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IMPLEMENTATION AND EVALUATION OF MODEL CAF IN EDUCATION ORGANIZATIONS

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ABSTRACT

In our contribution are described experiences concerning the development, implementation and evaluation of excellence model CAF in education organizations. There are described criteria and sub-criteria of model CAF and example of fulfilling these criteria by company Quality management Centre (CEMAKS) at the Slovak University of Technology in Bratislava. In contribution will be presented some ideas and opportunities for continuing improvement of quality level in education organization by application this model, analysis of model CAF criteria, methodology to develop this model, automated system of evaluation of model CAF which allows to measure quality level in time. This CAF model is useful tool for schools and universities on way to find new approach to increase quality level in education process.

Key Words: Quality, model, education, process.

INTRODUCTION

The Common Assessment Framework (CAF) is a total quality management tool inspired by the Excellence Model of the European Foundation for Quality Management (EFQM) and the model of the German University of Administrative Sciences in Speyer (Slovenská asociácia európskych štúdií;2006). It is based on the premise that excellent results in organizational performance, citizens/costumers, people and society are achieved through leadership driving strategy and planning, people, partnerships and resources and processes. It looks at the organization from different angles at the same time, the holistic approach of organization performance analysis.

The CAF model is an European model based on Total Quality Management – TQM.(Paulová,Hekelová,, Šatanová&,Šalgovičová: 2008; Oakland: 2003) It is designed for all organizations of public sector that are interested in continuous improvement and progress towards excellence.

The main purpose of the CAF model is self-assessment of the organization in order to achieve continuous improvement of quality. It helps identify strengths and opportunities for improvement and encourages solutions. It allows for an independent view on the organization and its functioning.

The CAF model is a basis for assessment and evaluation of a business aspiring to receive the European Quality Award (EQA), but also the National Quality Award of the Slovak Republic. In order to win the EQA, the model must be applied for at least three years and yield the corresponding results.

The EFQM model may be used in any business as well as any governmental organization (Porter, & Tanner: 2004; Hakes; 2007; Oakland,2003)) (however, the Common Assessment Framework – the CAF model(Slovenská

asociácia európskych štúdií;2006). is specially designed for public administration). There are several literature sources, which describe the structure of EFQM and CAF model(Porter, & Tanner: 2004; Hakes; 2007) and offer methodology, how to implement and evaluate it, but for customers are very brief and hardly understandable. Therefore we decided in our research work to propose integrated ele:tronic manual, which will offer to public organizations complex and total information concerning the implementation and evaluation of all criteria of CAF model. Our electronic manual contains total 9 criteria, 32 sub-criteria and 121 sub-sub criteria of CAF model. Users of this manual can self evaluate own activity in a given sub-criterion and using automated system (software) determines point value of quality level (see next chapters).

HISTORY AND STRUCTURE OF CAF MODEL

The CAF is a result of co-operation among the EU Ministers responsible for Public Administration. It is jointly developed under the aegis of the Innovative Public Services Group (IPSG), a working group of national experts set up by the Directors-General (DG) in order to promote exchanges and cooperation where it concerned innovative ways of modernizing government and public service delivery in EU Member States.

A pilot version was presented in May 2000 and a first revised version was launched in 2002. A CAF Resource Centre CAF (RC) was created at the European Institute of Public Administration (EIPA) in Maastricht following the decision of DGs in charge of public service.

Between 2000 and 2005 ca. 900 European public administrations used the CAF to improve their organizations. Also from outside Europe there is a lot of interest in using the tool e.g. from China, Middle East, Dominican Republic and Brazil. More than 300 CAF users met at the 1st and 2nd European CAF Users Events in Rome in 2003 and in Luxembourg in 2005. Two studies by EIPA, established in the context of these events, give detailed information on the use of CAF in Europe and they inspired the CAF 2006 revision.

A database on CAF applications is being further developed at EIPA, allowing integrating good practices in public administrations from all over Europe and maybe wider. A CAF e-tool will be soon fully available for the CAF community. The model is now translated in 19 languages. But also on the national level, many countries developed CAF support structures including training, e-tools, brochures, CAF users' events and CAF data bases. The Ministers responsible for Public Administration in the European Union expressed at the end of the Luxemburg presidency on 8 June 2005 their appreciation for the fruitful exchange of ideas, experiences and good/best practices between the Public Administrations of the EU Member states within the European Public Administration Network (EPAN) and for the development and use of tools such as the Common Assessment Framework. They asked to integrate even more the quality approach with the Lisbon agenda. The CAF 2006 revision has taken this demand into account.

The CAF is offered as an easy to use tool to assist public sector organizations across Europe to use quality management techniques to improve performance. The CAF provides a self-assessment framework that is conceptually similar to the major TQM models, CAF in particular, but is specially conceived for the public sector organizations, taking into account their differences. The CAF has four main purposes (Slovenská asociácia európskych štúdií;2006):

- to introduce public administration to the principles of TQM and progressively guide them, through the use and understanding of self-assessment, from the current "Plan-Do" sequence of activities to a full fledged "PDCA" cycle,
- to facilitate the self-assessment of a public organization in order to obtain a diagnosis and improvement actions,
- to act as a bridge across the various models used in quality management,
- to facilitate bench learning between public sector organizations.

The CAF model is based on 9 criteria (Slovenská asociácia európskych štúdií;2006): leadership, strategy and planning, people, partnerships and resources, processes, citizen/customer oriented results, people results, society results and key performance results. The first 5 criteria are enablers (what the organization has got) and the remaining 4 criteria are results (what the organization achieves). All criteria are divided into sub and sub-sub criteria. The diagram of the model, together with score for each criterion is shown in Figure 1. The direction of arrows shows the dynamic nature of the model. Innovation and learning help improve enablers, which leads to improved results. This process is continuous. Criteria and sub-criteria of the model are very sophisticated and deal with all areas of the organization, even with the environment surrounding it. The model emphasizes the ethical principle crucial for those who are exceptional.

SURVEY CONCERNING THE CAF MODEL IMPLEMENTATION

The survey concerning the CAF model implementation has been carried out during three months in year 2011 by the form of electronic and anonymous questionnaire. There were surveyed 150 public companies in Slovakia of all sizes. The questionnaire completed 40 of them. The issues were identified about whether the model has been applied for excellence in the organization, the purpose of its application (or the reasons not to apply it), as well as interest of the public company to introduce the CAF model in the future. Graphical interpretation of some of the responses is shown in Tables 1 and 2 and Figures 2 and 3.

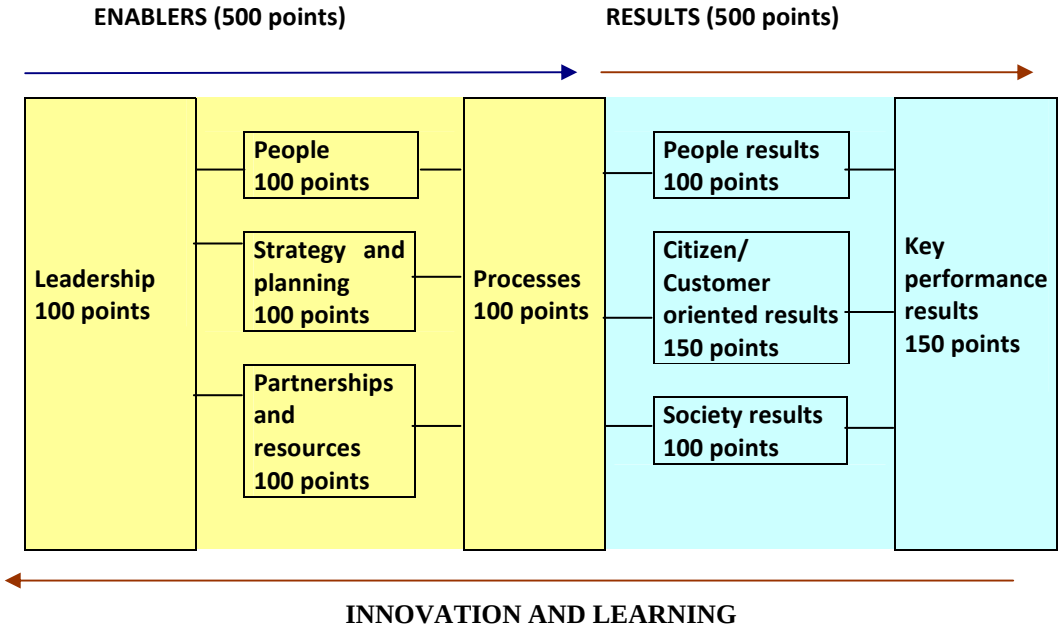

Figure 1: Structure of model CAF (last revision in year 2006)

Table 1: Application of the CAF model at present or in the past in surveyed companies

CAF application at present or in past	Number of answers	%
YES	6	15
NO	34	85
Total	40	100

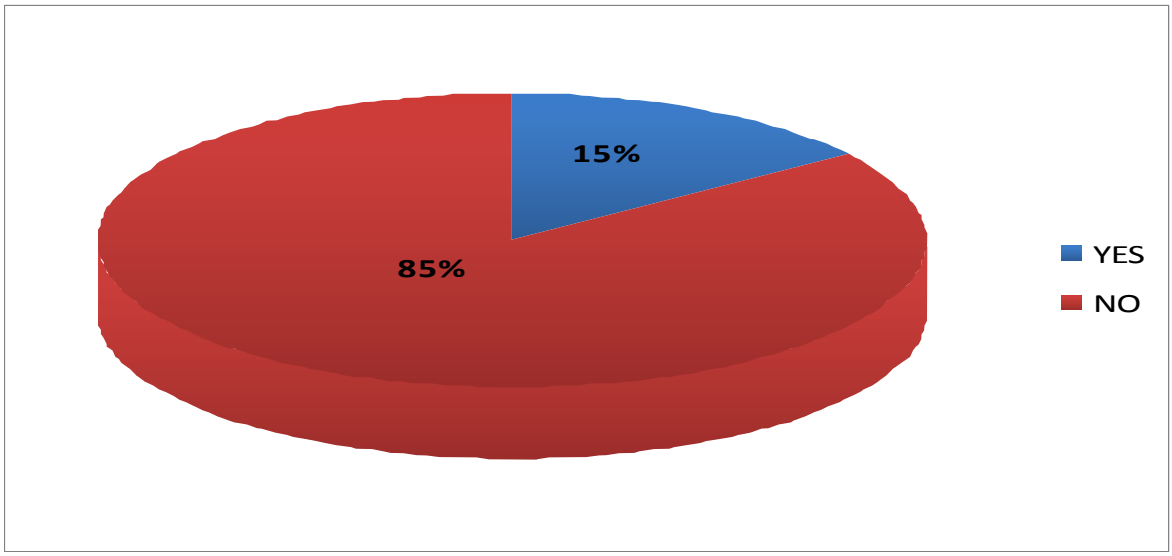

Figure 2: Application of the CAF model at present or in the past in surveyed companies

Table 2: Interest of surveyed companies to implement CAF model in future

Interest to implement CAF model in future	Number of answers	%
Definitely YES	15	38
Probably YES	20	50
Rather NOT	5	12
Certainly NOT	0	0
Total	40	100

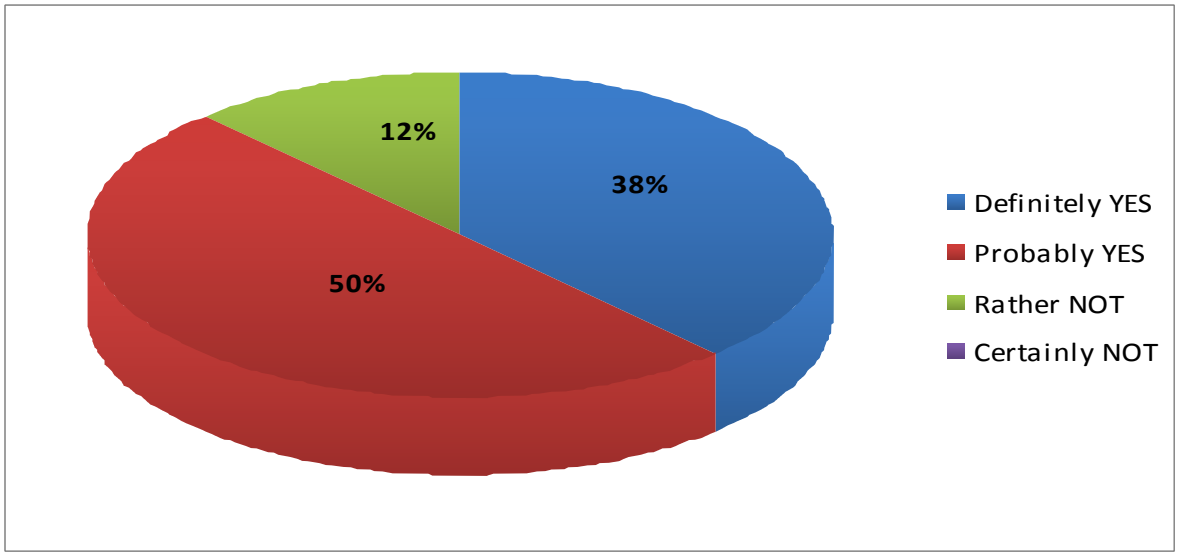

Figure 3: Interest of surveyed companies to implement CAF model in future

The results obtained by survey shows that the CAF excellence model and its application in practice in Slovakia are still relatively new, unexplored issues. Most companies do not exclude its application in the future, but they need much more necessary information about this model and effective training process. The solutions contained at this contribution can be helpful for the performance of the CAF model to organizations, which have aims to continually improve their quality management level and implement maximum positive effects in future activities.

Problems and areas for improvement regarding the CAF model application in education organizations

The study of the CAF model through consultations with trainers in the area of Quality Management and our own knowledge concerning this area of interest made us aware of areas for improvement and problems currently faced by Slovak companies striving for excellence when implementing the CAF model. Application of the CAF model in Slovak organizations is currently not a very frequent activity. Although the model seems simple, its application is a complex process in terms of time and resources. The CAF model can be described as a higher form of quality management in organizations. It is starting to be implemented mostly by organizations, which have successfully passed the introduction and certification of the Quality Management System (QMS) according to ISO 9001 and look for ways to further improve the quality of their products.

However, the management in most organizations fails to realize that this approach to improving quality is not as simple as it seems at the first sight. Although the nine main criteria of the CAF model seem like they were encountered when building the QMS, the CAF model contains a series of sub-criteria (32), which require a very detailed description of the functioning of the organization and many of the sub-criteria are often misunderstood by the management. Thus, the enthusiasm with which the management welcomes the introduction of the CAF model begins to fade when the model is implemented in practice. A deeper study of the CAF model makes directors come to conclusion that the whole process is too bureaucratic. Organizations often meet the CAF requirements, but fail to record their results sufficiently and as required. When aspiring to the National Quality Award of the Slovak Republic or the European Quality Award, the company has to prepare a self-assessment report according criteria of the CAF model, on the basis of which it is assessed. The preparation of the self-assessment report is an extremely complex and time-consuming process and requires involvement of key employees from all areas of business. Incorrect definition of processes and results in the self-assessment report may result in a low score of an otherwise successful organization from the professional CAF auditors. This leads to disappointment, conflicts and rejection of the whole process.

The path towards excellence according to the CAF model is a long-term process that must be upheld by the whole business from the top management to the last employee. If only the top management desires the introduction of the CAF model and then delegates the application duties to employees – failing to properly explain its effects – it encounters resistance and the process is doomed.

The current competitive environment in the global marketplace requires organizations to continuously improve quality. This applies not only to products, but also to processes and management. Today, it is often not enough to satisfy customer needs, but it is necessary to exceed them. This requires excellence in organizations. One of the tools that can help organizations on their path of improving and achieving a lasting success is the CAF excellence model understanding and effective implementation.

METHODOLOGY FOR THE CAF MODEL APPLICATION IN ORGANIZATION

During the research work at this area, we propose a methodology for application of the CAF model, which is proposed especially to education organizations, which have developed and implemented Quality Management System (QMS) according to standards ISO 9001 and plan further development and improvement of the existing management system using the model CAF. Steps of the methodology are illustrated in Figure 4.

The methodology is designed in conjunction with manual and automated self-assessment system to enable the organization to apply the CAF model in less time and evaluate their performance level and effectiveness by more transparent way. The methodology enables to get an idea of what is necessary to do in the process of CAF model application. The actual implementation of the methodology and the manual is designed to avoid confusion and unnecessary complexity, what require starting again and resulting to time loss.

Used scientific methods

Selected scientific methods of problem solution can be divided into two main groups: empirical and logic (scientific analysis and synthesis). Empirical methods are applied to an electronic survey that aimed to determine knowledge of the CAF model and its use in practice among organizations operating in Slovakia. The logical method was utilized for the problem solving analysis and synthesis. Methods of scientific analysis was used to evaluate the current issue of Quality Management level and CAF implementation in public sector, analysis of criteria and sub criteria of the CAF model, exploring the possibilities of applying the CAF model in public organizations and examination of existing systems of assessment under the CAF model. Scientific synthesis method was used during the process of CAF model development and implementation including the creation of electronic manual and during the process of automated evaluation system of public company quality management level.

MANUAL FOR THE CAF MODEL IMPLEMENTATION

Electronic manual is designed on the basis of the CAF model criteria and sub criteria requirements and helps to organization in a shorter time to understand and apply the CAF model and evaluate their own performance and effectiveness. The structure of the proposed manual consists of three main parts:

- analysis of CAF model requirements defined by criteria and sub criteria and determine the existing quality level of the organization and opportunities for improvement,
- self-assessment system of organization quality management level using the criteria and sub criteria of the CAF model by electronic automated system.

The evaluation system of the CAF model criteria

CAF model consists of enablers and results parts. For each of them is in the manual suggested a specific method of evaluation. In this paper we provide an example evaluation of enablers part of the CAF model.

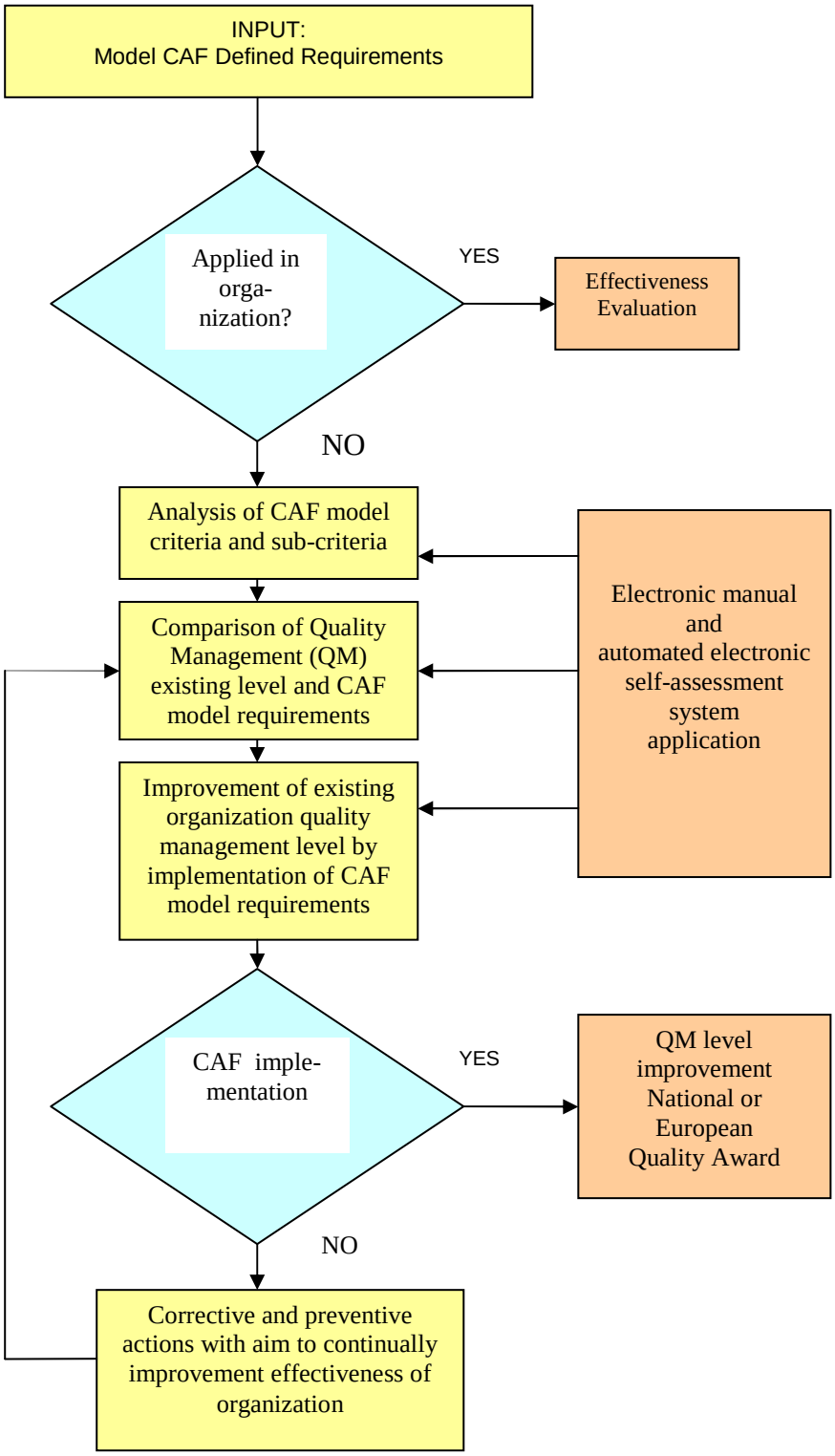

Figure 4: Steps to apply CAF model in education organization

In the process of self-assessment of the organization is for each of the manual requirements of enablers part of the CAF model selected phase of applications based on the Deming cycle (Table 3) and the performance level (Table 4).

Table 3: Evaluation of activity level application according to requirements of CAF model sub-criterion in organization

Activity is:	Description	Evaluation in %
P (planned)	Organization plans the activity to apply	10
D (done)	Activity is implemented	15
C (checked)	Organization checks the effects	20
A (acted)	In a case of positive effects activity is used in practice	25
B (benchmarked) (Zairi:2008; Bendell:1993)	Organization compares the activity with best organization in market	30

Table 4. Level of CAF model sub-criterion fulfilling in a given phase of application

Level of fulfilling	Description
0	There is no evidence to fulfill the requirements
0,25	There exist indicators of compliance requirements
0,5	Partial evidence of requirement fulfilling
0,75	Significant evidence of requirement fulfilling
1	Clear evidence of requirement fulfilling

The selected phase applications and performance levels are the basis for calculating the assessment for the achievement of the criterion and sub-criterion requirement. Position in the current phase of the application assumes management of the previous phases. If the company in meeting this requirement found for example in phase "act" with the degree to 0.5, the overall percentage achieved in meeting this requirement is:

1 x 10 + 1 x 15 + 1 x 20 + 0,5 x 25 = 57.5 (%)
PLAN DO CHECK ACT

By this way is calculated the percentages evaluations for all requirements P_{KiSj}. The percentage evaluation of each sub-criterion is the weighted average of achieved percentage values for each of its requirements, and a set of weights represents the coefficients of importance. P_{KiSj} is calculated according to this formula Gašparík:2010):

$$P_{K_iS_j} = \frac{\sum_{r=1}^{n} P_{K_iS_jR_r}.d_{K_iS_jR_r}}{\sum_{r=1}^{n} d_{K_iS_jR_r}} \quad (1)$$

where
P_{KiSj} is achieved percentage evaluation of "j" sub-criterion in "i" criterion
r = 1,2...n – number of requirements in criterion K_i and subcriterion S_j,
d_{KiSjRr} is coefficient of importance for "r" requirements of "j" sub-criterion in "i" criterion

Each of the criterions of the CAF model has a defined maximum point value which can be achieved. It is evenly distributed among the individual sub-criteria. The resulting number of points for the sub-criterion we obtain by multiplying of the achieved percentage value by maximum number of points. Generally we can for any criterion express (Gašparík:2010):

$$B_S = B_{max} \cdot \frac{P_s}{100} \qquad (2)$$

where
B_S is achieved score in evaluated sub-criterion
B_{max} is maximum score which can be in a given sub-criterion obtained
P_S is achieved percentage evaluation for given sub-criterion

The resulting score for each criterion is the sum of achieved point value of its individual sub-criteria. The total achieved point value concerning the enablers is the sum of achieved points for criterion 1 to 5. The maximum possible score can be 500 points (see enablers - Figure 1).

Electronic evaluation of the proposed solution

Electronic solution of proposed evaluation system is realized by using Microsoft Excel Program(Gašparík:2010.. The aim was to design and develop an automated system using computer technology, which would on the basis of defined requirements in electronic manual and in evaluation system allow easy, fast and comfortably realize evaluation of business performance and effectiveness, as well as clear and understandable display output of the evaluation process. Entering of inputs is handled through a questionnaire form, by selection of predefined options from "drop down menu" (dropdown list). The user does not perform any calculations, nor inscribe the input values. The results are updated immediately after any change in input data. The selected values the user can change at all time during the evaluation process. Sheets “enablers” and “results” clearly show achieved percentage scores for each sub-criteria and requirements, and from these values is automatically calculated score for sub-criteria, and all criteria of “enablers” and “results” sections. Changes of point values are automatically transferred to the sheet CAF - assessment, in which is a graphical view of the structure of the CAF model with the nine criteria and the corresponding percentage and scoring for each of them for the “enable” and “result” part and also total assessment of all criteria.

APPLICATION OF THE PROPOSED METHODOLOGY AND MANUAL INTO EDUCATION COMPANY CEMAKS

Application of the proposed methodology and the electronic manual was made for an education company CEMAKS in Slovakia, in which both authors of this contribution are working.

CEMAKS (Quality Management Centre in Construction) was founded in the year 1996 at the Department of Building Technology of the Faculty of Civil Engineering of the Slovak Technical University in Bratislava with an aim to secure training and consulting activities at introduction and implementation of quality management systems and integrated management systems according to STN EN ISO 9001:2009, STN EN ISO 14001:2005 and STN OHSAS 18001:2009. In its training activities, CEMAKS provides its customers the world-class management trends, such as total quality management (TQM), the KAIZEN method, reengineering and excellence models EFQM and CAF. CEMAKS is, since the year 1998, a holder of a certificate for SMK according to ISO 9001, granted by the certification organization Bureau Veritas Slovakia.

CEMAKS identifies, manages, improves and develops its key processes with an aim to support the specified strategy and planning. The moving spirit of our organization is creativity and seeking new ways and ideas at creation of new products, which will surpass the expectations of our customers. Another important factor is innovation and the need to create added value for the customers and also for our citizens and other interested parties, in order to satisfy their desires, wishes and expectations. The main activities in this field are:

identification of the key processes and their interaction, process management and control,

permanent improvement of quality of the products and services of CEMAKS by education of the CEMAKS employees and by scientific and research activities,

innovation and updating of methodic handbooks for training courses and education of the customers,

innovation of methodic and specialist documents for the needs of construction organizations,

improvement of quality of the consulting services on the basis of practical experience and train-up activities of the CEMAKS employees,

willingness to consult with the customers the topic of managerial systems, free of charge,

patience at preparation and realization of the processes of our organization,

organizing courses, specialist colloquia and scientific conferences at home and abroad in the field of managerial systems,

spreading the offered services abroad (Czech Republic, Kuwait, Cyprus, Ukraine).

For the 15 years of existence of CEMAKS, the following results may be considered as the most important:

- 145 construction companies certified for the system of quality management according to ISO 9001 in Slovakia and in the Czech Republic and 24 organizations certified for Integrated management System (IMS) according to ISO 9001, ISO 14001 and OHSAS 18001,
- at least 1300 students of the Faculty of Civil Engineering from all departments, trained for the function of „quality manager“, 5200 workers from practice trained in the field of quality management and 2550 workers from practice trained for the function of internal auditor of the quality management system according to ISO 9001,
- 20 publications and 30 lectures in the area of quality management abroad,
- 3 successfully finished research projects VEGA in Slovakia in the field of managerial systems and 2 projects abroad (Leonardo da Vinci) focused on quality,
- specialist and organizational guarantor of 3 international conferences (Bratislava, Bosnia); the most important of those was the international symposium on automation and robotics in construction (ISARC 2010) held in June 2010 in Bratislava, being of a world importance,

After the analysis of criteria and sub-criteria of the CAF model (see Figure 1), CEMAKS elaborated in the year 2009 a self-assessment report with an aim to investigate opportunities for further improvement of its activity. Process of self-evaluation of model CAF in CEMAKS was realized using our software for automated evaluation of quality management level in company according to CAF model criteria. By application of the higher described methodology and electronic manual company CEMAKS during one year increased quality management level in all criteria of the CAF model, (see Figure 5).

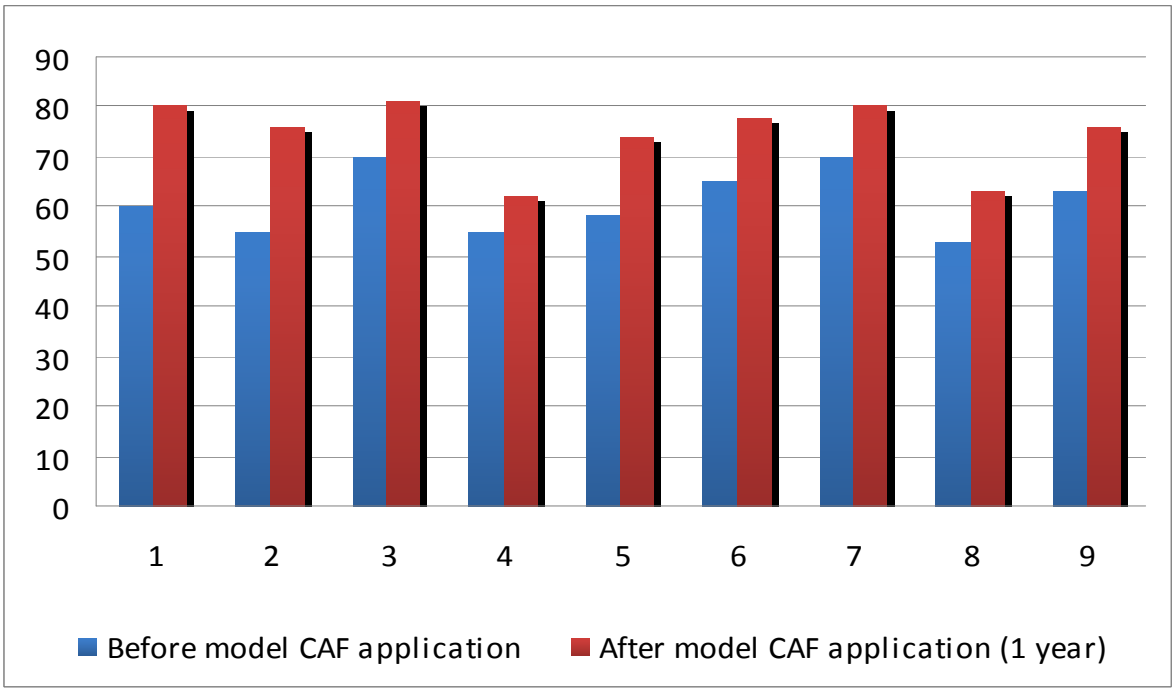

Figure 5: Effects in CEMAKS after model CAF application
Legend to Figure 5:
1 – Leadership 2 – Strategy and planning 3 - People (employees) 4 - Partnership and resources
5 - Processes, 6 – Citizen/ Customer oriented results 7 - People results 8 – Society results
9 – Key results

CONCLUSIONS

Model CAF is useful to implement after development and implementation of Quality Management System (QMS) according to ISO 9001. QMS represents very good basis for application of higher quality management philosophy, like TQM, KAIZEN or model CAF. Research work described at this contribution results in the form of its own methodology and electronic manual allows to public (education) organizations effectively introduce and implement CAF model requirements to practice in a relatively short period of time with aim to constantly improvement its performance towards excellence.
Model CAF is an effective tool for continual improvement of organization quality, which leads not only to higher level of quality, but also to customer satisfaction, success at national and world market and to increasing the culture of whole organization. This contribution was prepared as a part of scientific research project VEGA N. 1/0184/12.

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Jozef GAŠPARÍK is professor at the Faculty of Civil Engineering of Slovak University of Technology in Bratislava (Slovakia). At this time he is head of Department of Building Technology and guarantor of three study programmes: Building Technology and Management (bachelor degree), Building Technology (Master and PhD. Degree). He is founder and director of Quality Management Centre in Construction (CEMAKS). CEMAKS is a company with many years experience in the field of quality management training and consultancy. Since 1996 this organization prepared more than 145 organizations to successfully obtain the certificate of quality management systems according to ISO 9001 and integrated management system (quality, environment, health protection and safety). CEMAKS was the first training centre in Slovakia certified in Quality Management System according to ISO 9001. This certificate was given by Bureau Veritas based in London. In 1991-92 worked at University of Brescia in Italy. In past years he was a responsible solver of three successfully completed scientific domestic research projects focused on quality area and in 1998-2004 was a coordinator of two successfully completed international Leonardo da Vinci projects focused on social aspect of quality management. Research results were presented at conferences and workshops in Italy, Portugal, Belgium, France, Spain, Greece, Turkey, Egypt, Croatia , Cyprus, South Korea, Czech Republic and Poland.

Author is a member of executive of International Association on Automation and Robotics in Construction (IAARC). He won National Quality Award of the Slovak Republic for journalism in quality management field in 2008 and he was awarded as a professor of a year 2009 at the Faculty of Civil Engineering.

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