Performance Measurement and Financial Results in Polish Enterprises: Empirical Evidence

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Abstract The paper presents results of a study, which was conducted twice, in the years 2012 and 2014, examining relationships between the solutions adopted within performance measurement systems and financial performance (profit/loss) in Polish companies. In the light of the complexity of performance measurement systems, two approaches were adopted in the study. In the first approach, the focus was on separate and most frequently used individual elements of the system, considered as important. In the second approach, three types of systems were examined; they were created and defined in the process of gradual adding new elements from among those accepted for the study. The association between variables was evaluated with Pearson's chi-squared test for independence and Tschuprow's T coefficient.

The results obtained in the study do not provide a conclusive answer as to the association between given solutions adopted within performance measurement systems and financial results reported by companies. This association was found to be significant for selected elements of a performance measurement system in the study carried out in 2014. These elements include: having a strategy incorporating measurable goals, and linking performance measures to the incentive system in the group of companies whose strategies incorporate measures.

Keywords Performance measurement • Financial performance • Association analysis

1 Introduction

A knowledge-based economy displays several basic characteristics: an increasingly volatile inner and outer environment; a need for a more global view of the economy, market and environmental protection; a necessity to acquire knowledge and put it to use; recognition of the increasing role of intangible assets (knowledge, intellectual capital and information); transformation of the industrial society into an information society; and dependence of organizations' survival on the access to information

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and its skillful processing, and on the adaptation to change (Skrzypek 2011). In response to changes in business environment, changes in business management occur. High importance of information, which is essential to uninterrupted operation and growth of businesses, contributed to development of performance management. Effective and efficient performance management, which is focused on meeting stakeholders' goals, requires appropriate performance measurement systems to be designed and implemented.

The aim of the authors of this paper was to evaluate the associations between performance measurement systems of various degrees of complexity and financial results reported by Polish companies.

There are no standard definitions for performance measurement systems and performance itself available in the literature on the subject. Similarly, the outcome of development and implementation of performance management systems may be understood differently. In the paper, in the light of the complexity of performance measurement systems, first the nature of those systems was addressed. And so two approaches were adopted in the study. In the first approach, the focus was on separate and most frequently used individual elements of the system, considered as important. In the second approach, three types of systems were examined; they were created and defined in the process of gradual adding new elements from among those accepted for the study.

Next, possible consequences of implementation of a performance measurement system were discussed. Focus on meeting stakeholders' objectives makes the effects of development and implementation of a performance measurement system multidimensional. Franco-Santos et al. (2012) classified these consequences into three categories, as affecting: people's behaviour, organisational capabilities, and financial and non-financial performance. Financial consequences are the most general category as they incorporate all the other effects; in order to make a profit, i.e. achieve shareholders' goals, it is essential to satisfy the needs and goals of other stakeholders.

In order to evaluate significance of the association between performance measurement systems and profitability of Polish companies representing the non-financial sector, results of a study carried out twice, in the years 2012 and 2014, were used. In the study, samples of 300 companies representing the non-financial sector each were analysed using the CATI method, and the association between variables was evaluated with Pearson's chi-squared test for independence and Tschuprow's T coefficient (Hozer 1997).

The results obtained in this way were next compared and contrasted with results of other, earlier analyses carried out in this field.

2 Performance Measurement System and Effects of Its Development and Implementation

There are a variety of definitions of performance measurement to be found in the literature on the subject. A team of researchers led by Franco-Santos et al. (2007) reviewed 17 such definitions. As a result, the authors found that these definitions

emphasised only one or a combination of several aspects of performance measurement systems, and no set of characteristics was referred to in more than one definition. In particular, the following aspects were identified: elements understood as individual components comprising a performance measurement system, including e.g. strategic objectives, which are the starting point for designing activity measures that allow strategy monitoring, an integrated set of performance measures in four key areas: financial, customer, internal and employee, guidelines for rewarding employees, related to the level of achievement of performance targets; functions; tasks; roles; and processes. What this analysis lacks is the effects of implementation of systems in the form of improved efficiency of operations, which in turn leads to better performance.

In the light of this complexity of performance measurement systems and hence the difficulty to provide one standard definition incorporating all the above-mentioned aspects, following the examples of German (Speckbacher et al. 2003) and English (Franco-Santos et al. 2012) researchers, the authors adopted a complex classification of performance measurement systems. The following aspects were recognised as elements or individual components: having a strategy incorporating measures which comprise a consistent system of financial and non-financial measures, and linking measures to the incentive system. As a result, two approaches were adopted in the study. In the first approach the focus was on individual components of the system, whereas in the second approach—on three types of systems, which were created and defined in the process of gradual adding new elements from among those accepted for the study. As a result, the first type of performance measure systems (T1) is a strategy incorporating measures. The second type (T2) is a strategy incorporating measures which comprise a consistent system of financial and non-financial measures. The last type (T3) is understood as a strategy incorporating measures which comprise a consistent system of financial and non-financial measures that are linked to the incentive system.

The focus on meeting stakeholders' objectives leads to multidimensionality of the effects of development and implementation of a performance measurement system. Franco-Santos et al. (2012) classified these consequences into three categories, as affecting: people's behaviour (related to the actions or reactions of employees, e.g. participation, motivation and their underlying cognitive mechanisms such as perceptions); organisational capabilities, related to specific processes, actions or competences, which lead to competitive advantage, such as organisational learning; and financial and non-financial performance. Financial consequences are the most general category as they incorporate all the other effects; in order to make a profit, i.e. achieve shareholders' goals, it is essential to satisfy the needs and goals of all the other stakeholders, i.e. clients, deliverers, creditors, local communities and the state.

This study is rooted in the stream of previous research studies carried out so far in this field. Table 1 summarises the results of earlier studies on the impact of performance measurement on financial results of enterprises, indicating the direction of this impact.

Table 1 The impact of performance measurement on financial results—findings from selected studies (based on mentioned literature)

Study	Data collection	Level of analysis	Data analysis
Performance measurement system has a positive influence on financial results			
Banker and Potter (2000)	Archival research (18 hotels)	Business unit	Regression analysis
Crabtree and DeBusk (2008)	Survey and archival research (107 managers, IMA members)	Organisation	Paired t-test and Wilcoxon test
Cruz et al. (2011)	Case study (equity joint venture, 39 semistructured interviews and 11 other)	Organisation	Qualitative coding, construction of critical incident chart
Davis and Albright (2004)	Quasiexperimental design (2 divisions, 9 branches)	Business unit	Wilcoxon analysis
Ittner and Larcker (1998)	Archival research (1 firm)	Business unit	Regression analysis
Orlitzky et al. (2003)	Meta-analysis (52 studies and 33,378 observations of firms)	Organisation	Correlation meta-analysis
Laisasikorn and Rompho (2014)	Survey (101 firms)	Organisation	Statistical analysis
Endrikat et al. (2015)	Meta-analysis (40 studies and 22,201 observations of firms)	Organisation	Hedges-Olkin meta-analysis (HOMA)
Non-existent or very weak (positive or negative) association between performance measurement systems and financial results			
HassabElnaby et al. (2005)	Archival research (91 firms)	Organisation	Regression analysis, Cox survival analysis
Ittner et al. (2003)	Survey (140 executives)	Organisation	Correlation Regression analysis
Said et al. (2003)	Archival research (91 firms)	Organisation	Regression analysis
Studies with inconclusive findings as to this association			
Braam and Nijssen (2004)	Survey (41 b2b firms)	Organisation	Regression analysis
Griffith and Neely (2009)	Quasi-experiment (2 divisions of 156 branches and 121 branches of 1 firm)	Business unit	Regression analysis
Ittner and Larcker (1997)	Survey (249 firms) and interviews (44 firms)	Organisation	Regression analysis
Kihn (2007)	Survey and archival research (36 responses)	Business unit	Regression analysis with interactions

When summing up the concise overview of study results shown in Table 1, it should be highlighted that they are inconclusive, and frequently even contradictory, which gives rise to a need for further studies in this area and emphasises the requirement of certain diffusion of theoretical solutions to business practice.

3 Methodological Assumptions of the Study

The analysis was based on the results of a survey carried out with the CATI method among Polish enterprises representing the non-financial sector and employing more than ten people. The study was conducted twice, i.e. in the years 2012 and 2014, each covering 300 companies classified into three groups according to their size (100 companies in each group—small, medium-sized and big enterprises).[1] The sample was representative in terms of the NACE section for each size group. After excluding companies which did not provide complete information, the authors arrived at the final number and structure of companies as presented in Table 2.

The dependence between variables was evaluated with the Pearson's chi-squared test and Tschuprow's T coefficients (Hozer 1997). In order to satisfy the assumptions of the Tschuprow's T test,[2] the variable describing financial results of the analysed enterprises was divided into two categories: (1) profits made in all the 3 years of analysis, and (2) other results. This was justified by the qualitative nature of the explanatory variables, and the systemic decline in the research effort in each type of performance measurement system. As it is presented in Table 1 the correlation analysis as a data analysis method was also used in Ittner et al. (2003), and meta-analysis (basing on numerous researches) was used in Orlitzky et al. (2003).

4 Findings from the Study on Financial Consequences of Performance Measurement in Polish Companies

The first of the analysed relationships was the association between having a development strategy incorporating measurable goals and financial performance. Table 3 presents input data and results of statistics calculated for this relationship.

Based on the results of the chi-squared test for independence performed at the 0.05 significance level, there are no grounds for rejecting the null hypothesis that the examined variables are independent for the companies analysed in the year 2012. Opposite conclusions can be drawn for the study conducted in 2014. Tschuprow's T coefficients, in turn, reveal a low dependence, although for the year 2014 this dependence was considerably higher than in 2012. It means that the responses given in the survey suggest a dependence between having a strategy incorporating measurable goals and financial performance (results).

The next aspect examined in the study was the impact of a consistent set of performance measures on financial performance.

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[1]Research project on "Key performance indicators in company's performance management", project leader: prof. W. Skoczylas, in the years 2011–2015, Application No. N N115 436640, Contract No. 4366/B/H03/2011/40.

[2]Grouping classes with small population sizes.

Table 2 Number of enterprises under study by their size, year of study and financial performance

		2012			2014		
		Number of enterprises		% of enterprises reporting profits for three preceding years	Number of enterprises		% of enterprises reporting profits for three preceding years
	Size	Total	Of which: reporting profits for three preceding years		Total	Of which: reporting profits for three preceding years	
1	Small	92	65	70.7	89	59	66.3
2	Medium-sized	98	58	59.9	86	67	77.9
3	Big	93	70	75.3	86	64	74.4
Total		283	193	68.2	261	190	72.8

Classification of companies covered by both studies according to whether or not they had a consistent set of performance measures set against their financial performance is shown in Table 4.

In the case of these variables there are no conclusive findings as to dependence between the analysed elements. In the 2012 study, the highest number of companies reported having either a set of separate, unrelated financial and non-financial measures unique for each department, or a consistent set of the two types of measures. Nevertheless, only approx. 63% of companies in both groups reported profits for the three consecutive years under study. In the 2014 study, on the other hand, the highest number of responses (excluding the answer "I don't know, hard to tell") was found for companies which measured performance with sets of separate, unrelated measures unique for each department—either financial and non-financial, or financial alone (the latter being the second most popular answer). Considerably fewer respondents declared their companies had a consistent system of financial and non-financial measures. It is this group, however, that outperforms the former two in terms of the share of companies reporting profits in the 3 years preceding the study.

The results of tests evaluating dependence between these variables are summarised in Table 5.

Based on the results of calculations, no significant dependence was found (at the 0.05 significance level) between the degree of consistency of performance measure sets and financial performance for the two studies. Tschuprow's T coefficient also points to low dependence.

In the next step, the focus was on the distribution of responses provided only by companies which declared their strategies incorporated measures next to a descriptive part (type T1 performance measurement system). The results of this analysis are presented in Table 6.

After reducing the size of the sample to include only companies with a strategy incorporating measures for the year 2012, the highest number of companies is found

Table 3 A strategy incorporating measurable goals and financial performance of enterprises

Year of study	Number of enterprises having a strategy incorporating measurable goals	Total profits for three preceding years	% of enterprises reporting profits for three preceding years	Tschuprow's T	Chi-squared statistic	Degrees of freedom	p level	Conclusion
2012	107	76	71.0	0.090	3.261	2	0.196	Independent
2014	86	74	86.0	0.176	11.474	2	0.003	Dependent

Table 4 Number of companies according to the degree of consistency of their performance measure sets and their financial results

Specification	2012			2014		
	Number of enterprises		% of enterprises reporting profits for three preceding years	Number of enterprises		% of enterprises reporting profits for three preceding years
	Total	Of which: reporting profits for three preceding years		Total	Of which: reporting profits for three preceding years	
A set of separate, unrelated financial measures unique for each department	53	39	73.6	44	35	79.5
A set of separate, unrelated financial and non-financial measures unique for each department	78	49	62.8	81	60	74.1
A set of separate, unrelated non-financial measures unique for each department	5	5	100.0	9	6	66.7
A consistent set of financial measures	28	18	64.3	7	6	85.7
A consistent set of financial and non-financial measures	67	42	62.7	38	32	84.2
I don't know, hard to tell	52	40	76.9	82	51	62.2
Total	283	193	68.2	261	190	72.8

Table 5 The degree of consistency of performance measure sets and financial results

Year of study	Tschuprow's T	Chi-squared statistic	Degrees of freedom	p level	Conclusion
2012	0.105	7.041	5	0.218	Independent
2014	0.124	8.993	5	0.109	Independent

in the group having a consistent set of financial and non-financial measures. Nearly 70% of those companies report profits for the three consecutive years under analysis. In the 2014 study, the most numerous were companies with a set of separate, unrelated financial and non-financial measures unique for each department. The second in terms of size was the group of companies most advanced in developing a performance measurement system, i.e. those with a consistent set of

Table 6 Number of companies which declare having a strategy incorporating a set of measures according to the degree of its consistency, and their financial performance

Specification	2012			2014		
	Number of enterprises		% of enterprises reporting profits for three preceding years	Number of enterprises		% of enterprises reporting profits for three preceding years
	Total	Of which: reporting profits for three preceding years		Total	Of which: reporting profits for three preceding years	
A set of separate, unrelated financial measures unique for each department	10	7	70.0	10	9	90.0
A set of separate, unrelated financial and non-financial measures unique for each department	31	21	67.7	30	25	83.3
A set of separate, unrelated non-financial measures unique for each department	0	0	0	1	1	100.0
A consistent set of financial measures	13	8	61.5	5	5	100.0
A consistent set of financial and non-financial measures	36	25	69.4	21	18	85.7
I don't know, hard to tell	17	15	88.2	19	16	84.2
Total	107	76	71.0	86	71	82.6

Table 7 The degree of consistency of performance measure sets in companies with strategies incorporating measures, and their financial performance

Year of study	Tschuprow's T	Chi-squared statistic	Degrees of freedom	p level	Conclusion
2012	0.127	3.457	4	0.485	Independent
2014	0.209	8.438	5	0.134	Independent

financial and non-financial measures (type T2). Profitability analysis for both groups reveals that the latter outperforms the former: 85.7% of companies in the former group report profits in the 3 years preceding the study. Results of the statistical analysis of this association are shown in Table 7.

As can be seen in Table 7, there are no grounds for rejecting the null hypothesis that a type T2 performance measurement system and financial performance are independent. Tschuprow's T coefficient points to a small dependence between the analysed variables.

The last association under examination was the dependence between linking performance measurement to incentive systems of companies and their financial performance. The structure of enterprises according to the analysed variables is shown in Table 8, including also the share of companies reporting profits in all the 3 years covered by the study.

According to the data in Table 8, the majority of enterprises link performance measurement to their incentive systems, although they differ in the type (extent) of this link. In the 2012 study, the share of companies reporting profits in the three preceding years was smaller in this group than in the group where such a link is not found. In the 2014 study, in turn, despite a smaller number of companies which declare linking performance measures to their incentive system, the share of companies reporting profits in the 3 years is higher. It can be vividly seen particularly in the group of companies which link measures to their incentive systems for all the employees.

The results of the analysis of dependence between these variables are shown in Table 9.

Also in this study, based on the results of calculations, it is impossible to reject the null hypothesis that the analysed variables are independent (at the 0.05 significance level). Companies from the two studies showed a slight dependence.

After reducing the sample to the group of companies incorporating measures in their strategies (type T1), the structure of companies according to the link between performance measures and the incentive system was obtained as shown in Table 10.

Table 8 Structure of enterprises by the link between performance measures and their incentive system, and their financial performance

Link between performance measures and the incentive system	2012		% of enterprises reporting profits for three preceding years	2014		% of enterprises reporting profits for three preceding years
	Number of enterprises			Number of enterprises		
	Total	Of which: reporting profits for three preceding years		Total	Of which: reporting profits for three preceding years	
Yes, for all the employees	112	73	65.2	109	84	77.1
Yes, but only for selected groups of employees	110	76	69.1	82	58	70.7
No	61	44	72.1	70	48	68.6
Total	283	193	68.2	261	190	72.8

Table 9 Link between performance measures and the incentive system, and financial performance of enterprises

Year of study	Tschuprow's T	Chi-squared statistic	Degrees of freedom	p level	Conclusion
2012	0.049	0.946	2	0.623	Independent
2014	0.070	1.810	2	0.405	Independent

Table 10 Structure of companies according to the link between performance measures and the incentive system in the group of companies with strategies incorporating measures, and financial results of these companies

Link between performance measures and the incentive system	2012		% of enterprises reporting profits for three preceding years	2014		% of enterprises reporting profits for three preceding years
	Number of enterprises			Number of enterprises		
	Total	Of which: reporting profits for three preceding years		Total	Of which: reporting profits for three preceding years	
Yes, for all the employees	46	33	71.7	30	28	93.3
Yes, but only for selected groups of employees	48	34	70.8	40	31	77.5
No	13	9	69.2	16	15	93.8
Total	107	76	71.0	86	74	86.0

The data in Table 10 shows that the average best financial performance for the two studies also in this case is found in the group of companies linking performance measures to the incentive system for all the employees but the difference in favour of this dependence is rather insignificant. The results of analysis of the dependence between these variables are shown in Table 11.

The results of the 2014 study reveal that the link between the incentive system and performance measurement and financial performance of type T1 companies are dependent, and based on Tschuprow's T coefficient, this dependence is considered as moderate.

Further exclusions from the population reducing the sample to include only enterprises whose strategies include measures next to qualitative descriptions, and which adopted a consistent set of interrelated financial and non-financial measures (type T2) result in the structure of companies according to the links between performance measures and the incentive system as presented in Table 12.

Once again the data suggests that when both studies are considered, the average best financial performance is reported for companies which relate performance measures to their incentive systems for all the employees (type T3). Results of a statistical analysis of this dependence are summarised in Table 13.

Table 11 Link between performance measures and the incentive system in the group of companies with strategies incorporating measures, and financial performance of these companies

Year of study	Tschuprow's T	Chi-squared statistic	Degrees of freedom	p level	Conclusion
2012	0.053	0.426	2	0.808	Independent
2014	0.292	10.383	2	0.006	Dependent

Table 12 Structure of companies with strategies incorporating a consistent system of financial and non-financial measures according to the link between performance measures and the incentive system, and financial performance of these companies

Link between performance measures and the incentive system	2012		% of enterprises reporting profits for three preceding years	2014		% of enterprises reporting profits for three preceding years
	Number of enterprises			Number of companies		
	Total	Of which: reporting profits for three preceding years		Total	Of which: reporting profits for three preceding years	
Yes, for all the employees	15	12	80.0	9	8	88.9
Yes, but only for selected groups of employees	17	11	64.7	10	9	90.0
No	4	2	50.0	2	1	50.0
Total	36	25	69.4	21	18	85.7

Table 13 Link between performance measures and the incentive system in the group of companies having a strategy incorporating a consistent system of financial and non-financial measures and financial performance

Year of study	Tschuprow's coefficient	Chi-square statistic	Degrees of freedom	p level	Conclusion
2012	0.053	0.426	2	0.808	Independent
2014	0.328	3.196	2	0.202	Independent

It is impossible to reject the null hypothesis that the link between the incentive system and performance measurement, and financial performance are independent for type T3 enterprises.

5 Discussion

The analysis of associations between performance measurement solutions used by Polish enterprises and their financial performance does not provide conclusive answers. The significance of these dependences was proved by our results for

certain elements of performance measurement systems in the 2014 study. These elements include having a strategy incorporating measurable goals, where Tschuprow's T coefficient with financial results amounted to 0.176, and linking performance measures to the incentive system in the group of companies which declare having a strategy incorporating measurable goals and financial performance at the level of 0.292 (without specifying the type of measures and relationships between them).

These results are supported by the results of analyses performed with Cramér's V where the association between the type of measures and financial performance additionally proved significant (Batóg and Batóg 2016). Allowing for the size of enterprises in the study, and the employment of logit models led to identification of two types of performance measurement systems, i.e. those observed in big and medium-sized enterprises and those found in small enterprises. The former of the two types is usually formalised and well-structured and, as such, is more likely to yield higher revenues than the solutions adopted in small enterprises that lack the structure of a consistent system. In the evaluation of effectiveness and efficiency of performance measurement also studies which take into account the business sector and ownership structure are essential. An analysis of the correspondence has shown that advanced performance measurement systems in Polish companies are those found in big industrial companies with foreign capital. What is also noteworthy is the change in both approaches to measuring performance and their impact on financial performance over time. The results of the second study show a strong dependence between financial performance of Polish companies with: using financial and non-financial measures in performance measurement tailored to individual needs of business units, which, however, do not form causal chains; systematic measuring of performance; and measuring performance at different levels of organisation (the organisation as a whole, individual business units, individual employees) (Batóg and Batóg 2016).

The presented approach in the assessment of the relationship between the performance measurement system and financial results extends the scope of the earlier study of Batóg and Batóg (2016), but unfortunately taking into account the three levels of systems failure to confirm the relevance of the relationship. This applies to companies with T2 type performance measurement systems as well as to a narrow group of companies declaring possessing the most advanced T3 system type.

The results of the performance measurement system in Polish companies are consistent with results of studies by other authors such as Braam and Nijssen (2004), Griffith and Neely (2009), Ittner and Larcker (1997) and Kihn (2007). This is the first study conducted on such large, representative research sample in Poland. Thus, its results complement the results of world research on evaluation of performance measurement systems in Poland and the effectiveness of their implementation.

6 Conclusion

The study, despite inconclusive findings, recognises the need for further studies on performance measurement systems and their diffusion to business practice. The evaluation of associations between performance measurement systems and financial performance of companies conducted in 2 years separated by a 2-year gap pointed out to new solutions developed within performance measurement which influence financial performance in a positive way. The study focused, on the one hand, on selected elements and defined types of performance measurement (owing to the lack of one definition of a performance measurement system), and on the other—solely on financial performance (profit/loss) in the 3 years preceding the study, although, as shown above, the effects can vary. Development and implementation of a performance measurement system leads to a variety of positive effects. It enables the companies to: measure their performance in relation to the objectives of key stakeholders; explain strategic objectives; focus activities on critical processes, resources and changes in the organisation's environment; recognise (positive and negative) changes in performance; identify critical factors which require more attention; and provide a clear foundation for performance evaluation and rewarding employees for their performance. These positive aspects of a good system are a sufficient argument in favour of efforts aimed at implementing such systems. It is, therefore, essential to remove any information, capital, management quality, organisational and personal barriers to implementation of performance measurement systems so that they be: linked to the set of objectives of various stakeholders, sensitive to the changes in the inner and outer environment and flexible to incorporate dynamic change as well as provide accurate, up-to-date and desired information. Of equal importance is their efficiency in the organisational and functional dimensions, and wide acceptance of the implementation among managers and employees of the company. The systems are at the moment an instrument of efficient and effective management in companies (Skoczylas and Waśniewski 2016).

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