Economic Research-Ekonomska Istraživanja

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/rero20

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To cite this article: Ionica Oncioiu, Vinko Kandzija, Anca-Gabriela Petrescu, Ioana Panagoreţ, Marius Petrescu & Mihai Petrescu (2022) Managing and measuring performance in organizational development, Economic Research-Ekonomska Istraživanja, 35:1, 915-928, DOI: 10.1080/1331677X.2021.1951317

To link to this article: https://doi.org/10.1080/1331677X.2021.1951317

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Published online: 19 Jul 2021.

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ECONOMIC RESEARCH-EKONOMSKA ISTRAŽIVANJA
2022, VOL. 35, NO. 1, 915–928
https://doi.org/10.1080/1331677X.2021.1951317

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Managing and measuring performance in organizational development

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ABSTRACT

The purpose of this study is to contribute to our understanding of the effects of implementing optimized solutions to increase the performance of a company. Based on a sample of 1442 small companies, the design of a linear model of optimization was selected because of the limits of the model of organizational development in Romania and the perspective on the market value of firms, which, in fact, is the most eloquent result of management's actions. Research results reveal that successful performance management is important for the survival and success of any organization in today's environment, which is highly competitive and continuously evolving. As expected, the management of an entity goes beyond time, and the role of the leader of the future is to ensure the long-term growth of shareholders' wealth and the prosperity and well-being of the company he or she leads. Finally, our conclusions show that this model is valid and can be used to produce and implement organizational change in Romanian companies.

ARTICLE HISTORY
Received 24 July 2020
Accepted 29 June 2021

KEYWORDS
Performance; organizational development; optimization; positive organizational; behaviour; effectiveness; small companies

JEL CLASSIFICATION
L25; M10; M21

1. Introduction

Today's entities are facing increasing transformation pressures - moving from product-centric business models to new models focused on creating and capturing different sources of new value (Akgün et al., 2019; Chung et al., 2018). Moreover, in this digital age, the economic entity's performance has exceeded its profitability limits and any development strategy involves taking into account in addition to KPI's performance indicators and predictability and sustainability indicators (Gök & Peker, 2017; Hale et al., 2016; Kwon & Rupp, 2013; Lin & Kwantes, 2015).

In the opinion of performance management practitioners, the economic and financial performance are living concepts, always up to date, defined in the evaluation of global performance as integrative concepts (Andries & Faems, 2013; Bol, 2011;

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Ericksen & Dyer, 2005; Latham & Pinder, 2005; Lichtenstein, 2000; Rojon et al., 2015). From this approach, we can identify the idea that any information on economic and/or managerial performance published by a company will be the basis for decision-making by stakeholders and is a mirror of the past, 'where the problems are' and the future, 'where the results are' (Hauschild & Knyphausen-Aufseß, 2013).

The new global context and perspective of achieving and maintaining performance in a sustainable environment forces the leadership to synchronize managerial decisions with financial-accounting situations as well as industry-specific predictability reports (Lundgren & Wenchao Zhou, 2017). This is to focus on global escalation at the individual level, toward increasing competitive advantage and global development, counteracting external threats, and capitalizing on opportunities by adopting pertinent managerial decisions based on financial indicators (Chatzipetrou & Moschidis, 2018). A linear performance optimization model can be developed as a highly suggestive tool and can, of course, constitute a serious informational base for analyses and discussions in the company's governing bodies to guide the organization (Ahn & Ok, 2017).

This paper takes a fresh look at empirical studies that have tried to demonstrate the connection between organizational performance and organizational change in Romanian companies. All of the scientific processes involved take into account the indicators considered useful in identifying the answer to the central research question: What is the impact of optimizing the component of a performance management system in the design of a performance entity?

Using one of the best known intangible asset measurement models, developed in Sweden by Sveiby, the authors have improved it by combining the four types of indicators (growth, change, efficiency, stability) to generate a regression function of a company's management performance value, then using a linear programming method to optimize its components in order to determine the company's maximum value.

According with the research results, a coherent and effective solution to the problems faced by the performance management system in Romania, starting from the causes that generate them, is conditioned by actions in the main areas that determine their functionality and performance. Of course, there will need to be an effort to adapt by Romanian managers, who have to think internationally and try to become more competitive. As well, the findings obtained are valid and reproducible because they are based on a methodology of research that lends credibility to the conclusions we reached at the end of the research period. Furthermore, the proposed model is relevant regardless of the components of the performance management system at a company level.

The rest of the paper is organized as follows: First, we make a proper dimensioning of the current state of knowledge of performance management system components at a company level, consisting of quantitative and qualitative analyses. Second, we introduce the linear model of optimization. In Section 3, we present our results and discuss our findings. Finally, we provide the conclusion and make some recommendations.

2. Theoretical framework

The diversity of meanings in the concept of performance demonstrates that it is defined differently by users of financial information according to their interests.

Thus, managers are focused on the overall performance of their company, current and potential investors perceive performance in terms of return on investment, employees show interest in the stability and profitability of the company, creditors in its solvency and customers in the stability of the company (Antoni, 2004; Mendy, 2020; Wynen & Kleizen, 2017).

For a long time, the concept of organizational performance has attracted the attention of both theoreticians and practitioners (Bausch & Pils, 2009; Bolman & Deal, 1999; Bourner, 1996; Breuer et al., 2013; Farrukh et al., 2020; Frahm & Brown, 2007; Frese & Fay, 2001). Concerns in the field of performance management continued in the 1980s following two trends: the first considered the impact of strategic planning on an entity's performance, and the second, the role of strategic planning in decision-making by the leadership (Bloodgood & Morrow, 2000; Chandler, 1994; Gong et al., 2009; Sementelli, 2016; Weiss, 2001).

From a conceptual point of view, performance management has been found in the literature since the 20th century (Engellandt & Riphahn, 2011; Tsoukas, 2005). Brown and Harvey (2006) claimed that in spite of the complexity of problems of increased performance, it can be identified by the notion of transforming and the traditional dynamic inherent in efforts for successful change. Edwards (2010) noted that the importance of performance management can be better understood if it is regarded in the context of the expansion, shrinkage, and restructuring of the corporation.

By the same token, Guillén and Saris (2013) saw organizational performance as a transforming adaptive and complex change realized with the help of a model composed of integrated performance indicators reflecting a dynamic and independent approach with the purpose of generating core added value for the business while giving leadership the opportunity to develop the entity on the basis of organizational development principles.

In order for this approach to take shape, the efforts made by various theorists to extend the study on the concept of performance highlight the fact that its definition is made differently depending on the users of financial-accounting information (Guo et al., 2017; Kets de Vries, 2003; Pfeffer, 2012). Therefore, managers pursue the overall performance of their enterprise, investors perceive performance as remuneration of invested capital, employees will show interest in the profitability of the enterprise, creditors will consider solvency, and customers' stability (Fenton & Pettigrew, 2000; Mueller et al., 2018; Munro, 2014).

On the other hand, performing entities 'play their best cards' for three stakes: the first is 'sustainable performance', the second 'finding and retaining talent', the quality of human resources contributing to differentiation in a global and aggressively competitive market and the third is 'research and innovation' (Collins & Clark, 2003; Paton & McCalman, 2008; Yammarino, 2013). According to previous studies in the field and due to the very high pressures of the external environment, high performance organizations are entities that have exceptional financial results, satisfied customers and employees, high productivity, organizations that encourage innovation and skills development of leadership (Burnes, 2004; Connelly et al., 2012; Pieper et al., 2017, Peris-Ortiz et al., 2019; Renn et al., 2014).

At the level of an entity, performance management involves aligning the vision of leadership, strategy and culture with the actions taken to achieve objectives (Akgün et al., 2019; Mendy, 2020). Alignment is reflected both at an operational level, through operations management - reflected in meeting the objectives of the team, department or project, and at an individual level - reflected in the maturity of the entity and the high level of human resource capitalization. Consequently, the evaluation of individual performance increases and its results directly influence the performance management process, leading to the emergence of new tools and methods for measuring performance reflected in the development of performance management systems.

Supporting this view, some authors have shown that the implementation of a performance management within an entity responds to multiple requirements directly related to the level of fulfilment of the established objectives (Gök & Peker, 2017; Rojon et al., 2015).

Facing multiple challenges, such as conceptualization efforts of the field, trying to measure performance, establishing cause–effect relationships, and demonstrating the veracity of approximate variables, it happens that many companies that have a management system use certain individual indicators whose relevance is not fully justified (Brandts & Sol, 2010; Campbell et al., 2012; Fleisher et al., 2014; Searle & Barbuto, 2013; Will, 2015).

3. Methodology and data

In the literature, it is mentioned that there are three large classes of models: iconic, analogical, and analytical (Anh et al., 2018). The most popular models of this kind are operational research models, which include linear programming, dynamic programming, stochastic programming, storage models, Markov chains, and so on. Analog models are used less frequently. They reproduce phenomena in certain fields by resorting to techniques from other fields, by analogy.

Applied to the problem of evaluating the components of a performance management system at a company level, modelling must meet the following conditions, which will be dealt with in the following paragraphs: representing the components of performance management system at the level of a firm as much as possible; modelling the model to optimize these components and for numerical verification and validation of the model; determining the risks of applying optimized solutions; and completing the optimized model of the components of performance management system at the company level.

The analytical model used in this study involves a dependence variable Y function that accounts for the impacts of the independent X variables and associated A parameters. It starts from expressing outputs that the model needs to evaluate. As descriptions of the methods for measuring the components of performance management systems resulting from international experience are required, two formulas of the objective function Y are needed, one for expressing the difference between the market value of the firm and the share capital in the Y1 balance sheet used in the case of the quoted companies, and another, Y2, which expresses the difference between actualized cash flow realized at the end of the year that was projected at the beginning of the year, valid for non-stock companies.

The X variables on which the objective function Y depends are according to the Sveiby (1997) intangible assets monitor method, by which the components of a performance management system express the strategic objectives of the firm in three classes: competence of the firm's staff in terms of entrepreneurial innovation (CFEI), relationships with the market and customers after applying technology transfer mechanisms (MCT), and organizational structure and operation (OSO).

According to Sveiby's Monitor, each of the three classes corresponds to four types of indicators that express the generating value for the enterprise: growth indicators, change indicators (renewal), efficiency indicators, and stability indicators (Sveiby, 2004). Consequently, in a simple expression of the Y function of the X variables, there should be at least one indicator for each of the four categories and for each of the three classes (CFEI, MCT, and OSO).

It follows from the above that the objective function Y expresses causal links of the X variables. Indeed, in Y there are effects of several causes, such as the quality of the products sold, the personnel training level, the average age, the average time employees have worked at the company, the proportion of specialists among the staff, the degree of fluctuation of personnel within the company, etc. As such, objective function Y has to organize information on the factors that generate value through innovation strategies. The terms of this function corresponding to the n X variables, considered causes of the Y result, can be specified by strategic correlation. Since more than two variables have to be correlated, there will be multiple correlations with linear components.

Since it is clear from the description of the indicators that will form set X of the independent variables that they express strategies for achieving managerial objectives within given limits, it means that ultimately the best model for ensuring optimization of the components of the performance management system at the company is the linear programming model (PL). It will consist of an objective Y function of the form:

$$Y = \theta_0 + \sum_j \theta_j X_j \left(j = \overline{1, n}\right), \tag{1}$$

which must be maximized:

$$\max(Y - \theta_0) = \sum_j \theta_j X_j, \tag{2}$$

under the conditions of a system of restrictions of the form:

$$\min X_j \leq X_j \leq \max X_j, \tag{3}$$

and non-negativity restrictions:

$$X_j \geq 0. \tag{4}$$

In these relations, θ_0 is the general correlation coefficient, θ_j represents partial correlation coefficients, and X_j represents the level of strategic indicators.

However, the number of indicators may vary from one firm to another and according to the interest of the research. As far as the system of restrictions is concerned, it will have a size proportional to the number of variables. Working with a large model is undesirable for two reasons: (1) it does not allow a pertinent analysis, and (2) it is not easy to handle. As such, since the modelling methodology is more relevant in this case, the system of restrictions may include nine indicators: two to three indicators for each class of variables (external, internal, proficiency) and one for each category indicator (growth/renewal, stability efficiency): X_1: increase turnover; X_2: value added per employee; X_3: customer satisfaction; X_4: rate of commercial profitability; X_5: expenditure on research and development; X_6: expenditure on research and development; X_7: net investment rate; X_8: net asset productivity; X_9: degree of staff fluctuation.

With regard to the methodology of building the model used to optimize the components of a performance management system, it is possible to resort to a more substantial simplification, retaining only three of the most important indicators: X_1 (increase turnover), X_2 (value added per employee), and X_3 (customer satisfaction).

Under these circumstances, the model must have, besides the objective function, a system of at least three restrictions defining the positions of the variables in the three domains of existence (external domain, organization, people).

In order to take into account the possibilities and requirements of the three corporate manifestation domains, it is necessary to introduce Equations (2)–(4) into the PL model in addition to restriction (3) and restrictions on resources and market, of the following form:

$$\sum_j A_{rj} x X_j \overset{\leq}{\underset{\geq}{=}} B_r j = \overline{1,n} \quad j = \overline{1,R}, \tag{5}$$

where A_{rj} represents coefficients of set R of restrictions on the specific consumption of resources r per unit of measure expressing the indicators x_j, and B_r is the free terms of the restrictions, representing the availability of resources r.

The simple function serves in the managerial forecasting-planning problem. X variables are indicators that can express goals and strategies for achieving them, so that various strategy scenarios imagined by managers can be transposed by these indicators into the Y regression function, affecting their value. Thus, managers can know what to expect as a result of applying a scenario to objectives and strategies. In this way, the manager has a powerful tool for making decisions as conveniently as possible. This is an optimization technique by successive attempts.

In order to play the simplex table with the initial basic solution, it is necessary to accordingly adapt the model and intervene in the formulation of the objective function through a change in the dependent variable as follows:

$$[\max](Y - \theta_0) = [\max]F_{(X)} \tag{6}$$

If this function is attached to the constraint system, a special function of the form is formed:

Table 1. Method of sampling.

The company's business sector	
Tourism, travel and restaurants	49
Construction	55
Agriculture/forestry and fishing/mining	68
Business/finance/insurance/real estate/information services	94
Transport and utilities, telecommunications	199
Trade	404
Manufacturing industry	491
Other	82
TOTAL	1442
The company's turnover	
$<$ 50 million Ron	842
Between 50 million Ron – 100 million Ron	296
Between 100 million Ron – 500 million Ron	255
Between 500 million Ron – 1 billion Ron	34
$>$ 1 billion Ron	15
TOTAL	1442
Number of employees	
Between 10-50 persons	428
Between 50 – 100 persons	307
Between 100 – 500 persons	595
Between 500 – 1000 persons	48
$>$ 1000 persons	64
TOTAL	1442

Source: Authors' calculation based on information extracted from the National Institute of Statistics of Romania https://insse.ro/cms/en.

$$[\max](Y - \theta_0) = [\max]F_{(X)}, \tag{7}$$

which shows that, if this function is attached to the constraint system, and linear transformations are applied, a certain moment of the transformations can be reached at the zero value of v, which says that artificial variables became zero.

In addition, the optimal solution was safely obtained by linear programming with the two-phase simplex algorithm (Borgwardt, 1987). It began with an initial basic solution in which all un-known variables X were null, and which corresponded to the objective zero function. In each iteration, an X variable was introduced into the basic solution, which produced the improvement of the objective function until its optimization.

The empirical model described above was applied to the centralized statistical information found in the data provided by the National Institute of Statistics of Romania (https://insse.ro/cms/en) In order to get an image of the impact of optimizing the components of the performance management system in designing a performing entity for 1442 Romanian companies, the evaluation model was used based on the sample detailed in Table 1.

Returning to the concrete function, for the terms in which these variables are to be compatible with the Y function representing the difference between the market value and the book value of the firm, expressed in euros, the coefficients θ_1, θ_2, and θ_3 must represent sizes that ensure for each term units of value measure. For example, for the term ($\theta_1 X_1$), where X_1 is the percentage of increased production, θ_1 must express the number of millions of euros brought by a percentage point of the output increase at the Y difference between the market value, and the company's accounting value defines the value, in millions of euros, of the components of the performance management system. For the term ($\theta_2 X_2$), θ_2 will be the contribution, in thousands of euros, to the 1000-euro value added per employee. For the term ($\theta_3 X_3$), θ_3 has units of measure, expressed in millions of euros, returning to a point of the average satisfaction of the company's employees.

4. Results and discussion

Using the indicators described above, X variables were indicators that could express goals and strategies for achieving them, so that various strategy scenarios imagined by managers can be transposed by these indicators into the Y regression function, affecting their value. The regression function, as defined above, integrated into a model such as linear programming, acquires a much higher operating force than the independent function does: it advances thinking and managerial action in solving problems, reduces the workload involved in successive attempts, and offers optimal solutions for X variables.

Using the extracted data for the nine indicators presented in Table 1 for a period of 5 years for the 1442 companies, and introducing these data into Equations (5–7) by adding the system of restrictions to function $v - \sum_i A_i = v - A_2 - A_4 = 0$, we obtained:

$$v + 2X_1 + 3,5X_2 + X_4 - X_5 + X_6 - X_7 + X_8 + X_9 = 178,93. \tag{8}$$

Then, the iterative process of the linear transformations was applied until $v = 0$ is reached, resulting in the data presented in Table 2.

After six iterations of the first phase, function v reached zero, and transformation process was maximized (values of function coefficients v were null or negative). Although unknowns X_1, X_2, and X_3 entered the solution, the process continued because it was not known whether they had obtained optimal values.

In the second phase, from the last iteration of the first phase, we extracted the model that we reached:

$$\begin{aligned} &X_1 + X_4 = 7,8 \\ &X_2 - X_5 = 41,03 \\ &-X_5 + X_6 = 5,77 \\ &X_3 + X_8 = 3,9 \\ &X_7 + X_8 = 0,16 \\ &X_1 - 1,5X_5 + 1,5X_8 + X_9 = 0,47 \end{aligned} \tag{9}$$

hence, unknowns X_1, X_2, and X_3 were removed, and it followed that,

$$\begin{aligned} X_1 &= 7,8 - X_4 \\ X_2 &= 41,03 + X_5 \, . \\ X_3 &= 3,9 - X_8 \end{aligned} \tag{10}$$

These were then substituted into the initial objective function, attached to the constraint model resulting from the last iteration of phase 1, and applied to the linear maximization transformation of F(X). Table 3 shows the transformations.

Table 2. The iterative process of linear transformations.

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	A_2	A_4	
v	2	3,5	3,5	1	−1	1	−1	1	1	0	0	178,93
X_4	1			1								7,8
A_2		1			−1					1		41,03
X_6		1				1						46,80
A_4			1				−1				1	3,74
X_8			1					1				3,9
X_9	1	1,5	1,5						1			75,66
v	2		3,5	1	−4,5	1	−1	1	1			35,33
X_4	1			1								7,8
X_2		1			−1							41,03
X_6					−1	1						5,77
A_4			1				−1				1	3,74
X_8			1					1				3,9
X_9	1		1,5		−1,5				1			14,12
v	2			1	−4,5	1	2,5					22,23
X_4	1			1								7,8
X_2		1			−1							41,03
X_6					−1	1						5,77
X_3			1				−1					3,74
X_8							1	1				0,16
X_9	1				−1,5		1,5		1			8,5
v				−1	−4,5	1	2,5	1	1			6,63
X_1	1			1								7,8
X_2		1			−1							41,03
X_6					−1	1						5,77
X_3			1				−1					3,74
X_8							1	1				0,16
X_9	1				−1,5		1,5		1			0,47
v				−1	−4,5	1		−2,5	1			6,24
X_1	1			1								7,8
X_2		1			−1							41,03
X_6					−1	1						5,77
X_3			1					1				3,9
X_7							1	1				0,16
X_9	1				−1,5			−1,5	1			0,47
v				−1	−3,5			−2,5	1			0,47
X_1	1			1								7,8
X_2		1			−1							41,03
X_6					−1	1						5,77
X_3			1					1				3,9
X_7							1	1				0,16
X_9	1				−1,5			−1,5	1			0,47
v	−1			−1	−2			−1				0
X_1	1			1								7,8
X_2		1			−1							41,03
X_6					−1	1						5,77
X_3			1					1				3,9
X_7							1	1				0,16
X_9	1				−1,5			1,5	1			0,47

Source: Author's data calculations.

The results of the present study show that this solution obtained advocates focusing on the strategy of providing a maximal degree of customer satisfaction (X_3 = 3.9 = max X_3). With regard to the two other objectives, increasing turnovers (indicator X_1) and increasing added value per customer (X_2), it is necessary to ensure the minimal growth limit (X_1 = 0, X_2 = 41.03 = min X_2). This solution is rational because it is from the function of multiple correlations that efforts to increase the offered services do not result in an increase in the firm's market value, but on the contrary can cause a decrease in market value.

Table 3. The solution to the problem is in the simplex table.

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	
$F_{(X)}$				0,21	−4,5			−64,1		−503,4
X_1	1			1						7,8
X_2		1			−1					41,03
X_6					−1	1				5,77
X_3			1					1		3,9
X_7							1	1		0,16
X_9	1				−1,5			1,5	1	0,47
$F_{(X)}$	−0,21				−4,5			−64,1		−505,6
X_4	1			1						7,8
X_2		1			−1					41,03
X_6					−1	1				5,77
X_3			1					1		3,9
X_7							1	1		0,16
X_9					−1,5			1,5	1	0,47

Source: Author's data calculations.

Table 3 results show that the indicators, objectives X_2 and X_3, respectively, had higher priority than that of objective X_1 because they generated a positive contribution to the Y value of the management, while the impact of X_1 was negative.

Regarding the number of indicators of the regression function, it is necessary to specify that it is good if it is as large as possible, to best reflect the correlation of phenomena. At the same time, too many indicators make calculations more difficult. Thus, in the analysed numerical exercise, with only three indicators in the regression function, very good correlation as expressed by the correlation coefficient $r = 0.975$ was achieved.

All of this reveals the importance and scope of the research, which aims at modelling and optimizing the evaluation of the performance management system at a company level. Moreover, these findings were in line with previous studies (Ahn & Ok, 2017; Bol, 2011; Chung et al., 2018; Mendy, 2020), showing that an understanding of the economic and managerial mechanisms of operations under-pins the making of pertinent, real, and especially opportune decisions that could counter-act turbulent environmental threats and increase the potential of companies.

5. Conclusions

In order to cope with global competition, Romanian enterprises must stimulate and motivate individuals' creativity and favor the transformation into creative organizations. Hence, the initiation of organizational change must be supported, and, in this context, the components of the performance management system have an important role to play. Thereby, performance enhancement gives firms greater opportunities to adapt to the market and greater flexibility and chances of success compared to the competition, and aims to improve financial results.

Presented in this form, the Sveiby Monitor is a particularly suggestive tool and can, of course, constitute a serious informational base for analysis and discussion in a company's governing bodies for the purpose of guiding the organization.

In the present study, the authors concretized the deductive or analytical methodology by mathematically and statistically formalizing the technical and practical aspects regarding the evaluation of the performance management system components.

From a functional point of view, the model meets expectations. All of its components are logical. The objective function obtained by multiple regression confirms its value in the sense that it correctly discriminates the parameters of the X variables according to the dynamics of the experimental data and the correlation coefficient $r = 0.96$ (it is remembered that in the direct correlation this coefficient must be $\geq 0,7$ for the function to be valid).

Linear constraints framing the X variables between the normal limits of their play in the managerial process and inequalities in controlling resources involved in problem solving functioned normally. Moreover, the financial/economic impact of the expected linear pattern is significant. The linearity matrix of the model guarantees its validity with a probability of error $\alpha = 0.01$.

In addition, the obtained results demonstrate that optimization of the components of the performance management system with the proposed linear programming model is economically efficient. In setting the efficiency ratio between 0.9 and 1.5 with a probability of 95%, it is an economic success and is also protected against major risks.

An understanding of the economic and managerial mechanisms of operation underpins the making of pertinent, real, and especially opportune decisions that can counteract the turbulent environmental threats and increase the potential entities. For this, a permanent assessment and re-evaluation of the entity's performance is imperative.

The work has not exhausted the topic stated in the title, but could be an approach that addresses the entire complexity of changing the concepts and regulations in force regarding the true measure of organizational performance by introducing specificities within the limits allowed by the recommendations of the European Commission. On top of that, measuring the performance of enterprises is a global issue that decision-makers in organizations are becoming obsessed with quantifying.

Disclosure statement

No potential conflict of interest was reported by the authors.

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