Original research article

Strategic management accounting and strategic management: The mediating effect of performance evaluation and rewarding

P. Petera^{*}, J. Wagner, L. Šoljaková

University of Economics, Prague, Department of management accounting, Prague, Czech Republic

ABSTRACT

The purpose of this article is to investigate the mediating effect of performance evaluation and rewarding on the implementation of strategic management accounting (SMA) into strategic management. Although these issues have important consequences for managerial practice, they have yet to be empirically addressed by previous studies making this research more significant. A model was proposed and tested using partial least squares modeling. Data were collected via questionnaire from a random sample of 90 medium- and large-size businesses with two lines of mediation being considered. The first involves performance evaluation and performance-based rewarding of top management, while the second concerns the evaluation and rewarding of middle- and lower-level managers. A mediating effect does exist and is relatively strong. A practical implication of this study is the recommendation that companies should support the implementation of SMA into strategic management via performance evaluation of all managerial levels and performance-based rewarding of top managers. For middle- and lower-level managers, strategic performance-based rewards need to be carefully considered. Theoretically, this study pioneers the investigation of variables other than company performance as a dependent variable in SMA.

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^{*}Corresponding author:

Petr Petera

petr.petera@vse.cz

1. Introduction

Strategic management accounting (SMA) first appeared on the scene as a set of interconnected techniques and management approaches which could facilitate the incorporation of strategic thinking into management [1]–[3]. In terms of the highly competitive and turbulent environment, strategic thinking became a significant part of managerial work as high-quality strategy-focused management is of critical importance for success [4]–[7].

The use of SMA tools and techniques has been a favorite topic among academics and professionals over the last three decades. Reviewing the empirical research published in the literature, several blind

spots in the puzzle of understanding the mechanism of SMA diffusion into strategic management became evident.

First, only a specific SMA technique or an incomplete set of techniques were usually investigated in previous research. Full attention was brought upon implementation details of such a tool, but the global perspective of an SMA agenda considering synergies and context was lost. Rather than focus on details, this research comprises “the big picture of the world of SMA”.

Second, the use of some SMA tools is frequently considered as an independent variable explaining the performance of a company as a dependent variable, although the relationship between these two variables

is too distant and, in this regard, weak. The decision to use performance of the company as a dependent variable is quite common in management accounting research (see e.g. [8] and [9]) as results are easy to interpret (if companies using a certain tool have significantly better performance than other ones, then we can state that there is positive effect of the use of this tool on performance). However, many such studies provide unconvincing results as performance is contingent upon numerous intervening variables. Moreover, the time lag between the adoption of a particular tool and its performance impact is difficult to consider.

Therefore, we suggest focusing on a more reasonable dependent variable. Specifically, the implementation of SMA into the strategic management control of the company is suspected to be the immediate result of using SMA tools. At first, we do not consider this as a self-evident matter. This approach reflects a stream of literature advocating that the formalistic adoption of some tools or technique is not useful per se and that the key step for success is the integration of a particular tool or technique into strategic management, i.e., turning a formalistic adoption into a living aspect of a managerial agenda.

Moreover, the relationship between the use (adoption) of an SMA tool and its implementation into strategic management needs more detailed research. We followed the ideas of [10] and [11], who state that one of the important factors influencing whether performance information is used in managerial activities is the degree to which stakeholders are involved in the whole system (e.g., buy-in of performance measurement by managers). Adhering to the findings of agency theory [12], we hypothesize that buy-in from managers, thanks to linking managers' performance evaluation, and rewarding with the use of SMA results in higher implementation of SMA into strategic management. Specifically, our research question is whether, and how strongly, performance evaluation and rewarding mediate the relationship between the use of SMA techniques and implementation of SMA into management control.

After identifying this research gap, we prepared a contingency-based empirical study aiming to investigate this mediating effect. Contingency theory [13]–[15] has a long tradition in management accounting research having been introduced into the field of management accounting in the 1970s and advocating the idea that appropriate properties of a management accounting system depend on circumstances, i.e., there is no universal best-fit solution for all situations. Numerous studies (e.g. [16]) demonstrate that con-

tingency theory can be used to investigate both the mediating and moderating effect.

The research is based on 90 responses from a web-based survey conducted in 2018 among 1,000 medium- and large-size companies in the Czech Republic. We applied quantitative methodology, namely partial least squares structural equation modeling (PLS-SEM) [17], [18] which is used for data analysis. PLS-SEM has become an increasingly popular data analysis method, especially in recent years [19]. SmartPLS software, version 3.2.9, was used to process the data.

We believe this research has an important theoretical and practical contribution to be made. From the theoretical perspective, it contributes to understanding the mechanism of the techniques of SMA implementation into strategic management by investigating the moderating role of performance evaluation and rewarding. From a practical perspective, it helps owners (principals) to understand how to efficiently translate strategy into action using performance evaluation and rewarding systems for controlling managers (agents).

2. Literature review and hypotheses development

2.1 Strategic management accounting and its implementation into strategic management

The term Strategic Management Accounting (SMA) was pioneered in [20], [21] and defined as “the provision and analysis of management accounting data about a business and its competitors for use in developing and monitoring the business strategy”.

The definition of SMA was consequently discussed in significant conceptual papers [22]–[26]. While some scholars tend to interpret SMA narrowly, a majority accepts a broader definition [20] and this approach is adopted in this article which is reflected in the operationalization of the construct “Strategic management accounting use” (SMAU), see the section on “Measurement of Constructs”.

It was predicted [20] that SMA would spread quickly, both in practice and academia, but this prediction was not realized. On the other hand, interest in SMA gradually renewed and today there is a significant amount of research on this topic. There are over a hundred articles dedicated to SMA (if we apply a more narrow look and consider only articles published in high-quality journals indexed in Scopus or Web of Science), possibly even hundreds of articles

(if we take into account all articles and conference papers), but it is beyond the scope of this research to address all of these articles.

There are three key types of articles on SMA – theoretical (conceptual) ones, empirical case studies and empirical questionnaire surveys. Historically, questionnaire surveys on SMA were largely descriptive, but, consequently, they started to use a contingency approach, in addition to more and more sophisticated methodologies. Cadez and Guilding [27] were the first to employ structural modeling in the field of SMA and their paper addressed a package of SMA techniques and analyzed both contingent factors of SMA (i.e., factors which influence SMA adoption, in this case accountant participation in strategic processes, deliberate strategy formulation, market orientation, size of company and type of strategy) and the consequences of SMA use (specifically its influence on performance). Since then, several papers aimed at the relationships between SMA and other constructs were published.

In Table 1 a summary of key constructs investigated in previous research on SMA can be found.

It is possible to conclude that the majority of studies investigated various contingency factors influencing the utilization of SMA techniques and not the consequences of SMA use. The studies analyzing consequences of SMA use or both contingent factors (i.e., determinants) and consequences of SMA use are in the minority and, as a result of SMA use, company performance is usually investigated.

The literature review, therefore, proved that despite there being ample SMA literature, it is still possible to identify significant research gaps in several meanings of this word.

First, from a geographical point of view, the area of Eastern and Central Europe is subject to less research aimed at SMA published in high-quality journals than Western Europe. There are numerous papers dealing with various individual tools of SMA (e.g., budgeting [43], activity based costing [44]–[45], Balanced Scorecard [46]), but not with SMA tech-

Table 1. Summary of key constructs investigated in previous studies on SMA

Investigated factors influencing the use of SMA	Investigated consequences of SMA use	Article
governance and participation of accountants in strategic management processes	None	[28]
competition and perceived environmental uncertainty	None	[29]
influence of company size and strategy type	None	[30]
perceived environmental uncertainty, historical performance, life cycle stage, structure (centralization/decentralization), size of company, strategy type, and quality of information system	None	[31]
historical performance, perceived environmental uncertainty, proportion of service on total sales, size, strategy type and top management team characteristics	None	[32]
competition, dynamic use, dynamic tension, interactive use, membership in a group, proportion of services on total sales, size, subsidiary	None	[33]
perceived environmental uncertainty	None	[34]
company size, perceived environmental uncertainty, strategy type, and industry	None	[35]
product characteristics, production technology, information demand of managers, qualification of accountants, business environment, size, and age	None	[36]
company profile and manager profiles	None	[37]
life cycle of a firm	company performance	[38]
accountant participation in strategic processes, deliberate strategy formulation, market orientation, size of company, strategy type	company performance	[27]
differentiation strategy	exploratory innovation	[39]
None	company performance	[40]
None	internal and external capabilities of a firm and strategic position	[41]
None	company performance	[42]

Source: own literature review

niques as a whole.

It would be highly risky to suppose that imitating western approaches in other settings will bring the same results. For example, [47] found that cultural variables are critical for the selection of management tools. Research in Eastern and Central Europe is, therefore, highly needed.

Second, the previous part of this literature review revealed that, from the viewpoint of topics investigated, the majority of previous research in SMA focused on contingency factors of SMA. Studies investigating impacts of SMA on different factors are scarce and deal mostly with impacts on organizational performance.

Our study is distinctive from prior research in two key ways.

First, the approach taken in this article is innovative because it distinguishes the use of individual SMA techniques (SMAU) and the implementation of SMA into strategic management (Implementation). The underlying idea is that the use of individual SMA techniques is a prerequisite of the diffusion of SMA into a broader context of strategic management. This idea is in accordance with the stream of thinking advocating that it is necessary to differentiate between a formal adoption of performance measurement systems and their actual intensive use.

Second, it is supposed that the relation between SMA use and implementation of SMA into strategic management is not only direct, but also indirect through the utilization of performance evaluation and rewarding.

Last, but not least, it is possible to propose that previous studies focused on performance evaluation, rewarding and SMA in isolation, while this study more closely examines the interplay between individual constructs.

2.2 Strategic Performance evaluation and rewarding

Strategic performance evaluation and rewarding are strongly interconnected, yet separable approaches.

Thanks to performance evaluation, it is possible to understand the process of the subjective or objective evaluation of an employee's behavior. Generally, performance evaluation is considered a key component of management control systems which influences managerial behavior and performance [48]. Performance evaluation may be connected to rewarding (but not necessarily) and can be applied at all managerial levels [49], [50], [51].

Rewarding for performance is another tool of influencing employee motivation and behavior. On one hand, some researchers advocate that rewards for performance are counterproductive regarding work motivation [52]–[55]. On the other, the majority of scholars today advocate that correctly awarded rewards for performance are useful for motivating people in work settings [56]–[60].

Although the question regarding influence of performance evaluation and rewards on work motivation is important, we decided to focus our attention on the investigation of the mediating effect of performance evaluation and rewards on the degree of implementation of SMA into strategic management. As far as we know, this issue has not been addressed in any previous research.

2.3 Research model and hypotheses

The research model consists of SMA use as an independent variable, implementation of SMA into strategic management as a dependent variable, and performance evaluation and rewarding as mediating constructs. The detailed method of measurement of these constructs in the questionnaire is explained in the section "Materials and Methods", and the sub-section "Measurement of Constructs".

First, we propose that there is a direct positive relationship between the use of SMA techniques and implementation of SMA into strategic management. This relationship is in accordance with intuition and highlights the fact that a more or less formal use of SMA is a prerequisite to the integration of SMA into real business practice; more precisely – the degree of implementation positively depends on the degree of use of SMA techniques. It is possible to formulate H1: The degree of use of strategic management accounting techniques (construct SMAU) has a positive effect on implementation of strategic management accounting into strategic management (Implementation construct).

Second, we propose that there are also important indirect effects of SMA techniques used on SMA implementation through the utilization of performance evaluation and performance-based rewards. In the literature review, it was explained that performance evaluation of managers can be used with or without a link to rewarding for performance and it is rational to differentiate between performance evaluation of top managers and performance evaluation (connected with cascading strategy) of middle- and lower-level managers.

Psychology-based research [61], [62] suggests that

extrinsic motivation (caused by external factors, such as performance evaluation and rewarding) can be internalized. Specifically, we therefore hypothesize that performance evaluation of top managers per se should have a positive influence on the “buy-in” of SMA by top managers and on their willingness to implement SMA into strategic management. The mentioned buy-in can be further strengthened by linking performance evaluation of top managers with their rewarding. Therefore, we hypothesize H2: Performance evaluation of top managers (PerfEvalTM construct) combined with rewarding of top managers (RewardsTM construct) has a positive effect on the implementation of strategic management accounting into strategic management (Implementation construct) and H3: Performance evaluation of top managers (PerfEvalTM construct) has a positive effect on the implementation of strategic management accounting into strategic management (Implementation construct).

Analogically, performance evaluation of middle- and lower-level managers, together with a cascading strategy to these managers per se should have a positive influence on the “buy-in” of SMA by middle- and lower-level managers. The mentioned buy-in can be further strengthened by linking performance evaluation of middle- and lower-level managers with their rewarding. We therefore hypothesize H4: A cascading strategy to middle- and lower-level management and performance evaluation according to strategic criteria (construct PerfEvalMLM) combined with rewarding of middle- and lower-level managers (construct RewardsMLM) has a positive effect on the

implementation of strategic management accounting into strategic management (Implementation construct) and H5: Performance evaluation of middle- and lower-level managers (PerfEvalMLM construct) has a positive effect on the implementation of strategic management accounting into strategic management (Implementation construct).

The hypothesized relationships between constructs are depicted in a model, which can be found in Figure 1.

3. Materials and methods

3.1 Measurement of constructs

The questionnaire investigated several key constructs. For the sake of this article, attention is focused on the following six constructs:

- (1) individual SMA techniques use (SMAU),
- (2) performance evaluation of top management (PerfEvalTM),
- (3) rewarding of top management (RewardsTM),
- (4) cascading strategy to middle- and lower-level management and performance evaluation according to strategic criteria (PerfEvalMLM),
- (5) rewarding of middle- and lower-level management according to strategic criteria (RewardsMLM),
- (6) implementation of SMA into strategic management (Implementation).

Figure 1. Structural model of relationships between use of individual SMA techniques and implementation of SMA into strategic management SMAU = degree of use of individual strategic management accounting techniques; PerfEvalTM = performance evaluation of top managers; RewardsTM = performance evaluation of top managers; PerfEvalMLM = cascading strategy to middle and lower management and performance evaluation according to strategic criteria; RewardsMLM = rewarding of middle and lower managers; Implementation = implementation of strategic management accounting into strategic management.

These constructs were investigated via a measurement instrument, which is explained in Table 2 and Appendix 1. Regarding constructs used in management accounting, we were inspired by the comprehensive overview of this topic in [63].

The SMAU construct was intensively investigated in previous studies enabling it to be developed directly on the basis of previous literature ([27], [29], [30], [64]–[66]) and adapted to the specifics of Czech companies.

Other constructs are due to the innovative character of our unique model and have not been investigated before. These constructs were designed according to our knowledge of the field and, where possible, previously investigated and tested similar constructs were taken into account to prepare constructs of similar or higher quality. For example, rewarding of top

management was not often investigated in management accounting literature and [67], who investigated the linking of PMS to reward mechanism, measured rewarding as a dummy variable (by the way, they also constructed this variable as an “ad hoc constructed instrument”). Compared to this approach, our instrument (see below) is a step forward.

The overview of constructs can be found in Table 2 and detailed wording of the questions in the questionnaire can be found in Appendix 1.

3.2 Preparation of web-based questionnaire, sample and data collection

The web-based questionnaire prepared in Lime-Survey was used as a tool for data collection. The final version of our questionnaire was developed over

Table 2. Constructs

Construct	Variable abbreviation	Variable description	Measurement scale
Individual SMA techniques use (SMAU)	SMAU1	life-cycle costing	scale 1
	SMAU2	target costing	scale 1
	SMAU3	activity-based costing	scale 1
	SMAU4	quality costing	scale 1
	SMAU5	strategic costing	scale 1
	SMAU6	strategic pricing	scale 1
	SMAU7	strategic planning and budgeting	scale 1
	SMAU8	benchmarking	scale 1
	SMAU9	integrated PMS	scale 1
	SMAU10	customer accounting	scale 1
	SMAU11	competitor accounting	scale 1
Performance evaluation of top management (PerfEvalTM)	PerfEvalTM1	customer perspective	scale 2
	PerfEvalTM2	employee perspective	scale 2
	PerfEvalTM3	internal processes	scale 2
	PerfEvalTM4	innovations	scale 2
	PerfEvalTM5	quality	scale 2
	PerfEvalTM6	social responsibility	scale 2
Performance evaluation of middle and lower management (PerfEvalMLM)	PerfEvalMLM1	meetings with middle and lower management	scale 2
	PerfEvalMLM2	ongoing discussion across management levels	scale 2
	PerfEvalMLM3	dialog and information sharing across all managerial levels	scale 2
	PerfEvalMLM4	performance evaluation of middle and lower mgmt according to strategic goals achievement	scale 3
Rewarding of top management (RewardsTM)	RewardsTM1	financial rewards of top management depend on the performance of company	scale 3
	RewardsTM2	financial performance-based rewards are a significant part of the total reward of top managers	scale 3
Rewarding of middle and lower management (RewardsMLM)	RewardsMLM1	Financial rewards of middle and lower management for achievement of strategic goals are a significant part of their total reward	scale 3
Implementation of SMA into strategic management (Implementation)	Implementation1	identification of strategic success factors	scale 2
	Implementation2	setting of strategic goals	scale 2
	Implementation3	evaluation of the achievement of strategic goals	scale 2
	Implementation4	information on variance from strategic goals	scale 2
	Implementation5	control of key strategic areas	scale 2
	Implementation6	utilization in meetings of top management	scale 2
	Implementation7	management of strategic uncertainties	scale 2

*scale 1: 1=not used, 5=very intensively used; scale 2: 1=negligibly, 5=intensively, scale 3: 1=strongly disagree, 5=strongly agree
Source: own computations

several months and piloted by six specialists in the area of management accounting.

The population of this study are medium- and large-size companies (with more than 50 employees and with a turnover above 256 million CZK) from a wide range of industries domiciled in the Czech Republic. The overall amount of companies meeting our selection criteria was 3,938 according to the Albertina CZ Gold Edition database. As it would be difficult to contact all these companies, 1,000 cross-industrial business companies were randomly selected. The contact information to these 1,000 companies was obtained in two phases. First, we obtained a phone contact from the Albertina database or from corporate web pages. Second, we contacted these companies by phone and asked them to participate in the research and, if they agreed, we asked them for an e-mail contact to a senior financial manager (e.g., CFO or financial director) or their personal assistant and explained to them the goals of our research. Finally, we sent an e-mail with a link to our web-based questionnaire to the contacted managers (one questionnaire per company, i.e., the unit of observation is a questionnaire per company). The survey was conducted from September 2018 to December 2018. In total, 90 useable questionnaires are analyzed in this article, i.e., a response rate of nine per cent. The response rate is typical (slightly above the average) for questionnaire surveys in the Czech Republic; unfortunately, not all companies indicating a possible interest in research consequently participated in this activity.

Descriptive characteristics of respondents can be

Table 3. Descriptive characteristics of respondents (n=90)

Statistic	Full-time employees	Assets (thousands CZK)	Turnover (thousands CZK)
Mean	321.56	1,406,491	1,712,720
Std. Error of Mean	42.22	347,575	385,446
Median	191	514,204	585,270
Std. Deviation	401	3,297,387	3,656,664
Skewness	3.931	6.227	6.229
Kurtosis	20.920	46.320	46.725
Minimum	46	62,070	173,146
Maximum	2,931	27,666,833	30,900,714
25th percentile	102.50	265,451	355,757
75th percentile	369.25	1,048,376	1,431,773

Source: own calculations

found in Table 3.

Nearly all respondents fulfilled the original screening criteria. Two responding companies had under 50 employees and three companies had turnover less than 250 million CZK, nevertheless the size of these companies was very close to the threshold criteria and were not excluded from the analysis.

Structurally, 50 companies belonged to the manufacturing industry, eighteen companies to the wholesale and retail industry, and seven companies to the construction industry. The other industries included three or fewer companies.

4. Results

This chapter presents the results of the analysis in two steps. First, the reliability and validity of measurement constructs are examined. Second, the evaluation of the hypotheses and model fit are provided. This is a standard procedure recommended by scholarly literature on the PLS-SEM approach ([17–19], [68]).

4.1 Reliability and validity

Reliability and validity of constructs and outer loadings for individual variables can be found in Table 4. In the case of the RewardsMLM construct, it is impossible to evaluate its internal consistency because this construct is measured only by one item.

According to [17], Cronbach's Alpha, which measures the internal reliability of constructs, should ex-

Table 4. Reliability and validity of constructs

Constructs and variables	Outer loadings	P values	Cronbach's Alpha	CR	Average variance extracted (AVE)
SMAU			0.830	0.864	0.373
SMAU1	0.464	0.000			
SMAU2	0.735	0.000			
SMAU3	0.671	0.000			
SMAU4	0.711	0.000			
SMAU5	0.634	0.000			
SMAU6	0.668	0.000			
SMAU7	0.592	0.000			
SMAU8	0.644	0.000			
SMAU9	0.585	0.000			
SMAU10	0.471	0.000			
SMAU11	0.457	0.000			
PerfEvalTM			0.820	0.869	0.526
PerfEvalTM1	0.691	0.000			
PerfEvalTM2	0.752	0.000			
PerfEvalTM3	0.688	0.000			
PerfEvalTM4	0.763	0.000			
PerfEvalTM5	0.664	0.000			
PerfEvalTM6	0.786	0.000			
PerfEvalMLM			0.806	0.878	0.650
PerfEvalMLM1	0.889	0.000			
PerfEvalMLM2	0.874	0.000			
PerfEvalMLM3	0.867	0.000			
PerfEvalMLM4	0.543	0.000			
RewardsTM			0.632	0.844	0.730
RewardsTM1	0.874	0.000			
RewardsTM2	0.835	0.000			
RewardsMLM			1.000	1.000	1.000
RewardsMLM1	1.000				
Implementation			0.906	0.926	0.641
Implementation1	0.822	0.000			
Implementation2	0.821	0.000			
Implementation3	0.872	0.000			
Implementation4	0.768	0.000			
Implementation5	0.776	0.000			
Implementation6	0.820	0.000			
Implementation7	0.716	0.000			

Source: own calculations

ceed 0.7. From Table 4 it is evident that for RewardsTM this criterion is not fulfilled because Cronbach's Alpha equals 0.632. Cronbach's Alpha is disposed to underestimate the internal consistency reliability and can, therefore, be considered too conservative a measure. Some scholars [69] consider the less conservative composite reliability (CR) to be a better measure of reliability than Cronbach's Alpha. For CR, acceptable values are between 0.70 and 0.90 with high values (above 0.95) undesirable. Results depicted in Table 4 show that CR is acceptable for all constructs.

Outer loadings are recommended to be over the common threshold of 0.7 [68]. Nevertheless, Hultand [70] noticed, in practical research, that at least some measures have loadings below 0.70 and recommended dropping items with loadings of less than 0.40 or 0.50. In this study, all variables with outer loadings below 0.50 were excluded, i.e., the variables SMAU1, SMAU10, and SMAU11 were removed. All results in the following text are calculated after the exclusion of these variables.

On the construct level, convergent validity is usually evaluated via the average variance extracted (AVE) which should be higher than 0.50 [17]. Values under 0.50 may indicate issues with the internal consistency of constructs. This condition is not fulfilled for the SMAU construct even after the exclusion of variables with outer loadings below 0.50 AVE equal to 0.443, which can be considered a borderline value.

Discriminant validity controls if the variables do

not relate to more than one construct and there are several possible approaches to the evaluation of discriminant validity. The most commonly used is the Fornell-Larcker criterion [71] which compares the square root of the AVE with latent variable correlations. The Fornell-Larcker criterion is fulfilled when the square root of each construct's AVE is greater than its highest correlation with any other construct, see Table 5.

Results in Table 5 show that the Fornell-Larcker criterion is fulfilled for all constructs because the square root of each construct (can be found in the intersection of row and column containing the given construct) is greater than the correlation of this construct with other constructs (correlations can be found under the square root of a construct).

A study [72] noticed that use of the Fornell-Larcker criterion for PLS-SEM models may be inaccurate and suggested using a heterotrait-monotrait ratio (HTMT) of the correlations. The threshold level of the HTMT is the subject of discussion, but the majority of scholars suggest a threshold of 0.85. The HTMT criterion is shown in Table 6.

It is possible to conclude that the HTMT criterion is also fulfilled and discriminant validity is therefore corroborated both by the Fornell-Larcker criterion and HTMT criterion.

The variance inflation factor (VIF) reflects the collinearity in data behind the constructs. The threshold value is five and the value of VIF greater than five

Table 5. Discriminant validity, Fornell-Larcker

Construct	Implementation	PerfEvalMLM	PerfEvalTM	RewardsMLM	RewardsTM	SMAU
Implementation	0.801					
PerfEvalMLM	0.652	0.807				
PerfEvalTM	0.485	0.565	0.725			
RewardsMLM	0.197	0.531	0.292	1.000		
RewardsTM	0.445	0.515	0.415	0.435	0.855	
SMAU	0.646	0.563	0.517	0.192	0.242	0.665

Source: own calculations

Table 6. Discriminant validity, Heterotrait-monotrait ratio (HTMT)

Construct	Implementation	PerfEvalMLM	PerfEvalTM	RewardsMLM	RewardsTM	SMAU
Implementation						
PerfEvalMLM	0.746					
PerfEvalTM	0.552	0.677				
RewardsMLM	0.204	0.622	0.325			
RewardsTM	0.582	0.753	0.573	0.553		

Source: own computations

may indicate a potential collinearity problem [17].

On the basis of the results depicted in Table 7, it is possible to summarize that VIF is not greater than five for any variable, i.e., there is no collinearity in our data.

4.2 Results of structural model and evaluation of hypotheses

Evaluation of the measurement model proved

that its properties are acceptable, and it is possible to continue the analysis with an assessment of the structural model.

Results of the path analysis can be seen in Figure 2.

Figure 2 shows the path coefficient and statistical significance (p-values) of relationships between constructs. Results show that implementation of SMA into management is greatly explained by the model. The coefficient of determination (R^2) represents the

Table 7. Collinearity statistics, VIF

Variable	VIF
SMAU2	1.752
SMAU3	1.640
SMAU4	1.759
SMAU5	1.501
SMAU6	1.585
SMAU7	1.330
SMAU8	1.974
SMAU9	1.900
PerfEvalTM1	1.411
PerfEvalTM2	1.761
PerfEvalTM3	1.875
PerfEvalTM4	2.070
PerfEvalTM5	1.925
PerfEvalTM6	2.389
PerfEvalMLM1	3.020
PerfEvalMLM2	2.679
PerfEvalMLM3	2.264
PerfEvalMLM4	1.149
RewardsTM1	1.271
RewardsTM2	1.271
RewardsMLM1	1.000
Implementation1	2.465
Implementation2	2.502
Implementation3	3.973
Implementation4	2.331
Implementation5	2.223
Implementation6	2.529
Implementation7	1.715

Source: own calculations

combined impact of exogenous constructs on an endogenous construct, i.e., the amount of variance in the endogenous construct explained by exogenous constructs. Therefore, the higher the values of R^2 , the better the predictive abilities of a model.

Specifically, our model explained a 55.8% variance in the Implementation construct, a 31.7% variance in the PerfEvalMLM construct, a 28.2% variance in the RewardsMLM construct, a 26.7% variance in the PerfEvalTM construct and a 17.2% variance in the RewardsTM construct. In the context of social sciences, these results are fully acceptable, though the amount of explained variance in the key Implementation construct is especially high.

The analysis of inner models should not be limited to direct relationships. Our hypotheses relate to mediation effects and the model specifically includes more than one mediating variable, i.e., a multiple mediation analysis is required and specific indirect

effects need to be calculated for an evaluation of the hypotheses. Results can be found in Table 8.

Hypotheses H1, H2 and H5 are supported by the results, but hypotheses H3 and H4 are rejected. Although there is a positive specific indirect effect of SMAU on Implementation through PerfEvalTM, it is not statistically significant. The specific indirect effect of SMAU on Implementation through PerfEvalMLM and RewardsMLM is statistically significant but negative.

5. Discussion

The results proved that the measurement model does not suffer from any substantial issues from a statistical point of view. The only problem is with AVE for the SMAU construct which has a borderline value. It was, therefore, possible to advance the analysis and assess the structural model.

Table 8. Evaluation of hypotheses

Hypothesis	Description	Coefficient	P-value	Result
H1	SMAU→Implementation	0.386	0.001	supported
H2*	SMAU→PerfEvalTM→RewardsTM→Implementation	0.046	0.039	supported
H3*	SMAU→PerfEvalTM→Implementation	0.009	0.880	rejected
H4*	SMAU→PerfEvalMLM→RewardsMLM→Implementation	-0.059	0.023	rejected
H5*	SMAU→PerfEvalMLM→Implementation	0.237	0.003	supported

*Specific indirect effects are displayed here, not path coefficients
Source: own computations

Figure 2. Results of path analysis

The results show that regarding the key dependent construct Implementation, the model explained 55.8% of the variance in the construct. Acceptable levels of R^2 differ across disciplines. Nitzl [73] reported that in the field of management accounting the average value of the main variables was approximately 33%. It is, therefore, possible to advocate that, in the context of management accounting research, the amount of variance explained by our model represents an outstanding result.

We suggest that this result is partially caused by the fact that the dependent construct of our model (Implementation) has a close relationship with other constructs of the model and this relationship is not obfuscated by too many variables.

Evaluation of the hypotheses brought some significant findings and it is possible to summarize that the majority of results is in accordance with our expectations.

The direct effect of SMAU on Implementation is positive (path coefficient equals to 0.386) and statistically significant. This result is not surprising as it supports hypothesis H1 and implies that if companies use individual SMA techniques more intensively, they can also implement SMA into strategic management.

The total specific indirect effect of SMAU on Implementation is smaller than the direct effect, yet it is still positive and relatively strong (0.233). A more detailed analysis of this effect revealed expected results and one surprising result.

Utilization of the cascading strategy to middle and lower management, accompanied by their performance evaluation according to strategic criteria per se (without rewarding), has a positive and statistically significant effect on implementation of SMA into strategic management (hypothesis H5 is supported). Similarly, utilization of performance evaluation of top managers per se (without rewarding) has a positive effect on implementation of SMA into strategic management, but it is not statistically significant (hypothesis H3 is rejected). What is surprising is that while the specific indirect effect of SMAU on Implementation through PerfEvalMLM and RewardsMLM is positive and statistically significant (hypothesis H2 is supported), the specific indirect effect of SMAU on Implementation through PerfEvalMLM and RewardsMLM is negative (i.e., opposite to our expectations) and statistically significant (hypothesis H4 is rejected). This result is somewhat counterintuitive because it can be interpreted that performance evaluation of middle- and lower-level managers, the cascading strategy to these managers, in addition to

rewarding of these managers on the basis of their strategic performance, decreases the implementation of SMA into strategic management.

It is possible to formulate several practical managerial implications of these results. First, our research confirmed that the degree of implementation of SMA into strategic management positively depends on the existence of the formal use (adoption) of strategic management accounting. Companies striving to integrate strategic issues in management should, therefore, adopt and use individual SMA tools as a first necessary step. This obvious result is in accordance with conventional wisdom, but statistical confirmation is needed. Second, the implementation of performance evaluation and rewarding of top managers according to strategic criteria have a positive influence on the degree of implementation of SMA into strategic management and companies should implement both these tools for top managers. Third, we discovered that the cascading strategy and performance evaluation of middle- and lower-level managers without rewarding (i.e., feedback per se) has a significant positive impact on the degree of implementation of SMA into strategic management. Finally, we are disappointed by the fact that the specific indirect effect of SMA use on implementation of SMA into strategic management through the combined use of performance evaluation of middle- and lower-level managers and performance-based rewarding of these managers was found to be negative and statistically significant. It is important to emphasize that it is necessary to be extremely cautious with any straightforward interpretation of this result.

We can only speculate on the reasons explaining this negative relationship between rewarding of middle- and lower-level managers and implementation of SMA. This may be caused by the fact that top managers believe that rewarding of middle- and lower-level managers, according to strategic criteria per se, integrates the strategy into management sufficiently and, therefore, it is not necessary to exert such a significant effort to integrate strategy by any other means. In order to discover the more complete truth concerning the reasons for this result, further research is needed.

Regarding the relevance of our research for academia, we propose that the main contribution of this article consists of three points: 1.) a radical abandonment of organizational performance as a key independent variable; 2.) a shift of focus to performance evaluation and rewarding for performance as important mediating variables; 3.) highlighting the idea that it is necessary to differentiate between the adoption and use of various SMA tools and the deep integra-

tion of strategic thinking into management. On the basis of these statements, we suggest ideas for further research in the Conclusions which follow.

6. Conclusions and limitations

This study strove to investigate the mediating effect of performance evaluation and rewarding on the implementation of SMA into strategic management. Two lines of mediation were distinguished, the first through performance evaluation and performance-based rewarding of top management, the second through cascading performance measures to middle and lower management and subsequent performance evaluation and strategic performance-based rewarding of middle and lower management.

It was found that a mediating effect (in the terminology of PLS-SEM methodology a specific indirect effect) does exist and is relatively strong. Surprisingly, the specific indirect effect of SMA use on implementation of SMA into strategic management through the combined use of performance evaluation of middle- and lower-level managers and performance-based rewarding of these managers was found to be negative and statistically significant. The direct effect of SMA use on implementation of SMA into strategic management is positive and statistically significant. Our results provided support for hypotheses H1, H2 and H5. Hypotheses H3 and H4 were rejected. We advocate that companies should support the implementation of SMA into strategic management through performance evaluation of all managerial levels, the cascading of such a strategy to middle and lower management, and performance-based rewarding of top managers. For lower managerial levels, strategic performance-based rewards need to be carefully considered and further research into this area is needed.

Limitations of this study include standard limitations stemming from the inherent features of the survey-based data. Another limitation is that our sample consisted of 90 units of analysis, an acceptable amount, similar to other questionnaire-based studies in the field of management accounting. Finally, the questionnaire deals with the subjective opinions of respondents, and it is possible that they do not represent the status quo in their organizations.

There are several possible avenues of further research. The first option is to replicate this research in other Eastern and Central European countries following minor improvements in the measurement instrument (e.g., measuring all constructs by at least two variables). A second possibility is the preparation of qualitative research in the form of a comparative

multiple case study aimed at SMA adoption and use, and integration of strategic thinking into management. This research should address at least two cases: a company whose strategically based performance evaluation and rewarding is not implemented and a second company where SMA adoption and use is accompanied by performance evaluation and rewarding. It would be interesting to apply a theoretical stance such as a goal-setting theory or a self-determination theory to study how rewarding influences motivation at work and the behavior of various groups of employees.

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Appendix 1: Questions used for measurement of constructs

Strategic management accounting use (construct SMAU): To which extent does your company utilizes the following techniques of strategic management accounting (answer on scale from 1 = not used to 5 = very intensively used)?

- Information on costs of products and/or services for a long-term or for a product (service) lifetime (life cycle costing).
- Setting of cost limits on the basis of market prices and requested profit margin of products and/or services (target costing).
- Determination of costs and valuation of activities (activity based costing).
- Identification and management of quality costs, i.e. costs associated with the creation, identification, repair and prevention of defects (quality costing).
- Separated measurement of strategic expenses (e.g. research and development), capital expenses and operational expenses (STRATEX/CAPEX/OPEX).
- Analysis of strategic factors in the process of price setting (strategic pricing).
- Strategic planning and budgeting.
- Benchmarking (i.e. comparison of internal processes to an ideal standard).
- Integrated performance measurement and management systems (e.g. Balanced Scorecard).
- Information on value of customers (customer profitability analysis, customer life time value).
- Information on competitors (e.g. performance, market share, profitability, reduction of costs).

Performance evaluation of top managers (construct PerfEvalTM): To which extent are performance measures related to the following perspectives used for performance evaluation of top managers (answer on scale from 1 = negligibly to 5 = intensively)?

- Customer perspective (e.g. market share, satisfaction, customer retention).
- Employee perspective (e.g. satisfaction of em-

ployees, fluctuation, training of employees).

- Operational perspective (e.g. productivity, safety, optimalization of time use).
- Innovations (e.g. results of research and development, success of new products/services).
- Quality (e.g. quality of products/services, defects, received awards).
- Social responsibility (e.g. environment, communities, public relations).

Performance evaluation of middle and lower management (construct PerfEvalMLM):

To which extent top managers employ tools of strategic management accounting for (answer on scale from 1 = negligibly to 5 = intensively).

- Utilization in meetings and discussions of middle and lower management.
- Utilization in meetings and ongoing discussion across managerial levels.
- Utilization in dialog and sharing of information between various managerial levels.

To which extent do you agree with the following statement: "Performance of middle and lower managers is primarily evaluated on the basis of their ability to fulfil strategic goals and goals deduced from strategic goals" (answer on scale from 1 = strongly disagree to 5 = strongly agree).

Rewarding of top management (construct RewardsTM): To which extent do you agree with the following statements (answer on scale from 1 = strongly disagree to 5 = strongly agree):

- Financial rewards of top managers increase accordingly to the extent to which are actual results better than planned results.
- Performance-based rewards are an important part of the total salary of top management.

Rewarding of middle and lower management (construct RewardsMLM): To which extent do you agree with the following statement (answer on scale from 1 = strongly disagree to 5 = strongly agree):

- Rewards of middle and lower management for fulfilling strategic goals and goals deduced from strategic goals represent a significant share of their total salary.

Implementation of SMA into strategic management (construct Implementation): To which extent top management implements tools of strategic management accounting in the following areas (answer on scale from 1 = negligibly to 5 = intensively):

- Identification of strategic success factors (i.e. factors indicating fulfilment of a chosen strategy).
- Strategic goals setting.
- Evaluation of achievement of strategic goals.
- Information on variance of actual results from strategic goals.
- Control of key areas of strategic performance.
- Utilization in meetings and discussions within top management.
- Management of strategic uncertainties (e.g. factors, which may question the present strategy or provide opportunities for new strategic initiatives).