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THE CURRENT ROLE OF PROJECT MANAGEMENT IN COMPETITIVENESS OF COMPANIES

This paper presents the research findings as to the impact of project management on company's competitiveness along with identifying the major factors affecting project management. The 'hot spots' on which an organization can focus to enhance its competitiveness under limited resources have been revealed.

Keywords: *project management; competitiveness; limited resources.*
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СУЧАСНА РОЛЬ УПРАВЛІННЯ ПРОЕКТАМИ В КОНКУРЕНТОСПРОМОЖНОСТІ КОМПАНІЙ

У статті представлено результати дослідження щодо впливу управління проектами на конкурентоспроможність компаній і виявлено основні фактори, що впливають на управління проектами. Визначено ключові точки, на яких організація повинна зосередитися, щоб досягти максимального впливу на свою конкурентоспроможність в умовах обмежених ресурсів.

Ключові слова: *управління проектами; конкурентоспроможність; обмежені ресурси.*
Табл. 4. Літ. 13.

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СОВРЕМЕННАЯ РОЛЬ УПРАВЛЕНИЯ ПРОЕКТАМИ В КОНКУРЕНТОСПОСОБНОСТИ КОМПАНИЙ

В статье представлены результаты исследований о влиянии управления проектами на конкурентоспособность компаний и выявлены основные факторы, влияющие на управление проектами. Определены ключевые точки, на которых организация должна сосредоточиться, чтобы добиться максимального воздействия на свою конкурентоспособность в условиях ограниченных ресурсов.

Ключевые слова: *управление проектами; конкурентоспособность; ограниченные ресурсы.*

Introduction. The current state of the world's economy is affected by globalization and information technologies convergence reinforcement of competition and shortening of a life span of competitive advantages. Increased use of project management combined with information technologies can facilitate labor, teamwork and contribute to minimization of geographical distances and differences. A company can flexibly create teams, which, under certain task demands, can change quickly and thanks to software can also be controlled and coordinated without direct contact. Therefore, it is crucial for companies to choose the right management tools. Project management is a tool that helps companies focus on the realization of their objectives. In this paper, we present the results of the research project VEGA 1/0933/14 on project-oriented organizations conducted by the University of Economics in Bratislava.

Literature review. H. Kerzner (2009) wrote that increasingly more businesses are accepting project management as the way they work and he shows the importance of information sharing and benchmarking. Next, he identified the current development

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fields of project management: project management maturing model, effective procedural documentation, project management methodologies, constant improvement, capacity planning, and competency models. S. Marsina (2013) argues that transformation process to project-oriented company "is decomposed into five areas: training and development of human resources, communication, knowledge, project management development and the development of norms and standards". A. Hamranova et al. (2014) wrote about project management as a prerequisite for modern management of organizations. The author found out that to become a mature project-oriented organization a company needs to undergo a process based on strategic thinking and systematic approach of owners and managers. The process of creating a project-oriented organization was studied by S. Marsina et al. (2015). Project-oriented organization is defined as the one characterized by technological and organizational innovation, as well as the one that creates new management culture within organization through development and implementation of projects. On the sample of 154 questionnaires, F.A. Mir and A.H. Pinnington (2014) identified a positive impact that the performance of project management had on the success of projects. They argue that organizations should invest time, effort and money into the development of formal methods of project management in the management of key performance indicators. These methods should harmonize strategy and key performance indicators and ensure the implementation in accordance with the stakeholders' perspective. Y. Xu and Ch.H. Yeh (2014) offer the process of how to integrate project assignment and evaluation of project performance. This approach helps create a project-oriented organization with a proactive and transparent mechanism for managing new projects, project managers and performance evaluation of finished projects. R. Atkinson (1999) studied the success criteria for IS-IT project management. He wrote that using "The Iron Triangle" (cost, time and quality) "has become inextricably linked with measuring the success of project management". R. Atkinson also argued there can be two types of errors in project management. First is when something is done wrong, and the second is when something has not been done as good as it could have been done or is missing. Finally, he proposed the use of the Square Route to analyze the project, adding the dimensions of information system, organizational benefits and stakeholder benefits to this evaluation model. A.K. Munns and B.F. Bjeirmi (1996) studied the role of project management in achieving project success. They argued that project management team should not be entirely responsible and that client should take more active role in project development. They wrote that project performance could be evaluated in one of three ways: evaluating project management techniques and implementation, perceived values and client satisfaction. Four dimensions of project assessment were proposed by A.J. Shenbar et al. (1997). These dimensions are project efficiency, impact on customer, business, and direct success and preparing for the future and have to be evaluated in relation to time as they are time-dependent. The measures of success that have to be assessed with respect to these 4 dimensions are: meeting operational and technical specifications, meeting time and budget goals, fulfilling customer needs, solving a major operational problem, actual use by the customer, customer satisfaction, level of commercial success, generation of significant market share, opening new markets and new lines of products and development of new technologies. According to J.R. Turner et al. (2013), one of the promising areas

of research in project management are earned value management and its extensions like forecasting project completion time, earned schedule method and integration of planning and control of various parameters in focusing on scope, time, cost, quality and risk. Critical success factors for Six Sigma projects were studied by D.S.T. Marzagao and M.M. Carvalho (2016). They identified project manager competencies stand out as critical project success factors. F.T. Anbari et al. (2008) assessed how post-project reviews could help an organization improve the way in which its projects are conceived, implemented, reported and evaluated. They concluded "that primary triple constraints of delivering the project on time, on budget and according to scope/specifications require that knowledge-based service projects be implemented by a team of professionals deployed for the purpose of implementing projects". They also mention the secondary triple constraints of delivering projects to the desired level of quality, meeting customer expectations and succeeding in managing and mitigating various risks (technical, schedule, cost, quality). They concluded that these constraints are "best met by a project team with a clear purpose". Also "post-project reviews provide organizations with an opportunity to generate the historical information that allows time and resources to be accurately estimated and project risks to be contained". P. Leyman and M. Vanhoucke (2017) wrote about capital constrained projects and capital and resource-constrained projects. They wrote there is an observable focus on conventional measures of performance which are non-decreasing functions of the activity finish times; however, there is also growing popularity of non-regular objectives like maximization of net present value.

Research objective. The objective of this paper is to study the effects of project management on company's competitiveness, the identification and specification of relevant factors on influence of project management. As a result, we have identified the hot spots on which a company can focus if it has limited resources in order to achieve maximum impact on its competitiveness.

We expect that the ability to customize project constraints will have a significant positive impact on the competitiveness of companies. Such ability indicates either a well-developed project management system or capacity to influence the terms of cooperation with other subjects in their favor. Furthermore, we expect that constraints will have a negative impact on the competitiveness. As an expression of postindustrial economies, we expect the technological character of constraints. The third assumption is that the competitive form of today's project management will not be too demanding in terms of financial resources. Cost-effective use of project management assumes broad application of project management as a sign of project-oriented organization and is not used exclusively to implement just the most important task.

Methodology description. The findings presented in this paper are part of the results achieved in our three-year research project on project management conducted throughout 2014–2016. All of the presented data were collected during the second field study (March-April 2016). Our research was performed using a questionnaire method on the sample of 227 companies. The data were analyzed through PSPP. To analyze the data we used descriptive and inductive statistical methods. To test the presumptions, we used the analysis of variance and linear regression. The results were considered statistically significant if the level of significance was 0.05 or below. The

objects of our study were measured on the 4- and 5-point scales, which could have values from 1 to 4, or 5 respectively.

On the four-grade scale, we have measured the number of employees, competitive position and use of project management. Constrains, customization options, and resources were measured on the five-grade scale. To measure the number of employees we used a standard company classification according to the EU: up to 9, 10–49, 50–249, 250 and more employees. The competitive position variable had to evaluate the success of a company operating in the industry's competitive environment. It could take the following values: leader at the market, direct follower, in the first half, and in the second half. With the question of the use of project management, we studied the intensity of project management use in business. Companies responded on the scale from involving the project management in all important tasks, through only a few, and only the most important ones, to not using project management at all. Project-oriented businesses would be those that address their important tasks using project management. With the constraints variables we studied, what are the biggest constraints of projects: scope, cost, time, legislation, finance, politics, and technology. The respondents rated each constraint on the five-grade scale ranging from very little to very much. When asked about adjustment we studied to what extent the business can adjust the triple imperative to their needs: scope, cost and time. We studied how much were the companies bound and how much they could customize project constraints when dealing with projects. The respondents evaluated each factor on the five-grade scale from fixed to full adjustment possible. With resources question, we studied which resources are most important for project success. The respondents had to rate various resources on the five-grade scale. In our research, we followed a list of resources that had to be under control of a project manager (Kerzner 2009): financial, human, equipment, workspace, material, information, and technology. In the regression model design, we controlled for the number of employees and the use of project management, so we account for the size differences between companies and as well for the actual use of project management in the companies.

Key results. After processing our obtained data, we came to the following results listed in Table 1. A typical company in our study is between small and medium size, closer to small one, while micro, small and medium-sized companies together accounted for 83.26% of all the companies. A typical company in our survey achieved in the last 3 years the annual turnover growth rate of 5% a year, while most businesses, precisely 32.16%, had stable, unchanging turnover over the previous 3 years. On average, the companies perceived their competitive position in the range between the follower of the leader and position in the first half. Such evaluation is likely to be distorted, but the ordinal properties are sufficient for further research because they do not measure a position directly, but regarding the other participants, so we can assume that a similar distortion occurs by all participants. Therefore, we expect they can position themselves precisely relative to their direct competitors. Among the 227 surveyed companies 30.40% (69) did not use project management. Another 27.31% (62) companies used project management on all important tasks, 24.23% (55) used project management on a few major tasks, and 18.06% (41) of the companies used project management only when the task had a major role among the priorities. The conclusion derived from our research results is that if a company has introduced

project management, it will try to use it in several tasks to substantiate the initial costs of introduction. 27.31% of the companies can be regarded as having complied with the criteria for the project-oriented organization.

Table 1. **Description of the research sample,** *authors'*

Variable	N	Mean	St.dev.	Min	Max
Number of employees	227	2.24	1.06	1	4
Competitive position	227	2.28	0.94	1	4
Use of project management	227	2.52	1.19	1	4
Constraint: scope	227	2.79	0.90	1	5
Constraint: costs	227	3.51	0.98	1	5
Constraint: time	227	3.53	1.01	1	5
Constraint: legislation	227	3.24	1.10	1	5
Constraint: finance	227	3.52	1.05	1	5
Constraint: politics	227	2.74	1.08	1	5
Constraint: technology	227	2.84	1.01	1	5
Adjustment: scope	227	2.97	1.09	1	5
Adjustment: costs	227	2.83	1.07	1	5
Adjustment: time	227	3.00	1.10	1	5
Resources: financial	227	3.93	0.90	1	5
Resources: human	227	3.62	0.93	1	5
Resources: facilities	227	3.29	0.89	1	5
Resources: workspace	227	2.94	1.02	1	5
Resources: material	227	3.18	1.14	1	5
Resources: information and IT	227	3.55	1.03	1	5

In our research, the companies considered time as their biggest project constraint, followed by finance and costs. 55.95% of the companies (127) considered time as a big or a very big problem, 50.66% (115) labeled finance and 56.39% (128) costs as a big or very big problem. For most businesses constraint of finance, 20.26% (46) caused a very big problem, followed by time 15.42% (35) and legislation 14.98% (34). The least number of businesses had very big problem with constraints in the form of scope 3.96% (9). These results are very interesting and important because they represent vulnerable areas and enable businesses to prepare in advance to solving the problems and planning contingencies for risks.

As a counterpart to project constraints, we studied the possibility of companies to adjust the 3 constraints of project management, also known as a triple imperative of the project, to their needs throughout the project. We found that companies could, on average, adjust their constraints only a little, all with similar averages and volatility. Good or full adjustments to constraints could be made in the case of time in 38.77% (88) cases, costs in 31.27% (71) and scope in 39.20% (89) of the cases.

By studying the resources, we found that as the resources considered most important are finance, followed by human resources and information and information technologies. Workspace and material are considered as the least important. For successful implementation of projects the businesses considered as the very important finance in 71.36% (162) of cases, the second most common were HR in 37% (84) and the third was information and information technology – 53.74% (122) cases.

Conclusions and discussion. In this section, we analyze and describe the influence of factors of project management on a competitive position of a company.

Table 2 shows the impact of the adjustment of each constraint on the competitive position, while we have included the impact of the number of employees and the use of project management in the company to control for those factors. Among the factors influencing competitive position, the possibility of costs adjustment had the biggest impact. Our model of competitive position consists of the number of employees, the use of project management and the ability to adjust costs, time and scope and it explains 19% of the variability of competitive position. A statistically significant effect was observed only for the variables of project management use and the possibility to adapt costs. The variable "use of project management" shows that increased use of project management has a positive impact on competitiveness. Even more importantly, businesses that had the possibility to adjust project costs had better competitive positions at the market. Better competitive position may be caused by the possibility to adjust costs what will increase the likelihood of project success and successful projects results in more successful business. Another view, however, is that it may be a company that already has a better competitive position so it can either naturally afford to adapt its cost better, or it may be able to dictate the terms to business partners.

Table 2. **Impact of triple constraint adjustment on competitive position,** *authors'*

	Competitive position
Number of employees	0.17 (0.11)
Use of project management	0.28* (0.12)
Adjustment of scope	0.00 (0.11)
Adjustment of costs	0.31** (0.11)
Adjustment of time	0.17 (0.11)
R-squared adjusted	0.19

Significance level < 0.1, * < 0.05, ** < 0.01.

Table 3 shows the impact of various constraints on competitive position, while we controlled for the use of project management and the number of employees in the model. We found that among constraints, the most impact on the competitive position was made by technologies. Overall, we found a statistically significant effect of project management use and technologies and we also found a marginally significant effect (the level of significance 0.1) of scope and financial project constraints. This model explains 29% of the variability of competitive position. Businesses that are not constrained by technology had better competitive positions, while companies with constraints in the field of technology had weaker positions. Similarly, our research suggests that a negative impact on the competitive position can also be caused by problematic financing and troubles with project scope fulfillment.

Table 4 shows the model of competitive position, described by the resources. In this model, we studied the intensity of the impact of each resource on company's competitiveness, while we controlled for the size and project management use. This

model explains 17% of the variability of competitive position. By studying the resources, increased competitiveness was observed by those companies who implemented projects with lower demands on financial resources and material resources. Lower demands on financial and material resources indicate that project management was used as a tool. The importance of workspace for project realization is indicated by a borderline significance of 0.1.

Table 3. **Impact of project constraints on competitive position,** *authors'*

	Competitive position
Number of employees	0.05 (0.10)
Use of project management	0.46** (0.11)
Scope	-0.27 (0.13)
Costs	-0.08 (0.13)
Time	-0.12 (0.10)
Legislation	0.11 (0.13)
Finance	-0.22 (0.12)
Politics	0.07 (0.10)
Technology	-0.28** (0.10)
R-squared adjusted	0.29

Significance level < 0.1, * < 0.05, ** < 0.01.

Table 4. **Impact of project resources on competitive position,** *authors'*

	Competitive position
Number of employees	0.19** (0.06)
Use of project management	0.12* (0.06)
Finance	-0.22** (0.07)
Human resource	0.00 (0.07)
Facilities	0.07 (0.08)
Workspace	0.13 (0.07)
Material	-0.14* (0.06)
Information and information technologies	0.10 (0.06)
R-squared adjusted	0.17

Significance level < 0.1, * < 0.05, ** < 0.01.

In this paper, we presented the results of our research with some valuable findings that can be directly applied in practice. Using the method of multiple linear regression, we identified hot spots that had a significant impact on the competitiveness of companies. A common fact across all the results is that competitiveness is positively affected by the use of project management and that companies with more project-oriented organizational approaches achieved better results, which rests the case of the importance of project management in a modern company. Businesses with better competitive position were focusing more on the projects with low financial and material demands. The hot spot, on which more successful companies focused, were technologies. More successful companies did not have too many of constraints in the technology field. If a company wants to be competitive, it can reach the advantage by creating conditions in which it will have the ability to customize project cost constraints to its needs.

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