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## THE EFFECTIVENESS OF PERFORMANCE MEASUREMENT IN TERMS OF THE CONTEMPORARY BUSINESS ENVIRONMENT

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The effective performance measurement systems are inevitably becoming the condition of companies' existence in terms of the contemporary dynamic and very turbulent environment. The effective performance measurement system enables a company to measure and control its performance in accordance with the defined strategy. In the designing of the performance measurement system in the contemporary environment, both financial and non-financial indicators reflecting the effects of the key activities adding the value of any company should be respected. The introduction of the diversified strategically aligned performance indicators should improve the organizational outcomes by increasing the quantity of the information relevant for making a decision, which is at the manager's disposal, which makes easier strategically consistent decisionmaking. The effectiveness of the performance measurement system is influenced by numerous factors, some of which are the subject of the paper research. The aim of the paper is to highlight the significance of the use of multidimensional measures as well as of the specific organizational factors in the process of the contemporary performance measurement systems implementation.

**Keywords:** performance measurement, balanced scorecard (BSC), multidimensional performance measures use, organizational factors, performance measurement role

JEL Classification: M21, M41

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### INTRODUCTION

In order to survive in terms of the contemporary dynamic and very turbulent environment, companies must identify their existing positions, clarify their own aims and act in a more effective and more efficient manner. The performance measurement systems make

all of these possible. Neely et al (1995, 81) define the performance measurement system as a "set of metrics that enables the quantification of the efficiency as well as effectiveness of the actions". An effective performance measurement system enables a company to check if the defined aims have been realized and if the company as a whole has made progress (Lebas, 1995), identifying the position, clarifying the aims and highlighting the areas which should be improved, at the same time making the reliable prediction possible (Neely et al, 1996). The effective performance

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measurement system enables a company to measure and control its performances in accordance with the defined strategy.

In designing performance measurement systems in the contemporary environment, both financial and non-financial indicators reflecting the effects of the key activities adding value of the company should be included (Kaplan & Norton, 1996). The introduction of the indicators aligned with the defined strategy facilitates strategic decision making, which reflects on the final financial results of the company.

Innovations in the performance measurement system mainly point to the role of performance measurement in focusing managers' attention on the long-term consequences of their actions, encouraging them to supervise the implementation of the effective strategy and inform about the evaluation and development of organizational capabilities (Kaplan & Norton, 1996; Simons, 2000). While some empirical studies point to the fact that the introduction of contemporary measurement systems might result in numerous better final results (Davis & Albright, 2004; Malina & Selto, 2001), the results of other studies are unambiguous (Ittner et al, 2003a), and there is a limited insight into how improvements are realized.

Consequently, the paper is going to examine in what relation the use of multidimensional performance measures and the effectiveness of performance measurement systems are. Organizational factors (top management support, training, involvement of employees, connection between performance and rewards) have a significant impact on the effectiveness of the performance measurement implementation.

Performance measurement might have more roles. Grafton et al (2011, 690) point to the fact that "the role that enables making decisions refers to the provision of information ex ante to managers in order to remove uncertainties in the decision-making process; conversely, the role that has an impact on decision making refers to the manager's use of information at a higher level in order to evaluate the performances of subordinate managers. The paper stresses the connection between control systems and performances. According the conclusions of the studies of one-dimensional, typical financial performances,

information on performance measurement is considered to have an impact on managerial actions by having them included into the evaluation mechanisms (Sprinkle, 2003). Although contemporary performance measurement systems have primarily been designed and adopted to enable strategically consistent decision making rather than for evaluation (Kaplan & Norton, 1996), it is evident that information on performance measurement is of remarkable significance in the evaluation processes as well (Ferreira & Otley, 2009).

Bearing this in mind, the subject of the research would be directed towards the examination of the potential effects of the performance measurement systems on the final performance of a company, and towards potential factors leading to such effects, too. Paper also accentuates the twofold role of performance measurement in the decision-making process. The aim of the paper is to examine the factors that have an impact on the effectiveness of performance measurement and accentuate the connection between the control systems and the final performances of a company. The key hypothesis in the paper is that the effectiveness and efficiency of the performance measurement system depend on the use of multidimensional performance measures and specific organizational factors as well.

In order to test the starting hypothesis, firstly a qualitative methodology based on studying and a descriptive analysis of the research problem would be applied, and the empirical researches of other authors in field of accounting and business economy and management will be used, and by the methods of synthesis and deduction, various attitudes will be synthesized, based on which general conclusions will be derived in relation to the impact of specific organizational factors on the effectiveness of the performance measurement system and in relation to the role of performance measurement in the decision-making process as well. Besides, based on the original empirical research conducted by the author, specific conclusions for the Republic of Serbia will be derived.

Starting from the defined subject, aim and hypothesis, firstly, we will present the literature review of the effectiveness of performance measurement systems and the connection between multidimensional performance measures and specific organizational factors and final results; then, we will speak about

the research methodology in the empirical researches carried out by other authors and in the original author's research, after which relevant conclusions will be derived, indicating possible research limitations and future research directions.

## LITERATURE REVIEW

### **The effectiveness of performance measurement systems**

The performance measurement systems have been a very interesting research area in the last two decades, and from various aspects: their purpose and usefulness (Simons, 2000), design (Kaplan & Norton, 1996) and implementation (Speckbacher et al, 2003).

"An effective performance measurement system improves the congruency of employees' aims and organizational aims, enabling managers to evaluate their own performances as well as the performances of employees in an effective and efficient manner" (Tung et al, 2011, 1289), "has an impact on individual performances through cognitive and motivating mechanisms" (Hall, 2011, 68) and facilitates the formulation of the future strategies and business activities in terms of a more visible environment dynamism (Bisbe & Malagueño, 2012) and a greater diversification of business activities (Micheli et al, 2011).

The contemporary business environment, as remarkably unpredictable, dynamic, heterogeneous and complex, simply imposes a need to apply financial as well as non-financial performance measures, which are multidimensional performance measures. Coram et al (2011) examine the extent to which financial analysts rely on non-financial performance indicators and find asymmetric interests for non-financial indicators in dependence on the trend of interests for financial information.

The alignment of the strategy, objectives and measures as well as the inclusion of financial and non-financial measures from various perspectives is the common thing to all contemporary performance measurement systems. However, there are still limited

empirical investigations examining the effectiveness of such systems. Najmi et al. (2012, 1124) present "a conceptual model for the revision of the performance measurement systems designed on the basis of the performance prism, in a way that the presented model categorizes the revision process and tools into two main categories: the business performances revision and the performance measurement systems revision". Moreover, the majority of studies evaluate the effectiveness of such systems in relation to the total organizational performances (Crabtree & DeBusk, 2008; Davis & Albright, 2004; Ittner et al, 2003b), supposing a direct link between performance measurement systems and total corporate performances. The final performances, however, such as an increase in net sales, a return on capital and a return on equity would not be realized if the specific aims were not realized (for instance, an increase in the sales revenue, cost reduction, the motivation of employees, feedback and a precise evaluation of business units performances).

The effectiveness of the performance measurement systems implementation depends on numerous factors (Tung et al, 2011). The first one is related to the use of multidimensional performance measures that could remove the limitations of the traditional performance measurement systems and increase the effectiveness of the same as well (Van der Stede et al, 2006; Kaplan & Norton, 1996). Although the use of multidimensional performance measures has widely been adopted in the literature, which has resulted in numerous multidimensional models (Van der Stede et al, 2006), there is a significant variation with respect to the extent to which the most prominent multidimensional approach, the BSC, has been adopted in the USA, the German-speaking countries, the Nordic countries and Serbia (Domanović, 2010, 306-310), which makes the link between such measures and the mere effectiveness of performance measurement systems suspicious.

The effectiveness of performance measurement systems from the various aspects has been the subject of interest of many authors in recent times. Thus, Grafton et al (2010) examine the role of performance measurement and evaluation in the process of the building of organizational capabilities and performances. Pavlov & Bourne (2011) analyzed the effects of performance measurement on performances based on

organizational routines as analytical instruments in order to connect various factors, which have an impact on performance measurement effectiveness, into one coherent explanatory model. "Organizational routines are actually organizational processes which lead to organizational performances and are conceptualized at two levels – an abstract idea of routine and its expression into a specific action" (Pavlov & Bourne, 2011, 112). Lee & Yang (2011, 84) examined "the effect of the organization structure and competition on the performance measurement design as well as the effect of their common influence on performances, stressing that the performance measurement design has two dimensions: the use of integrated performance measures in relation to the four perspectives of the BSC and the phases of the performance measurement systems development". The conclusions partly point to the common effects on performances. Specifically, the mere extent of the competition, there would be the more significant positive correlation between the phase of the performance measurement systems development and performances and the use of integrated measures impact the organizational performances more in the mechanistic organizations than in organic ones. Franco-Santos et al (2012) analyzed the consequences of the use of contemporary performance measurement systems in detail into three categories: employees' behavior, organizational capabilities and performances. In the category of the consequences on employees behavior, they highlight: a strategic focus, cooperation, coordination and participation, motivation, role understanding and job satisfaction, decision making, learning and self-control, leadership and culture, prejudices about subjectivity, conflicts and tensions; in the category of consequences on the organizational capabilities, they stress strategic processes, communication and corporate control; in the category of the consequences on total performances, they point to performance at the business unit level, the team, managers and the whole of the supply chain. "Performance measurement might stimulate the initiatives of employees to improve operating performances, especially when employees participate in the performance measures development" (Groen et al, 2012, 120). Artz et al (2012) examine the role of the performance measures properties in the process of performance measurement systems designing and making strategic decisions at the business unit level.

### **The connection between multidimensional performance measures and performance measurement systems effectiveness**

Multidimensional performance measurement systems improve the consideration of all relevant performance dimensions (Ittner et al, 2003b). Van der Stede et al (2006) found that organizations which, regardless of the strategy, have extensive performance measurement systems, which include objective and subjective non-financial measures, have greater comprehensive performances. Van der Stede et al (2006) also demonstrated that non-financial performance measures are better than the financial ones with respect to the new initiatives implementation and management. The numerous pieces of the literature prove that the implementation of multidimensional systems contributes to the effectiveness of the same (Tung et al, 2011; Crabtree & DeBusk, 2008; Davis & Albright, 2004; Ittner et al, 2003b; Malina & Selto, 2001). Most of these studies examined the effectiveness of such systems from the perspectives of their contribution to financial performances. For instance, Domanović (2010) examines the corporate performance measurement from different branches in order to fortify the relationship between the BSC and financial performances. This study supports the theory that the BSC could be used in order to improve financial performances. Crabtree & DeBusk (2008) found that the BSC is also connected with higher stock returns. Malina & Selto (2001) concluded that the BSC is an effective framework for a corporate strategy evaluation. Their results point to the causal relations between motivation, strategic alignment and effective management control with the BSC.

### **The connection between organizational factors and performance measurement systems effectiveness**

The most prominent organizational factors with an impact on performance measurement systems effectiveness are the top management support (Bourne et al, 2002), training, employees participation and a link between performances and rewards (Burney et al, 2009).

The top management support is a significant contingent factor supportive of different innovations. The influence of the top management on performance

measurement systems effectiveness was analyzed (Tung et al, 2011; Bourne et al, 2002; Kennerley & Neely, 2002), accentuating that the top management support is critical for the design and implementation of the performance measurement system.

Cavaluzzo & Ittner (2004, 249) point out that "performance measurement systems effectiveness directly depends on the extent of managers' training". All performance measures should be communicated clearly and should be relevant and reliable so that managers could receive useful information for making decisions, and employees' better understanding, which would reflect on the greater commitment and efficiency.

A greater participation of employees in the process of designing and implementing performance measurement systems directly contributes to their effectiveness (Kaplan & Norton, 2001) because of the cognitive mechanisms such as better communication, knowledge application, job understanding, on the one hand, and the motivating mechanisms such as less resistance to change, commitment to the performance measurement system, the acceptance of feedback and aims (Hall, 2011), on the other.

The link between performances and rewards is a vital contingent factor in motivating employees and is considered as a crucial factor of systems effectiveness (Burney et al, 2009).

### **The performance measurement role in the process of making decisions**

Performance measurement information facilitates the decision-making process, the identification of the problem and suggesting corrective measures; gives a signal on critical processes, improves organizational learning and enables the plans and strategy revision as well (Grafton et al, 2010; Kaplan & Norton, 1996; Simons, 2000). Performance measures might be used for feedback and feed-forward as well as for a diagnostic and interactive control (Widener, 2007). In the paper, the use of performance measures in the feedback/feed-forward dichotomy is conceptualized. However, the adoption of the feedback/feed-forward distinction enables managers of organizational

units to focus their attention on the distinctive use of performance measures in the process of making individual decisions. Tessier & Otley (2012) analyze the positive and negative control dimensions and the result they give the revised model, which explicitly makes a distinction between managers' attention and employees' perceptions of control.

Feedback and feed-forward performance measures are part of cybernetic control (Grafton et al, 2010, 692). The primary difference between them is that feedback control is focused on the evaluation of real outcomes, and feed-forward control is focused on the prediction of future outcomes. "The use of performance information as a feedback mechanism provides managers with information of the outcomes that do not fulfill the expectations and acts as a catalyst of the problem identification" (Grafton et al, 2010, 692). This stimulates problem solving, the identification of the corrective action and organizational learning in the domain of the existing activity (Ferreira & Otley, 2009) as well as managers' focusing on the realization of the current aims (Nørreklit, 2000; Simons, 2000). Nørreklit (2000, 81) accentuates the fact that "the control process should be more interactive in the strategy formulation, making the BSC and in the process of the BSC implementation". The use of performance measures as a way of signaling future outcomes, communicating the strategy to employees and being a catalyst of planning and aims setting increases future performances (Kaplan & Norton, 1996).

The management control systems balance enables the creation of dynamic tensions and unique organizational capabilities, so that the interactive control lever has a significant role (Mundy, 2010). Gond et al (2012) analyze the influence of the management control system on the integration of sustainability in the framework of the organizational strategy based on Simon's control levers.

## **RESEARCH METHOD**

The paper relies on the empirical analysis of the relation between the specific organizational factors (top management support, training, employees participation and a link between performances and rewards) and

performance measurement systems effectiveness (Tung et al, 2011), the examination of the performance measurement effects on performances (Pavlov & Bourne, 2011), the review of the potential effects of the contemporary performance measurement systems on employees' behavior, the organizational capabilities and performances of the business units, teams and managers (Franco-Santos et al, 2012), the empirical analysis of the performance measurement role and evaluation in building up organizational capabilities and performances (Grafton et al, 2010), as well as the original author's empirical research conducted in 2009, while writing the doctoral dissertation (Domanović, 2010). The subject of the author's research was, among other things, the role of the balanced scorecard in the process of corporate efficiency improvement, generally, with a special view of the possibilities and effects of the BSC implementation in companies in Serbia, if the author supposed that managers were partly or in detail acquainted with the BSC concept and had partly or thoroughly implemented it in the process of the corporate efficiency evaluation. The starting hypothesis was that the BSC implementation was in the positive correlation with the corporate efficiency improvement.

In the empirical research of the other authors, whose research subject has already been explained (Tung et al, 2011; Franco-Santos et al, 2012; Grafton et al, 2010), the technique of the survey of financial managers was applied on a random sample of productive and service organizations in Australia, while in the author's original research, the questionnaire technique and interview with financial managers and control managers in reputable selected companies in Serbia were also applied. Senior financial managers and control managers were selected because it was believed that they would have a better understanding of performance measurement systems. As to the influence of the organizational factors on performance measurement systems effectiveness based on the research carried out by the already mentioned authors, the responsiveness rate is 30.9% (Tung et al, 2011, 1294). As to the performance measurement role, 794 respondents of the business unit managers were identified, 188 questionnaires were filled out and sent back (the responsiveness rate being 24.58% is), and

183 were completely filled out; the respondents had been working for the current employer for 12 years on average (median= 10 years), and had an average 7.48-year-long experience (median = 5 years) in the current strategic business units (SBU) and had been in the position of a manager for 4.17 years (median = 3 years); the respondents were of an average 40-49 years of age (Grafton et al, 2010, 695). In the author's original research, six questionnaires were directly collected from and filled out by the managers of reputable companies, and one questionnaire was uncompleted (Domanović, 2010, 268).

### **Variable measurement**

The system effectiveness was measured depending on the level at which the desired outcomes of the performance measurement systems had been realized. Tung et al (2011, 1294-1296) asked the respondents "to evaluate the level at which their performance measurement system realized each of the desired outcomes according to Likert's 5-level scale, starting from 1 "not at all" to 5 "to a great extent", so they divided the outcomes into two dimensions: those referring to the achievement of the organizational aims and objectives, thus marking this dimension as 'outcomes related to performances', on the one hand, and those referring to employees, thus marking this dimension as 'outcomes related to employees'. The performance outcomes include: motivating performances, providing help in the aim realization, the development of the performance-oriented culture, change support, the supply of useful feedback on performances, the strategy implementation, a precise business evaluation, employees' commitment to the defined aims and the alignment of the individual performances with the business units' performances, while the outcomes connected with employees include: individual skills and knowledge development, the identification of talented employees, talented employees rewards, the identification of poor performance employees, poor performance employees management (Tung et al, 2011, 1294-1295). An average score by all these items was calculated, so that greater (lesser) scores represented the better (worse) effectiveness of the performance measurement system.

In order to evaluate the extent to which the multidimensional measures were used, two approaches were applied: firstly, the respondents had to simply mark if they had implemented the BSC ("yes" or "no") and secondly, a more comprehensive approach focused on the performance measures adopted in the organization, demanding that the respondents should mark the extent to which they had used different measures from different BSC perspectives (Tung et al, 2011, 1295). These measures had been derived from the BSC literature and were largely designed for production organizations (Van der Stede et al, 2006; Ittner et al, 2003b; Kaplan & Norton, 1996). "The average 0.6-point factor analysis revealed 26 items in 6 specific dimensions, covering the following dimensions: finance, internal business processes, learning and growth and sustainability" (Tung et al, 2011, 1295). Performance measures from the finance perspective include: sales revenue, a return on investment, an improvement of the net assets/liabilities improvement. From the customer perspective, the measures are: product delivery on time, the number of new customers, product quality, and the number of returned products. From the perspective of internal business processes, the measures are: resource consumption, productivity, a work cycle, and warranty right costs. From the learning and growth perspective, the measures are: training hours, an improvement of employees' capacity, the number of implemented suggestions made by employees, the number of new products, the time of the commercialization of new products, the percentage of new product revenue. From the perspective of sustainability, the measures are: investments in environment management, investments in the local community, services connected with the local community. Each of these five perspectives is scored as a sum of particular items in each perspective, where greater (lesser) scores that pointed to the fact that the performance measurement system is focused on each perspective to a greater (lesser) extent, and an average score is calculated as a sum of the average score in each perspective, thus a greater (lesser) score means that the multidimensional measures are used to a greater (lesser) extent (Tung et al, 2011, 1295).

Organizational factors, which are relevant for the effectiveness of the performance measurement system, are: the top management support, training, employee

participation, a link between performances and rewards. Each of these four organizational factors was measured by the summarized Likert's scale of 5 points, starting from 1 "and do not agree at all" to 5 "strongly agree" (Tung et al, 2011, 1295), so that "the top management support was measured by the summarized scale, based on the respondents' statement about how much the top management supplied the adequate resources, efficiently communicated with the employees and by its authority provided support to the performance measurement system" (Tung et al, 2011, 1295). The top management support was measured as an average score, so a greater (lesser) score points to a greater (lesser) top management support. Specifically, the respondents had to evaluate if the employees had been trained to develop, implement and understand the performance measurement systems at an adequate level, so training was also measured as an average score, where a greater (less) score points to a greater (lesser) training level. Besides, there was an examination of the extent to which the respondents took part in designing the performance measurement system and in the mere selection of performance measures, so the final score represents the average scores of particular items, and a greater (lesser) score means greater (lesser) employees' participation (Tung et al, 2011, 1296). In order to analyze the effectiveness of the performance measurement system, it is important to examine how much the contemporary performance measurement system stimulates employees to be more efficient in their jobs, that is the extent to which performances are connected with financial rewards such as payments or bonuses as well as non-financial rewards such as recognition or service rewards.

In the author's original empirical research, the respondents had to state if they were acquainted with the contemporary performance measurement system, if they had implemented some contemporary model or were still implementing the traditional one, what the specific effects of the contemporary model implementation on the final corporate performances and the performances of the strategic business units and individuals were (Domanović, 2010, 323-326). The author offered several potential answers and the respondents were supposed to circle all they found relevant to them, although there were questions where they were supposed to add something not offered

in the survey. Based on the respondents' replies, descriptive statistics were made, which gave a real insight into the effects and possibilities of the BSC implementation in Serbia.

### The usage of the performance measurement information

The feedback and feed-forward application of the performance measurement information, Grafton et al (2010, 697), was measured via the eight issues based on the existing literature (Ittner et al, 2003a; Kaplan & Norton, 1996; Simons, 2000; Sprinkle, 2003). The respondents (both in the author's original empirical research and in the research of the mentioned authors) were supposed to rank the extent to which they actually used the measures which facilitated decision making: "(a) setting the performance targets for the business units and/or employees at the business unit level; (b) the guidance for the strategy implementation; (c) the organizational learning promotion; (d) the analysis of the past decisions' effects; (e) the prompt re-examination of the strategy and the meta values; (f) action plans development; (g) the communication of the significant aspects of the business units strategy; (h) the identification of the necessity for corrective actions" (Domanović, 2010, 323-326; Grafton et al, 2010, 697). Items a, b, f and g were marked as the feed-forward control, while the others were marked as the feedback control.

### Performance

In order to gain an insight into the business unit performances, the respondents had to evaluate the performances during the last year in relation to the competitors (where 1 = 20% better than competitors, 7 = 20% worse than competitors); and the total business units performances in relation to the expectations (where 1 = bad, 7 = remarkably) (Grafton et al, 2010, 697). "The factor analysis of the two items reveals one factor that could be marked as "performance" (PERF) and this concept includes 67% of the explained variations and Cronbach's Alpha is 0.52; so, it was found that PERF was in the significant correlation ( $r = 0.276$ ,  $p < 0.01$ ) with the measure consisting of the respondents' performances in comparison with the

competitors with respect to: (a) the market share; (b) the profit; (c) the rate of the sales revenue, which demonstrated the validity criteria" (Grafton et al, 2010, 697-698).

## RESULTS

Table 1 accounts for the summary descriptive statistics for dependent and independent variables.

An average score of the performance measurement system effectiveness for the performance outcomes was and for the staff outcomes was something higher than the midpoint of the interval, which shows that the respondents evaluated their performance measurement systems as moderately effective. The outcomes related to the performances were realized to a greater extent, with the mean score of all the items being equal or higher than the outcomes related to the staff. The outcomes related to the performances and those realized to the greatest extent were: providing help in the aim realization; feedback information about the employees' performances; the development of a performance-oriented culture and an accurate evaluation of the business units performances. The outcomes related to the staff and those realized at the highest level included: the development of individual skills and knowledge, the identification of talented employees and rewarding talented employees. As to the organizational factors, the mean value of the linkage between performances and non-financial rewards was below the midpoint of the interval and points to a relatively weak connection between performances and non-financial rewards.

As to the usage of the multidimensional performance measures, the research (Tung et al, 2011, 1297) also showed that 39 respondents (33.1%) stated that they applied the BSC in their business units. A more comprehensive approach to the measurement of the multidimensional performance measures use was focused on the extent to which the 26 performance measures from the five BSC perspectives were implemented. The mean value of the multidimensional measures use is below the midpoint of the interval, which points to the moderate use of the multidimensional measures in production organizations.



Table 1 Descriptive statistics

Variables	Number of respondents	Mean	Standard deviation	Minimum (theoretically)	Maximum (theoretically)	Cronbach $\alpha$
Independent						
Multidimensional performance measures use	118	2.94	0.70	1.17 (1)	4.67 (5)	
Top management support	117	3.51	1.02	1 (1)	5 (5)	0.915
Training	117	3.11	1.07	1 (1)	5 (5)	0.963
Employees participation	117	2.41	1.02	1 (1)	5 (5)	0.761
Link between performances and financial rewards	117	3.50	1.16	1.00 (1)	5.00 (5)	
Link between performances and non-financial rewards	117	2.93	1.13	1.00 (1)	5.00 (5)	
Dependent variables						
Performance measurement systems effectiveness (performance outcomes)	117	3.50	0.81	1 (1)	5 (5)	0.932
Effectiveness of the system (staff outcomes)	117	3.26	0.93	1 (1)	5 (5)	0.924

Source: Tung et al, 2011, 1296

As it can be seen from Table 2, the biggest accent was on the financial perspective (3.59), then on customers (3.43), learning and growth (3.11) and internal business processes (3.06). The sustainability mean (2.19) was below the midpoint of the interval, which points to the weak application of this perspective.

As to the Republic of Serbia (Domanović, 2010), the managers were mainly not acquainted with the BSC or were partly acquainted with it. Truly, some managers

did apply the BSC, but were not conscious of what the BSC was. The biggest accent was still on (Table 3) finance, then on customers, learning and growth and internal business processes.

The results of the research the author had conducted showed that managers of many companies in the world were skeptic with respect to the final effects of the BSC implementation on corporate efficiency. Corporate managers in the German-speaking countries

Table 2 Multidimensional performance measures use

BSC perspectives	Mean	Rank
Finance	3.59	1
Customers	3.43	2
Internal business processes	3.06	3
Learning and growth	3.11	4
Sustainability	2.19	5

Source: Author, based on Tung et al, 2011, 1297

Table 3 Multidimensional performance measures use in the Republic of Serbia

BSC perspectives	Number of companies
Finance	5
Customers	5
Internal business processes	3
Learning and growth	4
Others	/

Source: Author

considered the BSC as an instrument of the shareholder value management. The BSC is present a lot in the Nordic countries, contributing mostly to the logistic, delivery reliability and warehousing, as well as to non-financial efficiency indicators. In Serbia, a consistent implementation of the BSC is characteristic for companies with foreign capital. The economic effects of the BSC implementation were: a more systematic analysis of the efficiency parameters, costs comparison and a more efficient realization of the business strategy, and at the individual level, the BSC helps in having jobs done, points to certain shortcomings of the processes and employee dissatisfaction, and enables undertaking corrective measures. Also, the variable payment of employees, primarily managers, partly depends on the plan realization, i.e. on the target parameters value in the BSC.

#### Analysis of the multidimensional measures use and organizational factors on performance measurement systems effectiveness

Table 4 displays the results of the one-way variation analysis (ANOVA), which examined the difference in performance measurement effectiveness depending on whether the respondents applied the BSC or not, showing that the respondents who applied the BSC had reached a more significant effectiveness level both with respect to the performance outcomes and the staff outcomes.

These results provided us with a preliminary proof that the use of multidimensional performance measures was connected to performance measurement effectiveness, which confirms the starting hypothesis. The connection between multidimensional measures

and effectiveness was also analyzed by a more comprehensive approach on the basis of the extent to which the multidimensional measures were used. A step-by-step regression is applied in order to examine the connection between the use of the multidimensional performance measures use and organizational factors and the system effectiveness, based on the replies provided by the 115 respondents (Table 5).

The results accounted for in Table 5 show that, with respect to the outcomes related to the performances, the model was very statistically significant ( $F_{1/4} = 63.812$ ,  $p_{1/4} = 0.000$ ), with the coefficient of determination 0.530, pointing to the fact that 53% of the variation in the performance outcomes could be explained by explanatory factors. This model revealed that the use of multidimensional performance measures ( $p_{1/4} = 0.000$ ) was significantly connected with the system effectiveness.

Besides, the top management support ( $p_{1/4} = 0.000$ ) was significantly connected with the outcomes connected with the performances. As to the outcomes connected to the staff, with the coefficient of determination 0.405, which points to the fact that 40.5% of the variation in the realization of the outcomes connected to the staff, could be explained by the explanatory factors.

Thus, the use of multidimensional performance measures is significantly connected to the realization of the staff outcomes and the training level was also significantly connected to the performance measurement effectiveness. These findings give a further support to the starting hypothesis. The significance of the use of the multidimensional performance measures in explaining the level of the

Table 4 Results of the one-way variation analysis (ANOVA)

Implementation BSC	Number of respondents	Performance outcomes			Staff outcomes		
		Mean	F statistics	Signifi- cance	Mean	F statistics	Signifi- cance
Non-users	39	3.88	14.297	0.000	3.71	15.869	0.000
Nekorisnici	78	3.31			3.03		

Table 5 Results of the gradual regression analysis

Variables	Performance outcomes			Staff outcomes		
	Coefficient	t statistics	Significance	Coefficient	t statistics	Significance
Multidimensional systems	0.343	4.512	0.000	0.374	4.465	0.000
Top management support	0.487	6.411	0.000			
Training				0.362	4.325	0.000
F value	63.812			38.535		
P value	0.000			0.000		
Coefficient of determination	0.530			0.405		
Adjusted coefficient of determination	0.522			0.395		
Number of respondents	115			115		

Source: Author, based on Tung et al, 2011, 1298

effectiveness of the performance measurement systems imposed a further explanatory analysis in order to examine the connection between the BSC perspectives and the system effectiveness.

#### **Analysis of the connection between the BSC perspectives and performance measurement system effectiveness**

The gradual regression analysis has produced caused the findings that the outcomes connected to the performances are statistically significant, with the coefficient of determination 0.528, which points to the fact that 52.8% of the variations in the realization of the outcomes connected to the performances could be explained by the two perspectives of the BSC, significantly connected to the outcomes connected to the performances: internal business processes and learning and growth. The outcomes connected to the staff are statistically significant, with the coefficient of determination 0.499, which means that 49.9% of the variations in the realization of the outcomes connected to the staff could be explained by the two BSC perspectives, which have significantly been connected to the outcomes connected to the staff: learning and growth, and sustainability.

In Serbia, the outcomes referring to the performances could significantly be explained by the financial

perspective and the customer perspective (100%), whereas the outcomes referring to the employees could be explained by the internal business process perspective (60%) and the learning and growth perspective (80%).

#### **CONCLUSIONS**

Performance measurement systems effectiveness could be observed through the two dimensions, namely outcomes connected to corporate performances and outcomes connected to staff. The factor analysis revealed that the midpoint of both dimensions was above the midpoint of the interval, which means that the system effectiveness is at a moderate level. Such a conclusion highlights the significance of the examination of the contingent factors having an influence on the system effectiveness. The results also showed that a bigger success was realized in the performance-oriented outcomes than in the staff-oriented ones. This means that the performance measurement systems should mainly be used as a management tool to motivate, implement a strategy and realize aims, i.e. as an instrument of strategic control and management control, too.

The realization of the outcomes connected to the staff such as concern for employees, the efficient usage

of time, and management by poor-performance employees was less highlighted. The final conclusion refers to the mere existence of a company in a changeable environment, which depends on both outcomes. Hence, the organizations that look at the employees as potential partners and significant assets increase a possibility to achieve better organizational performances. Also, there is evidence that staff outcomes could be of help during the performance outcomes realization. If organizations were devoted to employees' concerns in the right way, they would be more emotively connected to the organization and, hence, be more willing to realize the organizational aims.

The more comprehensive analysis of the use of multidimensional performance measures revealed that production companies put the biggest emphasis on the measures referring to the finance perspective of the BSC, then on customers, learning and growth, internal business processes and sustainability.

The analysis of the relationship between the use of multidimensional performance measures and organizational factors and effectiveness revealed that the use of these measures, as operationalized in the BSC, together with organizational factors (the top management support and training) is significantly connected with effectiveness.

The analysis of the relationship between the organizational factors and the system effectiveness gains an insight into the prevailing organizational conditions that could increase/impel effectiveness. The top management support is connected with the performance outcomes, and the training level with the staff outcomes. Hence, in order to realize desired performance outcomes, the top management should make a concentrated effort directed towards a continual improvement, an open communication and a consistent support as well. Hence, the top management was encouraged to be personally devoted to the performance measurement systems and to ensure that enough time and resources were devoted to a meaningful development and management by the existing systems. Besides, organizations providing better staff training could realize desired staff outcomes. The two dimensions of the system effectiveness, the performance and staff

outcomes, enable the management to be conscious of a need to focus on the different aspects of the system effectiveness and provide researchers with a new measure for the evaluation of effectiveness as well. Besides, the connection of multidimensional performance measures and organizational factors with the system effectiveness enables managers to have an insight into the desired characteristics of the effective system and the prevailing organizational conditions supporting the systems. Hence, managers should focus on the use of multidimensional measures and increase the top management support and training in relation to the performance measurement systems.

This research is subject to the usual limitations of the survey and data collection from secondary sources. Since the survey is useful in the process of the determination of the connections, not causal relations, among variables, this kind of approach generates potential threats connected with the respondents' replies. This is also valuable for the author's research, beside the fact that the sample size was too small and insufficient for a more serious statistical analysis. In the future, the sample size should be increased and the connection of other organizational factors such as, for instance, the organizational structure, the management style and human relations with the system effectiveness should be taken into consideration. In order to increase the generality of the conclusions, future studies could be implemented using similar parameters in other activities such as the services and non-profit sectors.

In the future, the ways in which performance measurement impacts decision making could further be researched, especially in such cases where the roles are potentially in conflict, instead of mutually strengthening each other. It would be interesting to examine the extent to which an interaction amongst the roles of performance measurement is more or less focused on financial measures, and how these interactions reflect on specific individual decisions.

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