9}, \frac{1}{8}, \frac{1}{7}, \frac{1}{6}, \frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, 1, 2, 3, 4, 5, 6, 7, 8, 9\right\}$	
1	Same significance
3	Weak dominance
5	Strong dominance
7	Very strong dominance
9	Absolute dominance
2,4,6,8	Inter-values used to represent a compromise between grades

Table 3. Saaty scale for comparison in pairs

Results of comparison for a level of criterion in relation to the goal-business

excellence were given in Figure 2.

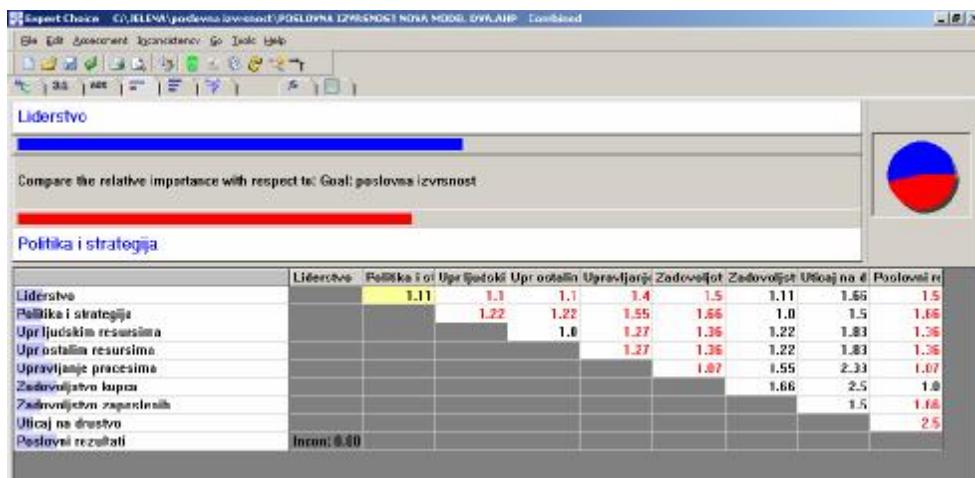


Figure 2. Results of comparison for a level of criterion in relation to the goal

Grading of alternatives in relation to individual criteria is not performed by mutual comparison but the use of so called Data Grid recommended for usage when there is a great number of elements from one level whose values vary according to some law (formula). Data Grid combines the strength of paired comparison with possibility of grading hundreds or even thousands of alternatives. Two experts performed grading of principles in

relation to criteria of business excellence independently according to their individually chosen scales (formulas). Table with results of grading of principles in relation to business excellence criteria is given in Figure 3; results were transferred from the previously presented Table 1. Same form is used for the grading of second expert.

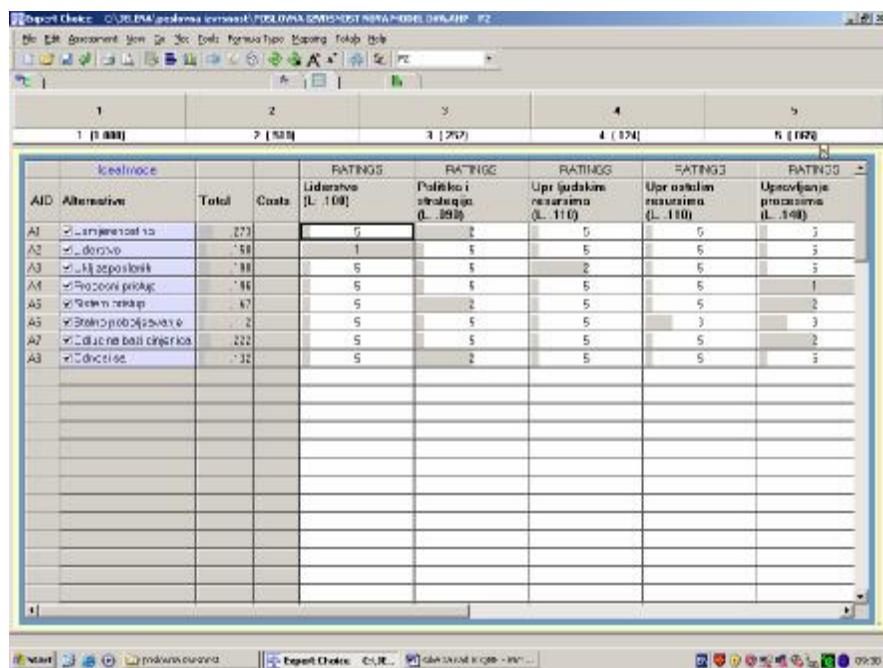


Figure 3. Results of grading by one expert

Last phase in AHP methodology is the synthesis of results, which implies final determination of priorities of alternatives in relation to positioned goal. It is also very important to determine a level of inconsistency of results that is automatically derived by this software package upon activation of synthesis.

Level of inconsistency (consistent -compliant, sustainable) according to this methodology should range between 0 and 0.1. Figure 4 presents synthesis of group decision-making results with final list of QMS principles' significance in relation to business excellence with a very good level of inconsistency.

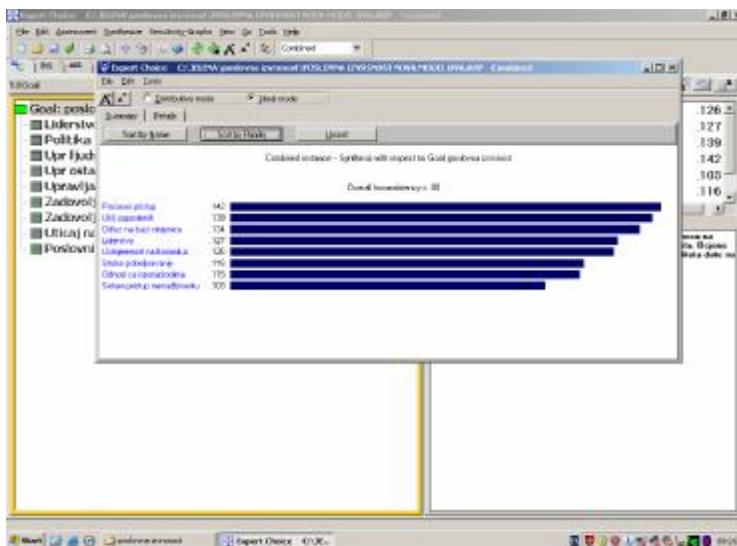


Figure 4. Synthesis of group decision-making results

Derived results of grading of business excellence criteria and QMS principles are graphically presented in Figure 5, and it also includes graphical interpretation of principles'

significance in relation to every criterion individually, derived by combination of both experts' results.

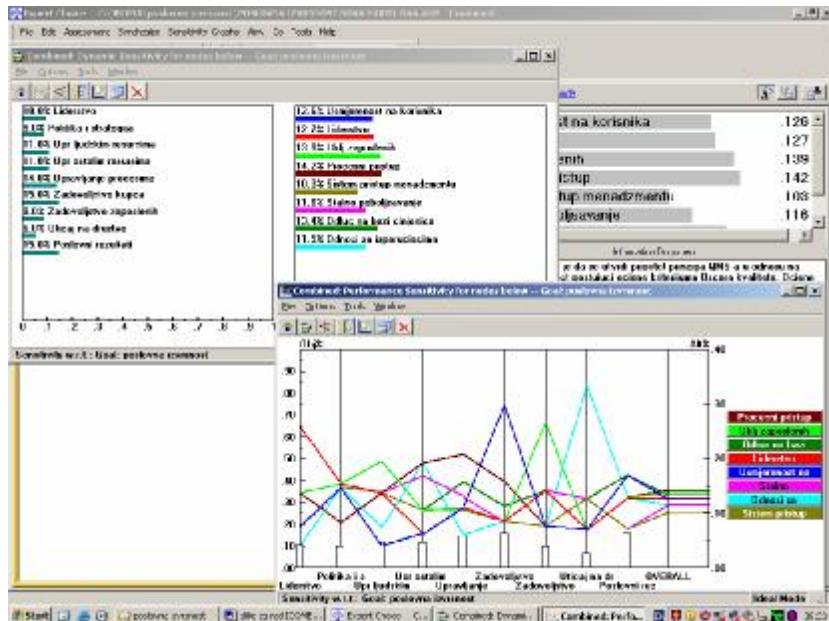


Figure 5. Graphical display of derived results

Layout of the quality management system principles and their belonging weight coefficients in terms of achieving the goal, i.e. business excellence can be observed from the Figure 4. It is obvious that the process approach is the most significant principle that has the biggest weight coefficient too and therefore the biggest influence in terms of achieving business excellence. Therefore, organizations that tend to achieve the excellence must give priority and to the biggest extent pay attention exactly to process modeling and elements comprised by the principle of process approach. That also means from the position of improvement in terms of preventive action, that organizations must give a priority and direct a preventive action with the strongest intensity to activities of process modeling and thus perform improvement, and thereby also the strongest influence or in other words a contribution in direction of achieving business excellence.

As a second by significance is a principle of involvement of employees, which together

with a principle of decision-making based on facts and a principle of process approach makes one group considering that difference between the weight coefficients is uniform and small. It can be noticed from a Figure 4 that histogram representation has a change in terms of continuity and that following two principles are observed with approximately same weight coefficients - leadership and user-related orientation. Then again two principles are separated, constant improvements and relations with supplier, and in the end, with a significant difference in comparison with others, a principle of systematic approach to management is isolated and it has a weight coefficient considerably smaller than previous ones in terms of numbers that prevail on the diagram from the Figure 4.

Now we can start an analysis in terms of criticism of principles with a view to achieve business excellence. If you apply Pareto method and rule 70/30 to the histogram layout, i.e. results from the Figure 4, »priority « or

»critical« principles in relation to achieving business excellence can be separated. Therefore, in this way we can find areas (principles) that must be affected by organizations in order to achieve business excellence. Through application of the Pareto method following group of principles is isolated:

- Process approach,
- Involvement of employees,
- Decision-making based on facts,
- Leadership and
- User-related orientation.

4. FINAL OBSERVATIONS

Improvement of business processes performances and organizational performances represent the constant tendency and, it could be said, the necessary concern of organizations that operate on contemporary business scene. That is the necessity that guarantees survival of organizations and, depending on intensity, even prestige on the market. On the other hand, standardization and tendency towards uniformity obliges organizations to implement standards even in management systems and thereby in the quality management system.

Besides opposite premises in terms of influence of quality management system on improvement of organizational performances, premises of positive influence and profit achievement that can be measured in financial indicators are dominant and accepted in this paper. Therefore, improvement in the part of QMS entails the improvement of organizational performances. As a significant element in current business conditions and ever-growing tendency of organizations to achieve a competitive advantage, there is an emerging approach of TQM as QMS followers in direction of achieving top organizational performances. Relationship between these two models is very poorly described and defined which is the good reason for initiation of research in that direction. Based on that fact, through analysis of literary sources, consultations with experts and expert analyses, in several iterations, correlation table of QMS principles and criteria of business excellence model was realized. Thereby conditions are created to enter AHP methodology and apply accompanying software for expert decision-making, determine individual weight

Therefore, that is the group of the most important principles in terms of achieving business excellence. Through improvement in these areas and achievement of top values organizations shall certainly realize the biggest part of improvement and create the most significant preconditions for achieving business excellence. Of course, that is only the necessary condition but other areas eliminated by Pareto approach must not be forgotten and top performances must be established there also. Certainly, five areas (principles) isolated by Pareto method are priority in terms of achieving business excellence.

coefficients of all QMS principles in direction of achieving business excellence. In that way areas with the biggest influence on achieving business excellence are identified by priorities.

Thereby points for improvement i.e. intensity of improvement with a purpose of achieving business excellence are identified by priorities. It can be concluded that organizations have to pay attention primarily on area of process approach and to preferably implement the biggest improvements in that part as to create significant preconditions for business excellence. Also, Pareto method selects a group of the five most significant or priority principles out of eight areas or principles. Organizations that realize improvements in those area and bring them to the level of excellence, realize the biggest part of improvement and create the excellent and key preconditions for achieving business excellence and achieving top organizational performances.

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