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THE CONCEPTUAL MODEL FOR SMALL AND MEDIUM SIZED ENTERPRISESF OR THE PURPOSE OF PROJECT MANAGEMENT

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Abstract. *The aim of this paper is to explain a model for evaluating project success of small and medium enterprises. These projects are considered in small and medium enterprises of process industry that operate in an uncertain and variable environment. Project success is evaluated through determining the project performance respecting international standard ISO9001:2008 for process organized enterprises and new ISO21500 and ISO10006as guidance for project management.*
Key words: *Project management, Project performances, ISO 9001, process organized SME's*

1.INTRODUCTION

Project management is an area of industrial engineering that has beena very popular field of research in the terms of science and practice in last decade, as proved by many papers ([3],[4],[12], [17]).

Project management, as a term, can be defined as the measuring project performance and taking appropriate management actions that should lead to an increase of the effectiveness of the project, i.e. to increase the level of feasibility of predefined project goals.

This paper discusses the project management of process-oriented SMEs in the manufacturing sector which operate in an uncertain and changing environment while respecting the appropriate standards and goals and proposes new organizational model for project performance evaluation.

The objectives of the project may be designated as the output performance of the project ([5], [6], [7]) and measuring these goals can deliver adequate assessments and strategies for improvement.

Generally, projects' results increase the effectiveness of business activities within the business process at either the SME or the state level. On the other hand, they enable the development and sustainability of the company over time. Implementation of these projects and measuring their performance canlead to harmonization of development objectives with the strategic goals of the company.

2. PROBLEM STATEMENT

Standard ISO9000 [9] gives the basic considerations and guidelines for understanding the concepts, aims, and applications of process approach using the concept of business processes in order to develop strategies to improve the quality of the processes within each manufacturing enterprise. Guidelines that this standard provides can be implemented in companies that differ in size and type.

According to this document (ISO 9000 Document: ISO / TC 176 / SC 2 / N 544R3; ISO9001: 2008) [9] process is defined as a set of interrelated activities that transform inputs into outputs, and desired results can be achieved more effectively if managing these activities and organization resources is seen as a group of business processes. A clear definition of such process network provides a more effective provision of outputs from processes which meet the needs of all stakeholders.

The model for the assessment of performance is applied in enterprises operating under ISO 9001: 2008 which are defined by a network of business processes. Thus, this paper proposes a model with process network inside of an organization that includes following processes [1]: Process Management, Concept Design and Development, Purchasing, Production, Marketing and Sales and Support processes.

Respecting this business processnetwork, we get an organized company that can apply a model for assessing the performance of projects that exist in these types of companies.

3. MODEL FOR EVALUATING PROJECT SUCCESS

Development of SME's, represents an expression of complete devotion of those companies to foster

company growth which can allow further improvement of the business environment, strengthening financial support, entrepreneurial education andadvisory services, to provide additional support in the development of business.

There are manycritical success factors that influence development success of described enterprises such as: project-related factor, client-related factor, consultant-related factor, contractor-related factor, supply chain related factor andexternal environment-related factor.

Fulfillment of these factors can be achieved by using appropriate activities for improvement which is defined by the project management.

Project management need to define the proper action in finding key performance indicators (KPI - Key Performance Indicators) in order to assess the actual performances of business processes.

The overall performance of the projectscanbe separated into input performance that define project objectives before its implementation and output performance, which should reflectthe set goals.

Model to measure the performance of projects in this paper is based on the theory of fuzzy sets ([8], [13], [18], [19]), fuzzygroup decision and Analytic Hierarchy Process ([2], [16]). Determination of the input and output performance of projects is based on multiple regression analysis. For determining of optimal values of input performance, the genetic algorithms were usedwhiledetermining the prediction ofproject performance resulting from the optimization of input performance is obtained by using artificial neural networks and various software packages.

3.1. Identifying input performance

After identification it is assumed that it is necessary for input performance to be hierarchically structured and to have their key performance indicators definedwhichis defined according to the paper [15]. Input performances are modified and structured according to the issues in which they are observed.Authors showed that project performance of projects wereevaluated on the basis of six KPIs namely project time, cost, quality,safety, site disputesand environmental impact. These KPIs address the economic, social and environmental dimensions of publicsector. Not all the KPIs are significant in terms of their relationship with project performances and there is significant evidence and support for measurement of project performance on the basis of time, cost, quality and site disputes.

3.2 Identifying output performance

In literaturethe commonly used output performance is as follows: improving existing business processes, business process reengineering, the development of new products and services, continuing education, human resource development, etc..

Output performance of the projects is defined using the results of the research presented in the [14]. Mir and Pinnington (2014) [14] after giving definition to project success were looking for a definition for project management performance and it is decided that PMPA model of Bryde ([5], [6], [7]) would be more suitable for the analysis. This model PMPA (Project Management Performance Assessment) is based on five enablers (output performance) of high performance PM (Project management); PM leadership, staff PM, PM policy and strategy, PM partnerships and resources and project life cycle management of processes. Additionally, there is another area in this framework - PM Key Performance Indicators which is based on actual measurements of achievement in project management activities.

Project Success variables in this paper were analyzed and the results are important because this paper is the first research that analyzes the relationship between the PMPA framework elements and Project Success variables. Project Management KPIs have the most wide ranging impact across the different variables of Project Success since it has the highest correlation amongst other variables. Besides Project Management KPIs, Project Management Lifecycle Management Processes and Project Management Staff also contribute a reasonable amount of variance in the Project Management Success variables. It was concluded that Project Management KPIs was the most important variable that affected the success of the projects therefore companies should invest in such area to develop methods that measure mentioned KPIs.

3.3. Project management in ISO 21500 and 10006

By the definition projectsare complexuniquebusiness venturethat is being undertakenin the futurein order to achieve objectives in the allotted time and with projected costs.

In real life there are generally two types of projects: investment projects, which change the way organizations work and commercial projects which directly generate income for performing organization.

Benefits realization is at customer side only. But for organizations performing commercial projects just collecting benefits is the main reason for performing projects.

ISO 21500:2012 [11], *Guidance on Project Management*, is an international standard that was intended to provide generic guidance, explain core principles and what constitutes good practice in project management.

This standard divides project processes into five process groups which are described as: Initiating, Planning, Implementing, Controlling and Closing.

Standard ISO 10006:2003 [10], *Quality management systems - Guidelines for quality management in projects*is applicable to projects of varying

complexity, small or large, of short or long duration, in different environments, irrespective of the type of product or process involved but it is not a guide to project management itself.

They are applicable to projects which can take manyforms from small to very large, from simple to complex, from being an individual project to being part of aprogram or portfolio of projects. They are intended to be used by personnel who have experience inmanaging projects and need to ensure that their organization is applying the practices contained in theISO 9000 family of standards, as well as those who have experience in quality management and are requiredto interact with project organizations in applying their knowledge and experience to the project.

4. THE INTEGRATED MODEL FOR IDENTIFICATION AND MEASUREMENT OF PERFORMANCE

As being said standards ISO 21500 and 1006 are applicable to ISO 9001 oriented companies. By ISO 9001 organizations must havea developed network of business processes ([1],[9]) which in reality is not always true case. This paper presents a conceptual model (Figure 1) of organizational management in production organizations that operate in Republic of Serbia through the use of network business processes which are inaccordance with ISO9001. Only then it is possible to apply the standards ISO21500 and 10006 for the project management in these types of businesses and to measurementioned key performance indicators if these organizations operate in such way.

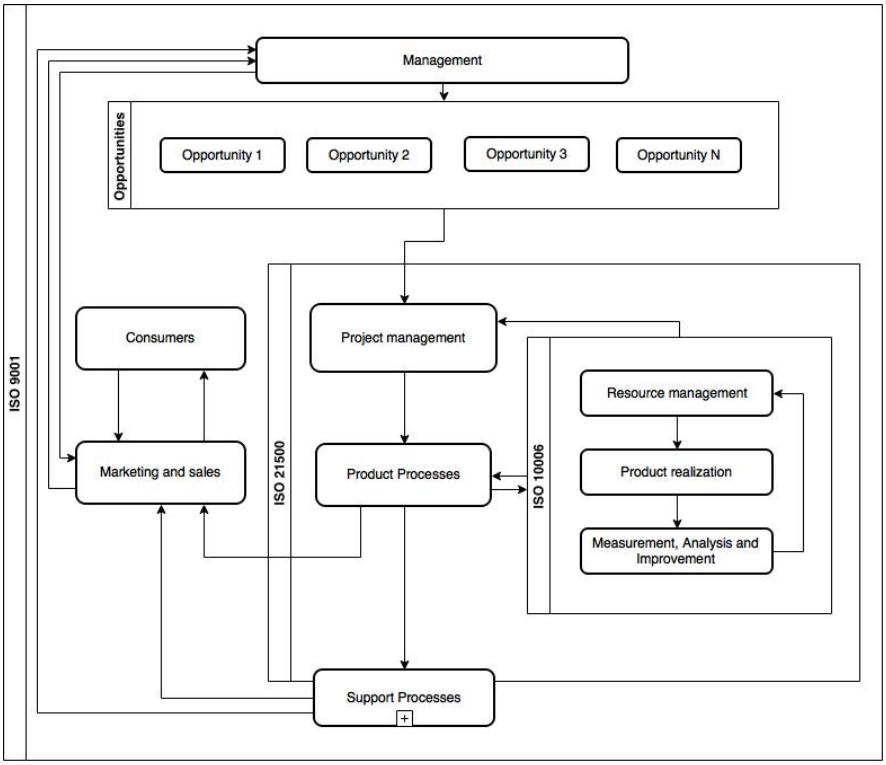

Figure 1. Conceptual model in which project performance can be evaluated respecting organizational scheme and standards ISO 9001:2008, ISO 21500 and ISO 10006

Figure 1 shows that management team have total control over business process network and project realization through utilization of standards ISO21500 and ISO10006 for project management.The measurementof key performance indicators is criticalthing to doin order to know the currentstate of the organizationand the measuresand strategies for improvement.

5. CONCLUSION

This paper propose concepts of organizational structure for enterprises which operate in Republic of Serbia and proposethe model for project success evaluation through measuring reviewed input and output performances of project and finding the right correlation between those subjects using mathematical models based on the theory of fuzzy sets, fuzzy group decisions, Analytic Hierarchy Process and multiple regression analysis. After getting the real values of this correlation, genetic algorithms can be utilized in order to find which is the strongest and which is the weakest link between input and output performance. Based on all this data given from the enterprises and data obtained through mathematical model, neural networks can be used to see future state of the project and projection on the

goals set by project management before project realization so the proper strategies can be made in order to improve the organizational business model.

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