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Letter to Editor

SIGNIFICANCE OF BUSINESS QUALITY MANAGEMENT FOR INCREASING COMPETITIVENESS OF SERBIAN ECONOMY

Marija Andjelković Pešić^{*}, Vesna Janković Milić and Jelena Stanković

University of Niš, Faculty of Economics, Serbia

Trg Kralja Aleksandra Ujedinitelja 11, 18000 Niš, Serbia

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Abstract

This paper points out some challenges Serbian economy is facing at the beginning of the XXI century. Based on the fact that the quality, both in theory and practice, has been promoted as the most important dimension of competitiveness, improvement of quality stands out as the primary task of enterprises in Serbia. In the last part of the paper there are some results of the research, conducted with purpose of identifying opportunities for improving the quality of business in Serbian economy. The authors have been trying to establish the connection between Serbia's competitiveness rating according to research results of confidential institutions (World Bank's Report on Business, Global Competitiveness Report 2010-2011) and presence of quality management concepts and tools in business practice in Serbia. The intention of the authors is to present the research results and to indicate the possibilities for improving competitiveness of Serbian economy, primarily through implementation of modern management concepts and models. The one that is suggested in this paper is the Six Sigma concept.

Keywords: competitiveness, quality, statistic analysis, Six Sigma.

1. INTRODUCTION

Global competition and more demanding customers have been forcing enterprises to continuously improve the quality of

operations and business, generally. For this reason quality is indispensable issue of theory and practice at the beginning of XXI century. In this sense, the Crosby's saying "the quality is free", still has not lose its

^{*} *Corresponding author: marija.andjelkovic@eknfak.ni.ac.rs*

significance. However, due to the modern terms, it should be modified. It actually means that quality improvement should be promoted through the saying "quality is a cost effective", because quality improvement assumes certain investments and commitment, but the benefits and savings, which it provides, outweigh the investment.

Quality can be interpreted and explained in different ways. However, the fact is that the starting point for the definition of this term is collection of data about customers' demands, since they are crucial arbiters of quality assessment. If we have in mind the results of numerous studies, according to which quality means perfection, consistency, elimination of defects, and/or reduction of losses due to the elimination of defects, delivery speed, compatibility with standards, reliability, etc., it can be said that quality should be viewed in a broader sense, or not only as the quality of products and processes, but also as a quality business (Soin, 1992; Welch 1996; Kaplan & Norton, 2001; Brue, 2002).

Significance of quality, as the basis and the mean for providing competitive advantage, is pointed out by customers, since they prefer to express their needs and demand from the enterprises to keep their promises. In order to help enterprises to meet customers' demands in the efficient way, authors have been suggesting certain models and tools. The fact is that there is no one and only solution for all enterprises, neither is one model or tool sufficient for providing quality improvement and gaining competitiveness advantage due to that. However, managers have to use a various tools and to make their own combination of different models in order to adapt the conclusions of many authors to the specific context in which they operate.

2. QUALITY MANAGEMENT APPROACHES AND CONTRIBUTORS – THEORETICAL BACKGROUND

Quality has been present during the human development history, and its significance has not decreased yet. On the contrary, the last few decades can be considered as decades of quality and the science that is concerned with quality issues is accepted as quality management science. Pioneers in the development of the quality management science are Edwards Deming, Joseph Juran and Armand Feigenbaum. Although their first papers were published even in the first half of the twentieth century, they remained almost unknown for nearly two decades. The work of the mentioned authors was recognized in the late 1940's and since then has been embraced by Japanese businessmen. In 1947 Deming held the first lecture on quality control. The other famous scientist concerning quality management science development was Juran. He emphasized the importance of vertical management and technical methods. Except Deming and Juran, Feigenbaum has gained recognition due to his work in Japan. He is known for developing the approach of Total Quality Control – TQC (Feigenbaum, 1986).

The most famous among Japanese experts in the field of quality are Kaoru Ishikawa, Genichi Taguchi and Shigeo Shingo. They are responsible for the further development of Total Quality Control. Ishikawa argued that the implementation of quality control means the development, design, manufacture and service of quality products, which is the most economical, most useful way, and which always meets the needs of customers. Rounded Taguchi's philosophy refers primarily to the manufacturing process management. Shingo has developed a

method known as Poka-Yoke (error proofing) for such a production management in which, theoretically, errors and unnecessary costs cannot occur.

When Japanese enterprises, through their business results, have confirmed the importance of quality management, quality started to occupy the attention of American theoreticians and practitioners. According to Simon (Simon, 1991), business modelling system involves the definition of inputs, processes and outputs with feedback. In the context of quality management, this principle implies connection of process management and quality assurance processes (Foster, 2004). During the 1970s and 1980s, the greatest Philip Crosby and Claus Moller, through their research and analysis of research results, gave a great contribution to development of science of quality. Philip Crosby pointed out that quality is free because the costs of prevention will always be lower than the costs of identification and elimination of errors and mistakes that have already been made (Crosby, 1979). Claus Moller in his work has pointed out the quality of care for people. The foundation of learning of Claus Moller is the focus on the human factor. In this sense, he has formulated 12 principles (Laguna & Marklund, 2005) that may be useful in improving quality.

A significant contribution to development of science of quality in the last decade of twentieth century and at the beginning of the twentieth first century have given Bill Smith, Mikel Harry, Jack Welch, Peter Pande, George Michael. Bill Smith is known as founder of the Six Sigma concept at Motorola. He was inspired by many innovations and achievements in the field of quality production, all occurred continuously since the Great Depression in the 1930s.

Smith (Smith, 2001) pointed out that the enterprise, in order to eliminate variation and defects, has to establish a special infrastructure of people, expert in quality management. Mikel Harry (Phelps, Parayitam & Olson, 2007) studied the variations, while Jack Welch is known for advocating transformational leadership. According to him, "the organization's ability to continuously acquire new knowledge and it's rapidly translation it into action are the basic conditions for providing competitive advantage" (Welch, 1996).

To be able to "deal with" quality, especially in order to promote the same, managers must understand what quality means for the enterprise and its stakeholders, as well as what is its role in creating an effective organization. Although quality can be correlated with the efficiency, it primarily affects the effectiveness. In this sense, we can say that quality is the "right thing" which has its own market or the customers that are willing to pay for it. Increasing awareness of the importance of quality (Oakland, 2007) and defining quality from the perspective of each stakeholder is the primary problem concerned with the quality.

If the quality management is observed in its evolutionary way, one can identify four approaches to quality management:

- Approach based on the product - the quality will be provided if the characteristics or attributes of products have been identified; according to those characteristics and attributes, presence of quality is ascertain; this approach assumes quality control,

- Approach based on manufacturing - the quality will be provided if the product has all characteristics predicted by the engineers specifications; this approach corresponds to total quality control,

- Approach based on the product users - the quality will be provided if it fully meets the demands of customers or if it is "suitable for use"; this approach assumes total quality management,

- Approach based on values - the quality will be provided if the product meets customers' needs, and also has an acceptable price, or if the variability of the process in which the product is produced is controlled at an acceptable level of costs; this approach corresponds to Six Sigma quality management.

3. FACTORS AND IDEXES OF COMPETITIVENESS

In the new economic era business is extremely dynamic and, therefore, one of the key challenges for enterprises is to transform the organizational design into a modern, more flexible. Functional silos and the principle of "command and control" can significantly interfere with implementation of the strategy, so managers have to renounce those (Kaplan & Norton, 2001). On the other side, with process approach to management and employee empowerment, managers create conditions for understanding strategy and talking about strategy, and also for its successful implementation.

Accordingly, changes in way of formulation and implementation of strategy must be accompanied by changes in the way of measuring the success of its implementation. Not only financial criteria should be considered, but also other criteria should be noticed in long term and from all aspects (Salehi & Behzad, 2011). This means that, besides financial, managers need to use non-financial measures and criteria, which indicate the extent to which the enterprise

uses the intangible resources (Hanson & Erikson, 2002). Non-financial measures supplement the financial, as indicators of future financial picture of the enterprise.

Concerning both, financial and non-financial criteria and depending on what is the basis of competitive advantage, few dimensions of competitiveness can be identified, and they are (Chase, et al., 2004):

- Costs ("make it cheap"),
- Quality ("make it good"),
- Delivery speed ("make it fast"),
- Delivery reliability ("deliver when promised"),
- Volume flexibility ("change its volume"),
- Innovativeness ("change it").

These factors of competitiveness can be classified into three dimensions: costs (in terms of product price), quality and reliability (in terms of product functionality and continuous fulfilment of customers' requirements), time and flexibility (in the sense that the product is always available to customers and that is always delivered on time, or that new products and processes are introduced in time). According to Skinner (Rao et al., 1996), the dimensions of competitiveness are in the trade-off relationship, because it is not possible to simultaneously achieve high quality, low costs and on-time delivery of products. Guided by the above, in 1969 Skinner formulated the trade-off model. Unreasonableness of this model has been confirmed many times in the practice of successful enterprises. The best indication of the nonexistence of model based on the "trade-off" of the dimensions of competitiveness are the Japanese enterprises that have managed to provide the improvement in all three dimensions. Their production is characterized by low costs,

high quality, fast production and delivery.

A World Bank survey, presented in the Report on Business 2009 (www.doingbusiness.org), shows deterioration in business environment in the Serbian economy and 94 position in the ranking of 181 countries (91 position in 2007). Compared to the countries in the region, Serbia had better position than Croatia (106) and Bosnia and Herzegovina (119), and poorer than Hungary (41), Romania (47), Slovenia (54), Macedonia (71), Albania (86) and Montenegro (90). Comparative analysis of the dynamics and pace of improving performance indicators with countries in the region points to a slowdown of economic reforms in Serbia with all negative consequences on the overall competitiveness of the economy (www.doingbusiness.org).

In addition to the World Bank survey, it may be useful to realize the measures of competitiveness from the World Economic Forum. World Economic Forum measures competitiveness of national economies through Business Competitiveness Index (BCI), Growth Competitiveness Index (GCI), and Global Competitiveness Index. (Önsel et al., 2008) Business

Competitiveness Index has been introduced by Michael Porter, in 2000. This index is based on microeconomics variables. Growth Competitiveness Index was introduced by Sachs and McArthur, in 2001. It is based on a stronger academic fountain in economic growth theory. The index that was last mentioned is the latest compared to the previous two. Therefore it is logic to expect that it includes both macroeconomic and microeconomic factors of competitiveness.

Since 2005, the World Economic Forum has based its competitiveness analysis on the Global Competitiveness Index, because it is highly comprehensive index for measuring national competitiveness, since it captures the microeconomic and macroeconomic foundations of national competitiveness. This index is calculated as a weighted average of many different components, each measuring a different aspect of competitiveness and ranking on the scale from 1 to 7. These components are grouped into 12 pillars of economic competitiveness: institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labour market efficiency, financial market development, technological readiness, market size, business sophistication and innovation.

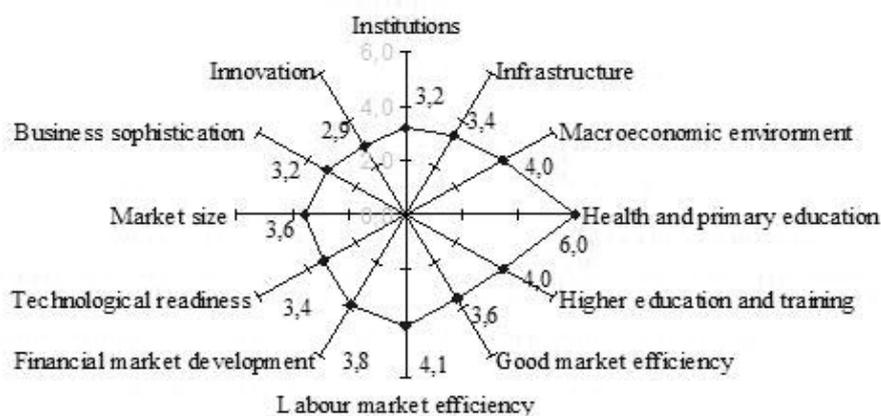


Figure 1. Scores of 12 pillars for Serbia

Source: WEF_GlobalCompetitivenessReport_2010-11 and 2009-2010

readiness, market size, business sophistication and innovation (Schwab, 2010). Scores for these components for Serbia are given in the Figure 1.

According to Global Competitiveness Report 2010-2011, at the top of the list is Switzerland with GCI score of 5.63. Results for Serbia and countries from the region are given in the following table (table 1).

The average GCI score for these countries is 4.08, which is quite low compared to the country which is leader, but still not so bad. However, as it is the case with any kind of average, in this case also, GCI values for

countries as individuals express positive, on one side, and negative variations, on the other side. Variations for a certain countries are presented in Figure 2.

The Report on Business from 2009 (World Bank survey) and Global Competitiveness Report for 2010-2011, unfortunately show the same fact – deterioration of Serbian economy competitiveness. According to the Report on Business (www.doingbusiness.org), Serbia's ranking has decrease from 91 (in 2007) to 94 (in 2009). Also, according to Global Competitiveness Report 2010-2011, Serbia's

Table 1. Rank and GCI value

| Country | 2010-2011 | | 2009-2010 | | Change | |
|------------------------|-----------|-------|-----------|-------|--------|--------|
| | Rank | Score | Rank | Score | Rank | Score |
| Serbia | 96 | 3.84 | 93 | 3.77 | -3 | + 1.8% |
| Croatia | 77 | 4.04 | 72 | 4.03 | -5 | +0.2% |
| Montenegro | 49 | 4.36 | 62 | 4.16 | +13 | +4.8% |
| Bosnia and Herzegovina | 102 | 3.70 | 109 | 3.53 | +7 | +4.8% |
| Macedonia | 79 | 4.02 | 84 | 3.95 | +5 | +1.7% |
| Albania | 88 | 3.94 | 96 | 3.72 | +8 | +5.9% |
| Hungary | 52 | 4.33 | 58 | 4.22 | +6 | +2.6% |
| Romania | 67 | 4.16 | 64 | 4.11 | -3 | +1.2% |
| Slovenia | 45 | 4.42 | 37 | 4.55 | -8 | -2.8% |
| Greece | 83 | 3.99 | 71 | 4.04 | -8 | -1.2% |
| Bulgaria | 71 | 4.13 | 76 | 4.02 | +5 | +2.7% |

Source: WEF_GlobalCompetitivenessReport_2010-11 and 2009-2010

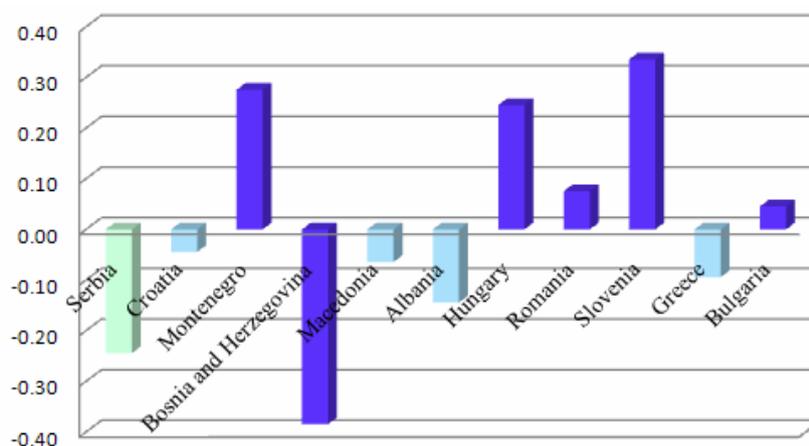


Figure 2. Individual variations from the average GCI in 2010-2011

Source: WEF_GlobalCompetitivenessReport_2010-11 and 2009-2010

competitiveness has decreased from 93 (in 2010) to 96 (in 2011) place. These facts must be a warning for creators of Serbian economic policy and the basis for improvement of conditions for doing business in Serbia.

4. QUALITY AS A FACTOR OF COMPETITIVENESS AND BUSINESS RESULTS

One of the conditions for successful Serbia's EU accession and efficient performance in the international market certainly is higher level of competitiveness of Serbian products. However, products of Serbian enterprises are generally not competitive, when it is about price, and quality, as well. The competitiveness of Serbian enterprises is mainly based on export of cooperative services (outsourcing), with the usage of imported technology (licensing, joint ventures). Therefore, the model of industrial growth for period 2011-2020 assumes (www.ntp.rs):

- Dynamical growth of investments,
- Export rate growth,

- Industrial employment growth.

One of the ways for achieving these goals is to increase the level of production quality, and the quality of business in general. Namely, higher quality of realization of activities and processes leads to reduction of variability and defects, and to increase of finished products' quality while provides savings and cost reductions. Also, the effort for improvement of quality results in increase in higher productivity, satisfaction and loyalty of customers, competitive advantage, market share growth and, finally, leads to increase of financial results. The impact of quality improvement, therefore, can be viewed internally and externally. Internally, high quality means higher productivity, which, consequently, allows lower prices and higher competitiveness, market share and profits. On the other hand, high quality, in terms of reducing of variations and defects, and therefore reducing of costs and increasing value added, also provides a positive effect on financial results (Soin, 1992). From an external point of view, higher quality means increased customer satisfaction, creating a good reputation of the enterprise and

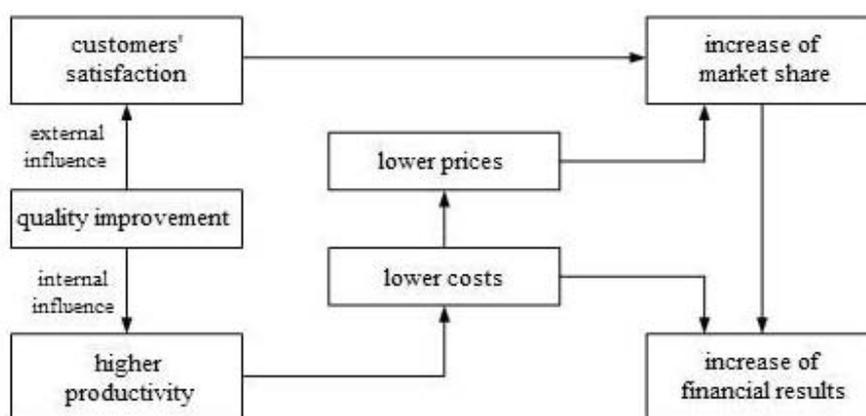


Figure 3. Influence of quality improvement on financial result of an enterprise

increasing the number of loyal customers (Figure 3).

Development of new manufacturing and information technologies allows flexible and diversified production directed towards satisfaction of the sophisticated demands of customers (Dedhia, 1995). In fact, today customers are more informed and educated, and, due to that, more and more demanding when it comes to features, speed of delivery and price of the products. For this reason, product quality must be defined by customers. The image of the enterprise has an important role when customers make the decision concerning choice of producer, and one of the most important factor that influence image of enterprises is tested and certified quality of products.

In order to deliver quality to customers, it must be required from the suppliers. This implies the establishment of cooperative relationships with suppliers and in some cases the long-term partnership. In the new economy, knowledge economy, the role of employees who are not on managerial positions has been changing. They are people who can help managers to solve the problems, and not "variable" costs. Therefore in addition to cooperation with customers and suppliers, it is necessary to establish cooperation between employees in order to ensure their commitment.

Despite the fact that economic reforms in Serbia deemed to be "slowed", the enterprises themselves must strive to ensure the improvement of their operations and business performances (Evans et al., 2004), particularly in terms of quality and productivity improvement. According to the Republic Development Bureau, index of productivity in industry decreased in 2009 compared to 2008 year (www.odrzivirazvoj.gov.rs). In order to check the extent to

which Serbian enterprises follow the trends in business improvement, and if they are on track to increase quality and productivity and to contribute to the improvement of competitive position of the Serbian economy, empirical research was conducted. This research shows "as-is" state of the Serbian economy, according to which it is possible to formulate recommendations for transferring into "to-be" state, as desirable state for Serbian economy.

5. METHODOLOGICAL FRAMEWORK OF RESEARCH

Modern management theory suggests many new or renewed concepts, models and techniques, whose application can help managers to provide or sustain competitiveness of enterprises in the crisis conditions. The key question that concerns competitiveness in crisis conditions is if managers are willing to accept these concepts, models and techniques, concerning that their application demands certain abdication in terms of time and money. The assumption of the research this paper is based on is formulated as it follows: The implementation and continual application of quality management concepts, models and techniques has positive influence on business performances and competitiveness of enterprise, and therefore on business results. The research was composed in the following way:

1. Questionnaire formulation,
2. Sampling (choosing the enterprises that will form the sample),
3. Collection of data (through survey of Serbian enterprises' managers),
4. Analysis of collected data, graphical

and statistical presentation of the research results, and finally,

5. Making conclusions and formulating suggestions for managers of Serbian enterprises with the purpose of diminishing expected negative effects of economic crisis.

The questionnaire has two parts. The first one has comprised the basic questions concerning enterprise size, capital origin, industry, as well as the amount of profit (loss). When the collection of data has been repeated this year, the first part of the questionnaire was supplemented with few more questions concerning the most used business performance (including financial) indicators and those indicators' level compared to the state in 2007 (in terms of increase or decrease in percentages).

The second part has comprised questions concerning the implementation of modern management concepts, models, techniques, and methods. The intention was to evaluate if managers are familiar with the tools of modern strategic and quality management. The accent was on the Balanced Scorecard and Performance Prism, precisely on implementation of the principles and philosophy that these tools promote. Concerning quality management, the focus was on Total Quality Management and other modern versions (like Six Sigma). One of the respondents' tasks was to evaluate the influence of certain ways (through price, quality, service or promotion) for providing competitiveness advantage to customers' satisfaction. The second group of questions was related to process capability measures, including statistical process control (Mishra & Dangayach, 2009). Finally, it quality is observed as a characteristic of business, and not only of product or service, the last question refers to evaluation of factors affecting business quality. The questionnaire

form used for this investigation is presented in appendix 1.

The data collected during the survey were crossbreed and combined by certain statistical software. The graphical presentation of results has provided clarity of information and facilitated making conclusions in the economic way. Based on the information provided after data analysis, authors have formulated conclusions. Those conclusions show how close or far practice in Serbian enterprise is from the modern management theory or in what extent modern concepts, models, methods and techniques have been implemented so far. Conclusions based on the research results represent the basis for formulating recommendations for managers in Serbian enterprises with purpose to provide the best possible performances in the crisis conditions. The following subtitle shows the results of analysis of certain questions, which concern quality models and tools implementation in enterprises in Serbia.

6. THE RESEARCH RESULTS ON IMPLEMENTATION OF QUALITY MODELS AND TOOLS IN SERBIAN ECONOMY

The task of the research was to determine whether the enterprises in Serbia are familiar with modern concepts and models of business management, particularly quality management, and whether they have been trying to convey positive experiences of enterprises in developed countries. Another task of the research was to evaluate the level of quality presence in Serbian economy or, in the other words, to determine which of the mentioned approaches is represented in

enterprises in Serbia. These tasks were carried out in order to point out the possibilities for improving of the competitiveness of the Serbian economy. The survey was conducted in two stages: during July and August 2009 year and during May and June 2011 year. The first time the sample was randomly selected from the group of enterprises from the Republic of Serbia, and it included 60 enterprises. These enterprises were randomly selected due to the hypothesis that quality and business excellence is not something that Serbian economy can proud of. Therefore the sample was not limited to one or few branches of industry, which means that the population was Serbian economy, as a whole. In order to increase the relevance of the research, the choice of enterprises in the sample was done by using stratification. All enterprises were divided into three groups: small, medium and large. The sample was constructed proportionally to the number of employees in these enterprises. In addition, the criterion for stratification was the number of employees, because the assumption was that all employees must be involved in quality improvement and business in general, and that all employees are agents of change. Repeated survey, conducted during 2011,

was carried out on the same sample, to ensure the relevance of the data and the reality of making conclusions.

When it is about concepts primarily aimed to improvement of production quality, research results in 2009 showed the following state:

- Just-In-Time (JIT) concept was implemented in only 15% of the enterprises in the sample,
- Total Quality Management (TQM) in 31.6%, while
- Six Sigma was present in only 3.3% of the enterprises in the sample (Figure 4a).

Sertainly, it should be noted that a significant number of managers did not actually understand the meaning of mentioned concepts, and some of them, who neglected their application, changed their minds after the explanation of these concepts' essence. Therefore, it may be concluded that in certain number of enterprises mentioned concepts have not been implemented formally, but rather just some of their principles and ideas. According to the survey repeated in 2011, the situation has not changed significantly (Figure 4b)). The only difference is slightly larger share of TQM presence (35%).

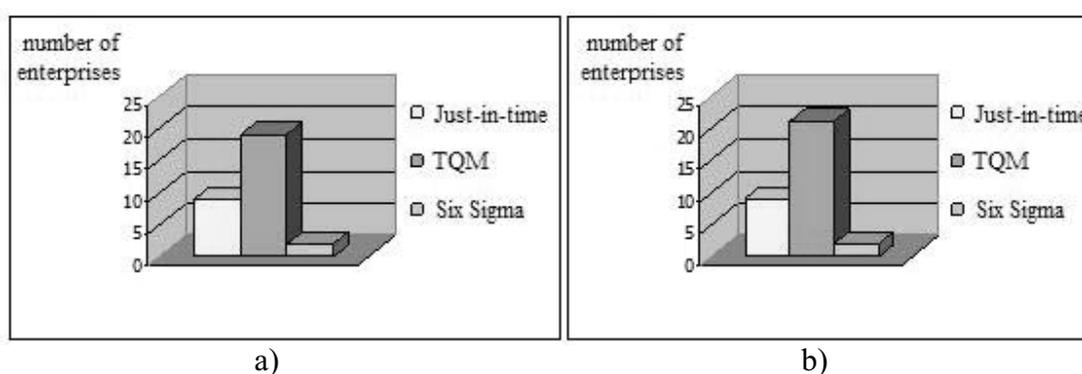


Figure 4. The presence of the quality management concepts

a) Research conducted in 2009.

b) Research conducted in 2011.

Although according to the representation of the quality improvement concepts (JIT, TQM, Six Sigma) could be concluded that enterprises in Serbia do not attach sufficient importance to quality, as the dimension of competitive advantage, the answers related to the impact of assessment of certain ways of providing competitive advantage (price, quality, service, promotion) on the orientation of customers (in terms of selection of products of specific enterprise) lead to the opposite conclusion (question number 2 in the questionnaire). Given that in the research have been used a qualitative attributes (how managers find out ways for providing competitive advantage), for their measurement rating scale was used. In this specific case rating scale with five points was applied, in order to express the influence of ways for providing competitive advantage to customers choice numerically (huge impact - 5, a major impact - 4, moderate impact - 3, low impact - 2, a negligible impact - 1), as well as to provided more detailed analysis. According to the survey in 2009, the highest average rating received the quality (4.56), as determinant of competitiveness (Table 2). Also, the standard deviation for quality was the lowest (0.51), which means that the opinions of managers on impact of quality on improving the competitiveness are similar, and that the quality is considered the most influential for customers' choice. Also, great impact on

customers' choice has service, while price and promotion, as a means for providing competitive advantage are found to be less important for the customers from managers' point of view. Research results from 2011 confirmed that the quality in the enterprises in Serbia is considered the best way to improve competitiveness, because again the average score for quality was highest (4.38). These results indicate that managers of enterprises in Serbia do realize the importance of quality as a dimension of competitiveness, but (if we take into account the results concerning the representation of concepts for quality improvement) they do not behave in accordance with their beliefs.

An important instrument for improving processes quality and, consequently, product quality, is statistical process control (Montgomery, 1991). An effective organization knows that if they don't have enough information about process, product or service, they can't control that part (Velimirović, Velimirović, Stanković, 2011, 65). However, the research results show that quality control is still observed primarily in terms of finished products. In this sense, quality control of final products is present in all enterprises in the sample (Figure 5a)). Also, in more than half of the enterprises in the sample there is control of unfinished products and operations (65% for both types of control according to a survey from 2009, and 68% for the control of the unfinished product, and 60% for the control of individual operations according to a survey from 2011). When it comes to control of production quality, according to research results statistical process control is still not sufficiently present (23% according to a survey from 2009 and 32% according to a survey from 2011). On the other hand, the results of iSixSigma Magazine, at the level

Table 2. Evaluation of elements of competitiveness influence on customers' choice

| Elements | Average 2009 | St. dev. 2009 | Average 2011 | St. dev. 2011 |
|-----------|--------------|---------------|--------------|---------------|
| Price | 3.95 | 0.98 | 3.73 | 1.10 |
| Quality | 4.56 | 0.51 | 4.38 | 0.69 |
| Services | 4.12 | 0.74 | 4.08 | 0.85 |
| Promotion | 3.22 | 1.06 | 3.32 | 1.13 |

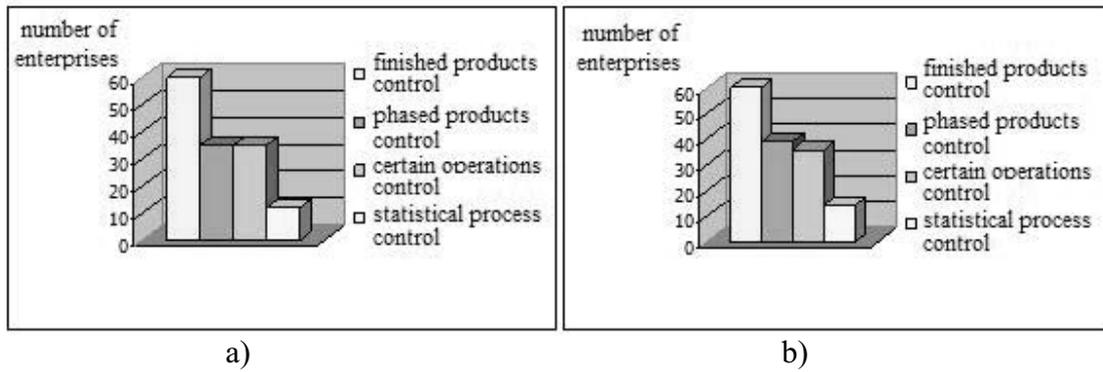


Figure 5. The presence of certain quality control forms
 a) Research conducted in 2009.

b) Research conducted in 2011.

of the world economy, shows that statistical process control is presented in about 80% of the enterprises. These data indicate a significant lag of the Serbian economy in comparison with the world, although, according to the latest research, some progress can be noted (Figure 5b). If the trend of increasing the presence of statistical process control continues, the positive trend for enterprises in Serbia in terms of their competitiveness may be expected.

Considering that statistical process control itself includes a number of instruments, the research included a question concerning the presence of these instruments. When statistical process control

is seen in this way, one can conclude that many enterprises apply certain instruments of statistical process control. For example, a flow chart is represented in 28 enterprises in the sample according to the survey from 2009 and in 46 enterprises in the sample according to the survey from 2011. According to the research results it can be said that "cause-and-effect" diagram application also has positive trend (24 enterprises in 2009 and 32 enterprises according to a survey from 2011). However, when it is about regression analysis, significance testing, control charts and Pareto diagram situation is not quite satisfactory. According to the research in

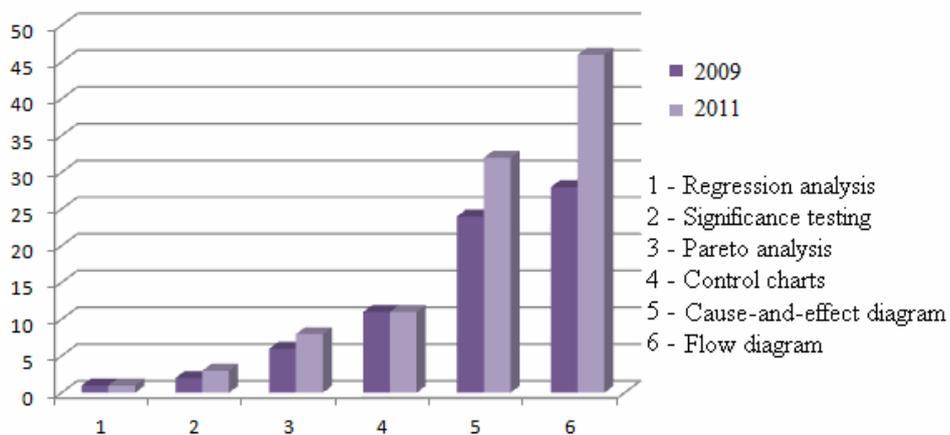


Figure 6. Representation of statistical process control tools

both survey years, these instruments have been applied in less than 20% of enterprises.

Bearing in mind that parallel with the improvement of quality of processes, managers have to ensure improvement of quality of management, in addition to questions relating to concepts and tools for process quality improvement, the questionnaire included the issues related to the representation of models for the formulation and implementation of business strategy, as well as issues related to the

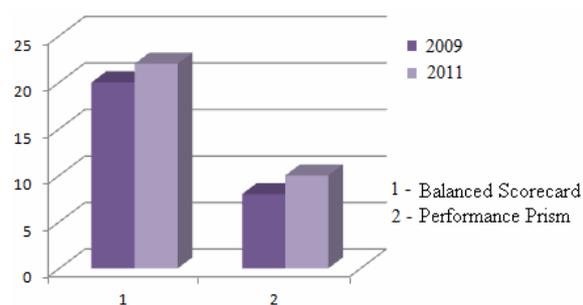


Figure 7. Relative participation of enterprises that have implemented modern management concepts

factors of enterprises' quality management.

According to the research conducted in 2009, the models for the formulation and implementation of business strategy (such as the Balanced Scorecard and Performance Prism) were implemented in only 28% of the enterprises in the sample. Specifically, enterprises that have implemented the Balanced Scorecard model represent 20%, while the enterprises that have implemented the Performance Prism model represent only 8% of enterprises in the sample. The latest study, from 2011, confirmed the findings from 2009 (Balanced Scorecard 22%, Performance prism 10%), which means that managers of enterprises in Serbia have not yet understood the importance of modern management methods and concepts.

Although the connection between the application of these or other methods and concepts of management and competitive advantages is not explicit, it certainly exists. Specifically, Balanced Scorecard and Performance Prism facilitates managers to

Table 3. The rating of the factors influencing business quality

| Mark | Dimensions of business quality | 2009 | 2011 | change |
|------|--|------|------|--------|
| D1 | Quality of business depends on amount of costs | 3.86 | 3.73 | -3.37% |
| D2 | Quality of business depends on the structure of costs | 3.75 | 3.72 | -0.80% |
| D3 | Quality of business depends on the quality of product (service) | 4.38 | 4.45 | 1.60% |
| D4 | Quality of business depends on the quality of business processes | 4.16 | 4.32 | 3.85% |
| D5 | Quality of business depends on creativity and innovativeness | 3.82 | 3.93 | 2.88% |
| D6 | Quality of business depends on the speed of process realization | 4.00 | 4.05 | 1.25% |
| D7 | Quality of business depends on the product delivery speed | 4.25 | 4.32 | 1.65% |
| D8 | Quality of business depends on the relationship with customers | 4.18 | 4.30 | 2.87% |
| D9 | Quality of business depends on the relationship with suppliers | 4.06 | 4.03 | -0.74% |
| D10 | Quality of business depends on the employees' competitiveness | 4.59 | 4.48 | -2.40% |
| D11 | Quality of business depends on the employees' improvement | 4.15 | 4.27 | 2.89% |
| D12 | Quality of business depends on the business culture | 4.13 | 4.27 | 3.39% |

easily identify the connection between daily operations and ways of realization of business processes and to ensure customer satisfaction (and the other stakeholders), and provide competitive advantage.

When it is about factors of business quality, respondents were offered the 12 dimensions presented in Table 3. The obtained scores based on employees' ratings in 2009 and 2011 are presented in same table.

In favour of the previously mentioned findings, these results also show that managers are aware of the importance of product and processes quality, but that their efforts to improve these aspects of the business are insufficient. Factor analysis is a generic term for a family of statistical techniques concerned with the reduction of a set of observable variables in terms of a small number of latent factors. (Chandrasekaran, Natarajan, Sivasundaram, 2010, 31). Factor analysis is a multivariate

Table 4. KMO and Bartlett's Test

| | | |
|---|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | | .832 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 409.374 |
| | df | 66 |
| | Sig. | .000 |

method used for data reduction purposes. The basic idea is to represent correlated variables (dimensions of business quality in this case) by a smaller set of "derived" variables, which are called factors. These factors can be thought of as underlying constructs that cannot be measured by a single variable (www.mlsc.lboro.ac.uk).

Testing the feasibility of factor analysis application is performed by Bartlett's test and Kaiser-Meyer-Olkin (KMO) statistics. Bartlett's test, based on χ^2 distribution, is used to test the hypothesis that there is no

Table 5. Total Variance Explained

| Component | Initial Eigenvalues | | |
|-----------|---------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % |
| 1 | 6.043 | 50.356 | 50.356 |
| 2 | 1.498 | 12.482 | 62.838 |
| 3 | .990 | 8.246 | 71.084 |
| 4 | .626 | 5.220 | 76.304 |
| 5 | .579 | 4.823 | 81.127 |
| 6 | .539 | 4.491 | 85.618 |
| 7 | .446 | 3.717 | 89.335 |
| 8 | .386 | 3.217 | 92.552 |
| 9 | .340 | 2.836 | 95.388 |
| 10 | .254 | 2.119 | 97.507 |
| 11 | .198 | 1.651 | 99.158 |
| 12 | .101 | .842 | 100.000 |

significant correlation between the original variables. The table that follows (Table 4) shows the results of this test (p-value=0.000), which show that null hypothesis is rejected. This means that there is significant correlation between original variables (D1, D2... D12). The rule of KMO statistics says that if its' value exceeds 0.5, the application of factor analysis is recommended.

As a criterion for factors allocation in SPSS software (SPSS 14.0 for Windows, By: SPSS Inc.) characteristic value is used and the critical value of this criterion is one. In this case the first two factors have characteristics value greater than 1, and the percentage of explained variance with these two factors is 62.84%.

After the rotation of factors, factor matrix was obtained. In this matrix high values of factor loadings (associated with only a small number of variables) can be clearly separated for each factor (Table 6).

High factor loadings for the first ten variables correspond to the first factor, while high factor loadings for the last two variables correspond to the second factor. Squares of these factor loadings represent the

proportions of variance of certain variables, which are attributed to the effects of a given factor. Therefore, considering the data in Table 6, for these factors proportion of variance is calculated as it follows:

$$\begin{aligned} D1: (0,862)^2 &= 0.743 = 74.3\% \\ D2: (0,815)^2 &= 0.6642 = 66.42\% \\ D3: (0,807)^2 &= 0.6512 = 65.12\% \\ &\cdot \\ &\cdot \\ &\cdot \\ D11: (0,870)^2 &= 0.7569 = 75.69\% \\ D12: (0,851)^2 &= 0.7242 = 72.42\% \end{aligned}$$

This means that the first factor explains 74.3% of variance of variable D1, 66.42% of variance of variable D2, 65.12% of variance of variable D3, and so on. The second factor explains 75.69% of variance of variable D11, and 72.42% of variance of variable D12. These two factors may be observed as new variables, which can be used in further

analysis. Based on results presented above, these two factors can be interpreted in the following way:

- The first factor, considering variables that it explains, can be defined as non-price factor,
- The second factor, considering variables that it explains, can be defined as price factor.

7. THE SIX SIGMA CONCEPT – RECOMMENDATION FOR SERBIAN ENTERPRISES

Considering the research results, it can be said that managers in Serbia are aware of necessity of business quality management. They recognize the difference between quality management and business quality management. However, unfortunately, the same research results show that the contemporary quality management concepts

Table 6. Rotated Component Matrix

| Mark | Business quality dimensions | Component | |
|------|---|-----------|------|
| | | 1 | 2 |
| D1 | Quality of business depends on the employees' improvement | .862 | .202 |
| D2 | Quality of business depends on the employees' competence | .815 | |
| D3 | Quality of business depends on the product delivery speed | .807 | .106 |
| D4 | Quality of business depends on the business culture | .794 | |
| D5 | Quality of business depends on the relationship with suppliers | .780 | .363 |
| D6 | Quality of business depends on business process quality | .757 | |
| D7 | Quality of business depends on the relationship with customers | .661 | .390 |
| D8 | Quality of business depends on creativity and innovativeness | .620 | .357 |
| D9 | Quality of business depends on the process realization speed | .575 | .472 |
| D10 | Quality of business depends on the quality of product (service) | .496 | .227 |
| D11 | Quality of business depends on the amount of costs | | .870 |
| D12 | Quality of business depends on the structure of costs | .180 | .851 |

and tools are not applied in sufficient number of enterprises in order to provide critical mass of enterprises to provide effect at the Serbian economy level. In order to increase the number of enterprises in which managers, but the other employees too, think and act in a way which provides performances improvement and competitiveness rising, the implementation of the Six Sigma concept is recommended.

Despite its name, Six Sigma is not a statistical tool that is used for decades, but the business concept for improvement of the business quality. The Six Sigma concept involves a continuous process improvement, incremental improvement or "kaizen" (Japanese term for continuous improvement), where the improvement process is directed towards correcting of the existing processes, focusing on key factors that determine the results of the process. It incorporates a methodology for implementation of improvement projects. Though authors usually speak about incremental improvements, improvement projects can be directed to the introduction of

radical changes, too. Due to its characteristics, Six Sigma may be interesting, usable concept for the enterprises in Serbia, in the sense of their improvement and facilitated inclusion in global market.

The Six Sigma concept implementation includes five phases, known as DMAIC process that must be always present in business, and must be continuously enforced. The first phase of this process is the define phase and it includes defining customers' requirements, key process for their fulfilment and performance standards. After defining, the next phase is measure, in which managers have to establish a system of measures and to evaluate the performance of key processes and activities. Information obtained by measurement become subject of analysis, the phase during which managers have to identify potential areas for improvement. Implementation of the improvement must be evaluated and controlled, so therefore the control represents the last phase of the DMAIC process.

The path from the initiative for the

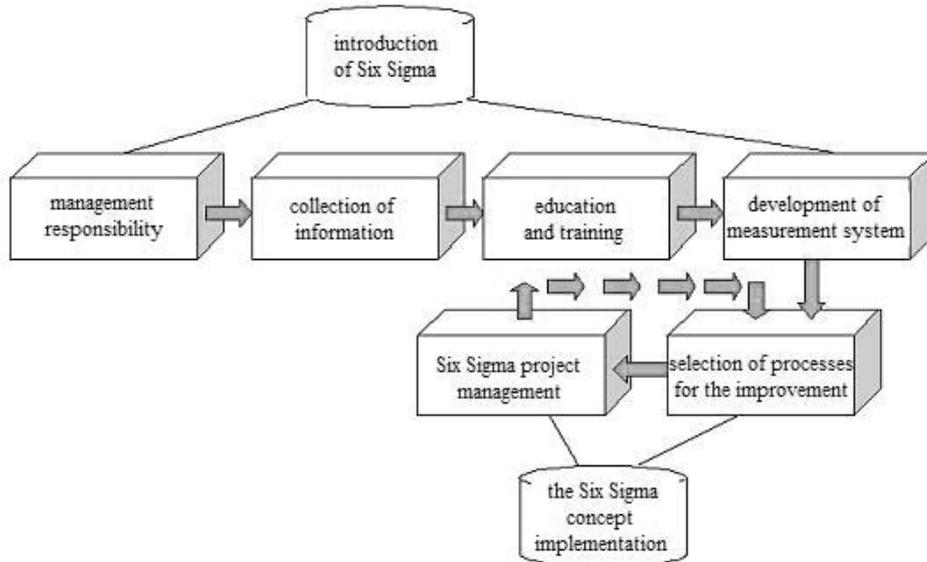


Figure 8. The Six Sigma concept: from the initiative to implementation

establishment of the Six Sigma concept, till the appearance of effects of the implementation is not easy, but is recommended if the enterprise wants to provide or increase competitive advantage (Figure 8). In order to spread the business principles on which this concept rests, through the enterprise, managers have to ensure the acceptance of the same by the other employees (except managers). To implement this concept successfully, the continuous collection of information, education and training of employees, as well as establishing a system of measurement is necessary. All mentioned is in function of selection of the processes (www.isixsigma.com), which should enhance or is in the function of successful project management. Such "behaviour" of the enterprise is an important condition for achieving competitive advantage in the new economy.

In order to avoid the confusion and ensure uniformity of performance measurement for activities and processes, this concept recommends a measure known as sigma quality level, which is based on the standard deviation. The Six Sigma concept promotes this measure of quality, because it assumes that the enterprise should change its attitude about quality, since it is no longer acceptable to express defects in percentages. However, enterprises, which from the Six Sigma concept accept only sigma level, as measure of quality, in order to control variations and defects, do not have many chances for success. Successful enterprises are the ones that, apart from the quality measures, adopt the Six Sigma as a business philosophy and strategy. The Six Sigma concept is based on Deming's idea of "striving for continuous improvement" and Taguchi's view according to which "any deviation from the target value

causes an increase in costs". The pursuit of the Six Sigma concept is to reduce variation, because decrease of variation causes increase of productivity, measured either as the amount of output per unit of input, or as the amount of output per unit of time, and therefore it is recommended for the Serbian enterprises with purpose of competitiveness improvement.

8. CONCLUSION

Based on the results of the research conducted twice, in 2009 and in 2011 year, when it is about considering quality and quality improvement as factors of competitiveness it can be said that there is positive tendency, but not enough (which is confirmed by official reports of the Republic Institute for Development). It can be concluded that managers are aware of the importance of the process approach and the process quality improvement, but the usage of tools and instruments that can contribute to discovering the opportunities for quality improvement is not sufficient. In addition, a significant problem is the fact that the introduction of modern concepts and methods for quality management is characteristic for higher management levels. Managers must understand that at the operational level there are significant opportunities for providing savings and improving of competitiveness. For this reason, it is considered that training for managers and other employees for implementation of measures and instruments for analysis with purpose to identify possible causes of problems is necessary. Taking concrete steps to improve the quality (primarily in terms of application of modern concepts and tools) will greatly facilitate the

Serbian enterprises' struggle with the competition in the domestic market, the appearance to the European and world market, and establishment of partnerships or other forms of cooperation with enterprises from developed countries.

The question managers often ask themselves in new economy is: how to become and remain competitive in the global marketplace? Considering the complexity of production systems and the lack of simple solutions to numerous problems, the answer to this question is not easy to give. However, enterprises must choose which of the available concepts, methods and models will use in order to define their own solutions to

increase competitiveness. Regardless of which model they choose, enterprises must meet customers' requirements concerning quality, price (cost), speed of delivery and flexibility.

If the enterprise wants to be in a group of successful ones, it has to generate money - achieve positive financial results, constantly, day after day, but at the same time, it has to build and develop businesses, which will ensure that the achieved results will maintain in the long run. The Six Sigma concept should help managers in resolving the paradox that assumes providing the short-term financial results through improvement projects, and, at the same time, development

ЗНАЧАЈ УПРАВЉАЊА КВАЛИТЕТОМ ПОСЛОВАЊА ЗА ПОВЕЋЕЊЕ КОНКУРЕНТНОСТИ ПРИВРЕДЕ СРБИЈЕ

Марија Анђелковић Пешић, Весна Јанковић Милић и Јелена Станковић

Универзитет у Нишу, Економски факултет, Србија

Извод

Овај рад указује на неке изазове са којима се суочава привреда Србије на почетку XXI века. Полазећи од тога да је квалитет, како у теорији, тако и у пракси, промовисан као најзначајнија димензија конкурентности, унапређење квалитета представља примарни задатак предузећа у Србији. У последњем делу рада приказани су неки резултати истраживања спроведеног са циљем идентификовања могућности за унапређење квалитета пословања у Србији. Аутори настоје да успоставе везу између конкурентности Србије према резултатима истраживања институција од поверења (Извештај Светске банке о пословању, Извештај о глобалној конкурентности 2010-2011) и заступљености концепата и алата за управљање квалитетом у пословној пракси у Србији. Намера аутора јесте да прикажу резултате истраживања и да укажу на могућности за унапређење конкурентности привреде Србије, превасходно преко имплементације савремених управљачких концепата и модела. Један од њих, чију имплементацију аутори сугеришу, јесте концепт Six Sigma.

Кључне речи: конкурентност, квалитет, статистичка анализа, Six Sigma.

capacity for the future, through investment in human capital and key processes.

According to factor analysis results, there are two groups of factor that can be identified. The first one considers non-price factors, while the second considers price factors. This classification indicates that Serbian economy does not have an integrated view of dimensions of business quality or that some of enterprises use non-prices dimensions for gaining competitive advantage, while the other use price dimensions for the same purpose. In order to provide sustainable competitive advantage, both groups of enterprises have to understand the significance of all dimensions of business quality and the necessity of providing their optimal combination. Also, this classification of factors may be considered as an indicator for a questionnaire structuring for further research, meaning that the questionnaire which will be used for future research may have the questions belonging to these two groups clearly separated.

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Appendix 1: Questionnaire for managers

Part I

1. Name of the enterprise: _____
2. City: _____
3. Industry: _____
4. Ownership: _____
5. Origin of the capital:
 - a. The most of it comes from the Serbia
 - b. The most of it comes from abroad
6. Function of the surveyed manager: _____
7. Number of employees:
 - a. Less than 50
 - b. 51 – 250
 - c. Over 250

Part II

1. Have you adopted the principles of some modern concepts:
 - a. Just-In-Time
 - b. Total Quality Management (including statistical quality control and its tools)
 - c. Six Sigma

2. Evaluate the influence of the proposed ways for providing competitiveness advantage to customers' satisfaction (the lowest mark or negligible impact = 1, the highest mark or very large impact = 5):
 - a. price..... 1 2 3 4 5
 - b. quality 1 2 3 4 5
 - c. service 1 2 3 4 5
 - d. promotion..... 1 2 3 4 5

3. How do you provide wanted quality of products (services):
 - a. Control of finished products (services)
 - b. Control of phased products
 - c. Control of certain operations
 - d. Statistical process control

4. Is the quality improvement based on application of some instruments, like:
 - a. Cause-and-effect diagram
 - b. Flow diagram
 - c. Pareto diagram
 - d. Control charts
 - e. Significance testing
 - f. Regression analysis

5. Do you use some of the models for strategy formulation and implementation:
 - a. Balanced Scorecard
 - b. Performance Prism
 - c. Something else (which one) _____

6. Evaluate the following assertions (the lowest mark = 1, the highest mark = 5):
 - a. Quality of business depends on amount of costs..... 1 2 3 4 5
 - b. Quality of business depends on the structure of costs 1 2 3 4 5
 - c. Quality of business depends on the quality of product (service) 1 2 3 4 5
 - d. Quality of business depends on the quality of business processes 1 2 3 4 5
 - e. Quality of business depends on creativity and innovativeness 1 2 3 4 5
 - f. Quality of business depends on the speed of process realization..... 1 2 3 4 5
 - g. Quality of business depends on the product delivery speed 1 2 3 4 5
 - h. Quality of business depends on the relationship with customers..... 1 2 3 4 5
 - i. Quality of business depends on the relationship with suppliers 1 2 3 4 5
 - j. Quality of business depends on the employees' competitiveness 1 2 3 4 5
 - k. Quality of business depends on the employees' improvement 1 2 3 4 5
 - l. Quality of business depends on the business culture 1 2 3 4 5