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TO APPLY THE SIX SIGMA METHOD OR THE NEW TQM (TOTAL QUALITY MANAGEMENT) STRATEGY IN THE MACEDONIAN COMPANIES

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Abstract

Among the modern managerial routes from the last ten years of this century, the method of Six Sigma and TQM philosophy have been particularly stressed. This paper presents the proposed methodologies for the six sigma method and TQM strategy as well as their application in practice in Macedonia. Although the philosophy of the total quality management (TQM) is deeply involved in many industries and business areas of European and other countries it is insufficiently known and present in our country and other developing countries. The same applies to the six sigma approach methodology of reducing the dispersion of a process and it is presented in a small fraction of Macedonian companies. The results of the implementation show that the use of Six Sigma approach is not so much the number of defects per million opportunities, but the systematic and systemic lowering of the dispersion process. The operation and effect of the six sigma method engages experts that receive a salary depending on the success of the Six Sigma program. On other hand the results of the application of TQM methodology within the Macedonian companies will depend on the dedication and commitment of all employees and their motivation.

Keywords: TQM strategy, Six Sigma method, methodology, motivation.

The essence of the Six Sigma method

Six Sigma is a method to all processes, products and companies. It was first developed at Motorola in 1986, whose products are well known market brand. Today, the application of Six Sigma has become a worldwide trend caused by the economic achievements of Motorola, process oriented and product quality improvement practices, according to Coronado and Antony [1].

The company Allied Signal has published the effect of $ 800 million, generated in the period from 1995 to 1997, as a result of promotions, following the Six Sigma.

The company General Electric (GE) in the third quarter of 1997 realized $ 600 million (up from 13.8% to

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14.5%), thanks to the application of Six Sigma method. This company in 1999 achieved an effect of 2 billion dollars. For the company, the Six Sigma method presents a vision of quality expressed with only 3.4 defects per million opportunities for each product or service.

In year 2000, the company Ford Motor Co said that it is the first "automaker" which uses Six Sigma method for improving business processes and product quality.

The Six Sigma method for many authors [2] presents a mean to improve the processes by finding and eliminating errors, as well as to detect the causes of errors or defects in processes, with specific analysis output parameters that are important to customers or users.

Processes are implemented in different ways by technological schemes, and they affect people, materials, machines, methods, internal and external factors. Therefore, one of the tasks is fighting deviations of the process and retention within its minimum limits by applying Six Sigma method. If unauthorized deviations are identified earlier, the costs for additional processing and finishing of the defective products are lowered. This falls in the price of low quality. But, the implementation of the Six Sigma method is required to meet certain conditions [3].

Factors for successful implementation of the 6 Sigma method

A prerequisite for the successful implementation of Six Sigma program is having a modern management, i.e. strong leadership in particular.

The spread of this concept requires a certain social and cultural level of the environment (habits and mentality of employees), infrastructure creation and development of the company's corporate culture.

The basic concept of Six Sigma is defined by Motorola, according to the classical scheme of continuous improvement and quality improvement by applying PDCA cycle (Deming's cycle).

Today, the most commonly used cycle is the DMAIC [4], (Define, Measure, Analyze, Improve and Control).

Besides this methodology, the IDDOV cycle is being used too. This cycle consists of following phases: identification, definition, design, optimization and validation and is intended to create a new product or process.

Both methodologies define the steps for running a Six Sigma program in order to improve and help the team towards the fulfillment of the main goal. Furthermore, it will explain the methodology of DMAIC cycle, fig. 1.

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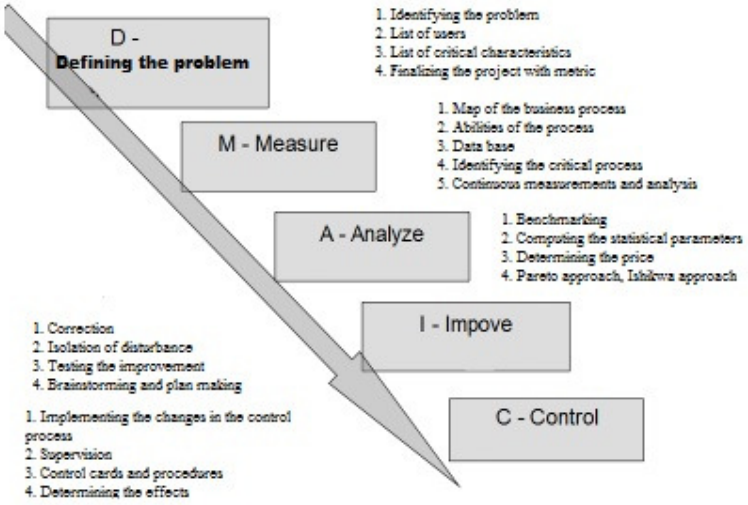

Fig.1 *DMAIC cycle for Six Sigma introduction*

The Six Sigma methodology goes through several steps:

Step 1: Identification of the problem.

Through identification of problems, both the purpose and framework of the project are defined and are identifying the problem that should be solved on the road to achievement of specified levels of tolerance.

Step 2: Measure the current situation.

The measurement is performed by using the appropriate methods and techniques to collect data and provide information on the current situation. Based on the data and information, the baseline levels of performance are being assessed, as well as the indicators and selected problems that require special attention.

Step 3: Analyze the problem and possible causes.

Through analysis for identification of the primary (main) cause of problems for quality assurance (by checking the data, using special methods and techniques for data analysis, etc.).

Step 4: Suggestions for improvement.

This step isolates the problem and provides models for improving business processes which are applied to real processes.

Step 5: Control of the implementation of improvements.

The purpose of the fifth stage - the control, is evaluation and monitoring of the results of the previous stages. At this stage, verification of the modification of the system is being performed.

New rules, procedures, instructions to staff and other norms of operation are being created.

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Each of these stages requires application of special analytical and mathematical methods out of a wide range of methods.

An important point in the implementation of Six Sigma is the distribution of the roles of specialists. For each step, implementers are being entitled with the following roles:

- Leader (Champion) - member of the top management of the company who has the obligation to accept the proposed solutions of Six Sigma project and to ensure its implementation. The leader has the task to create a climate and conditions, and to provide the necessary resources;
- Black Belt is awarded to an employee according to his specialist knowledge of high class or an expert in the field of Six Sigma. The employee prepares the project team, manages and performs training. He / she takes full responsibility for the complete execution of the program for acquiring the necessary skills in the team;
- Project group exercise program for Six Sigma is comprised of employees who implement the Six Sigma project. They are specialists in certain areas within the project Six Sigma, who have passed the training and are great support during the project implementation and work according to their knowledge.

Belts in applying the six sigma method:

- the difference in terms of TQM strategy;
- each zone has a well-defined content to be learned;
- the introduction of Six Sigma methodology starts with team formation, and then continues with education.

The biggest advantage of applying the Six Sigma method is to increase the viability and profit at the expense of reducing direct costs, while increasing the customer's and user's satisfaction.

By reducing the number of defects and cutting production cycle, productivity is being increased. The value of Six Sigma can determine the cost of poor quality.

Six Sigma methodology was applied in the Macedonian Public Revenue Office in terms of improving services to citizens or taxpayers [5].

The promotion was aimed at the business process where applications file tax returns.

The progress of implementation of Six Sigma went through the following steps [5]:

Step 1: Identification of the problem.

In the process of identifying the problems, the following was noted:

- long waiting in front of the counters for filing tax returns every 25th of the month;
- frequent wrong filed forms;
- waiting again for corrections;
- transportation costs of applications received by the center for data processing;
- errors occurring in the data processing of tax report.

Due to the problem of long waiting in front of the counters caused by filing tax returns by taxpayers and errors that occur because of erroneous forms and omissions, the top management decided to overcome this problem.

Step 2: Measuring the current situation.

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Through measurement and analysis of the current situation Six Sigma team concluded that:

- taxpayers spend a long time waiting in front of the counter;
- to serve customer more employees who perform the receipt of applications at the counter and more employees performing processing of applications are needed;
- need more staff to contact tax bonds that have errors in the submitted report.

All these abnormalities cause additional costs for the customers, as well as financial losses and wasted time for Office management.

Step 3: Analyze the problem and possible causes.

Top management of the Office decided to advance the business process in terms of reducing waiting time for filing tax returns, reducing errors in the preparation and reducing errors when processing them.

Step 4: Suggestions for improvement.

Starting from the motto of the Office "customer above all", management decided to have a system for electronic filling and processing of applications. For this purpose it has designed and implemented an integrated information system that fully meets the needs of taxpayers, respecting the standard operative procedures (SOP).

Step 5: Control of the implementation of improvements.

In this step, assessment and monitoring of the results of previous stages is made. At this stage to the new system and new rules, procedures and instructions for employees are verified.

After application of the improvements, by out repeated measurements, the following results have been obtained:

- reduced crowds in front of the counters;
- reduced number of employees to serve customers;
- reduced number of employees processing tax returns;
- reduced cost of transporting report of all the regional offices to the center for data processing;
- reduced errors in the report and contacts with taxpayers for their correction.

The effects of the implementation of Six Sigma method in management are recognized in cost savings during operation regarding the perpetrators of the process. Some employees are seconded to other jobs and optimization of the business processes.

Because of the positive results from the implementation of the decision, top management decided to apply this methodology in other business processes.

The Six Sigma methodology was applied in the enterprise for airport services "Alexander the Great" in Macedonia in the business process for ground handling of aircraft, in order to meet the needs of air carriers [6]. With great effort, the team uses Six Sigma method to optimize business process serving airline. Practice has shown that it is insufficient.

Companies can count on success in the future if they offer their customers / users innovation.

The Company is required to continuously enhance its activity. Increased application of Six Sigma methodology in terms of commitment to the stability of the process, meeting the established rules, opposite the incentive to innovation that deviate from the rules. The innovational approach leads to variations in the manufacturing process, disorders, unusual solutions, insufficient training, or anything

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that fights against Six Sigma method.

Six Sigma method is characterized by quality close to perfection but also in many companies, especially in the development of complex programs for quality assurance, made up of a million steps, the level of Six Sigma approach is insufficient for achieving a high level of satisfaction of customers / users.

The essence of TQM strategy

New TQM (Total Quality Management) strategy for quality requires new activities in the field of education employees, introducing standardization of all processes, introducing statistical process control to non-defect work, a new approach to the analysis of costs. This requires a scientific, methodical, planned approach, persistence and thoroughness. At the same time, it means a drastic change in the behavior of employees, radical changes in organizational structure, clearly defining the rights, obligations and responsibilities of each individual. The application of the new philosophy of total quality management (TQM), is related to the selection of appropriate people for the realization of all activities in accordance with education, motivation and ability of employees.

TQM philosophy introduces new key changes in access to quality. The first change refers to the establishment process of continuous improvement in all segments of the organization by involving all employees, and the other, to meet the needs of all users (not just customers) with the results of organization.

Following the interpretation that a European Foundation for Quality Management (EFQM), the importance of the total quality management (TQM) [5, 6] is defined as "Management strategies for achieving excellence in the organization and its results."

In countries with long term transition as ours prevailing passive-import oriented strategy prevails in which profits are realized in the economy mainly by imports.

Macedonian companies take poor care of quality, insufficient attention is given to continuing education, poor investing in innovation, in a small number of companies there is built a quality system, little attention is paid to employees, customers, suppliers and the community, has a weak application of statistical process control (SPC) and work in a team considered a return to the past. In short, here methodology for technological development is unknown, it is missing an integral model for the design and implementation of TQM (Total Quality Management) system in Macedonian companies.

This paper developed a universal, integrated methodology for design and implementation of TQM system in Macedonian companies [7], which should help to provide useful guidance to all Macedonian companies that tend to be organizations of "world class".

Integral methodology for designing and implementing TQM system companies

Foundation in creating this model redesign or reengineering business processes, after which, it starts a new phase in the business - continuous improvement or Deming Quality cycle (Plan-Do-Check-Act).

The need for reengineering can occur in companies that are in a major crisis or feel that the crisis will soon come. The application of reengineering is present in companies that are in good standing and have the potential for development and growth but also want to be in trend with the needs of the global market.

In reengineering, the buyer / user is primarily a user can also be employed within the company (other

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departments, agencies). The reengineering achieves narrow specialization of work and great autonomy in performing the tasks.

Integral methodology for designing and implementing TQM system consists of multiple methodologies: Subsystem methodologies - internal standardization; subsystem methodologies - Statistical Process Control (SPC); methodology for analyzing the total cost of a given process; subsystem methodologies - Education; Methodology about evaluating the success of projected and implemented system for TQM (Audit), fig.2.

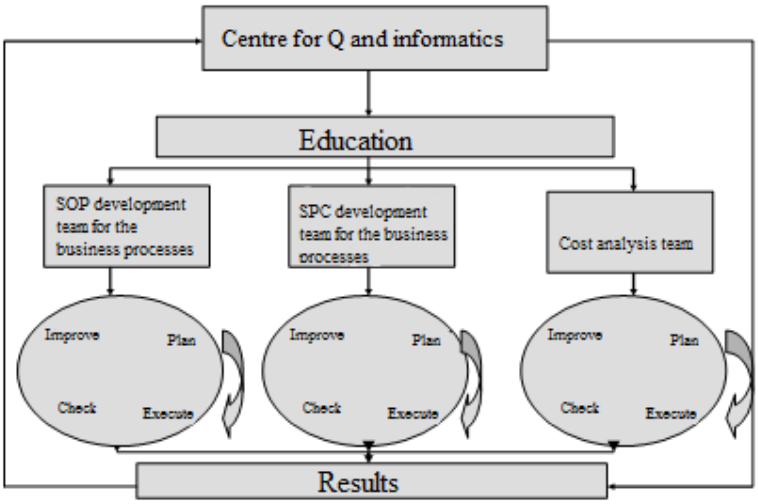

Fig2. *Integral TQM system design and implementation methodology*

Benefits of the proposed methodology

The model - methodology [7] that proposes an integral and universal meaning that is applicable to all companies regardless of the industry they belong to, and the success of its application depends if you only achieve integration of information technology: intern standardization, methods and techniques for non-defect production, system for cost analysis and continuous education and motivation of employees to provide competitive advantage. Integral methodology for designing and implementing TQM system has feedback as a result of the necessity of ongoing improvement of business processes. By repeating or spiral repetition of such cycles, we see the benefits of the application, with the changing organizational culture to such initiatives and an incentive to higher goals of excellence.

This methodology not only successful in the implementation of improved business processes in Macedonian companies, but will raise the awareness of employees about their quality and focus on increasing customer satisfaction. Without the commitment of top management to set goals for quality and consistency in their implementation, these efforts will only be spending time and money, while at the same time they will reduce the possibility of following such a successful initiative.

The benefits of implementing this model does not only increase the commitment of top management and employees to improve processes, but customer satisfaction, employees, shareholders, suppliers, the community and increase business results of companies that continue to serve as the driving force for

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continuous improvements.

However, it should be noted that without education in these areas and continuous education for managers first and then, through them, to all employees application of this methodology is not possible, it won't be possible for benefits from the quality system to be evaluated. Besides education, motivation is also an important driving force for achieving system total quality management.

Part of the proposed methodologies for subsystems of the house of quality tested in our practice from some companies from different economic sectors and good results have been shown in operation, the fact of the matter is that the proposed methodology is applicable in practice [8].

For this purpose, applied QC-CE (Quality Cycle & Cause and Effect) model for the design of standard operating procedures in the form of block diagrams, which can manage all business processes in companies in a way that will accurately determine the obligations and responsibilities of participants in the planning, execution, control and correction (PDCA) [9].

For the design of the standard operating procedures, appropriate methodology methods and techniques of statistical process control and non-defect production methodology for optimizing costs have been applied.

The results obtained in this study came to the conclusion that the application of the methodology for SPC and methodology for optimizing costs can achieve defined quality and better productivity at the lowest cost in operation. The application of the methodology for cost clearly shows the results of the improvements, but not the only indicator of them [10]. Increased product quality, increased employee motivation, better work environment and foremost customer satisfaction, are results that appear to be not measurable, but very important for the survival of their companies and its sustainable development. These methods yielded the same effects in different companies, which demonstrated the universality of the proposed methodology.

The design of the information system for quality factory rail vehicles applied QC-CE-Pyramid model, where through analysis of the existing information system with corrections and amendments to it through the approach QC-CE pyramid model, improving its performance and effectiveness [11].

CONCLUSION

The opportunity for creative work that is offered by the TQM strategy, providing expert input, respecting the personal views and opinions, sense of involvement in the management of the enterprise, the common spirit to succeed, the elements of teamwork that will contribute to the development of mutual trust and respect, dedication, openness, patience and loyalty to one another and loyalty to the company.

The success of the implementation of TQM strategy depends on the commitment of all employees and their motivation and the application and effects of Six Sigma professionals engaged that part of the salary they receive depends on the success of the Six Sigma program. The success of TQM strategy is based on simple methods and techniques, while Six Sigma requires rigorous application of statistical process control.

TQM strategy does not directly measure the success of the company through the financial indicators, while Six Sigma does.

The application of TQM strategy requires that the management personnel in the company by its good will and perseverance include the human resources by forming teams of all profiles, integrating their

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knowledge to achieve complete mastery of quality in all processes of enterprises at least costs of operation. This way will allow time to prevent possible malfunctions, time to eliminate the problem by removing the possible reasons. The usual resistance and fear of change is quickly exceeded and strong desire to change the current situation, a new approach to quality, is present, with full commitment towards customers, employees, environment and state.

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