Westfälische Wilhelms-Universität Münster
Wirtschaftswissenschaftliche Fakultät
Lehrstuhl für Betriebswirtschaftslehre, insb. Controlling
Prof. Dr. Wolfgang Berens
(http://www.wiwi.uni-muenster.de/ctrl)

Does Managerial Accounting Follow Entrepreneurial Characteristics?

Results of an empirical analysis of German SME

Klaus Flacke
Klaus Segbers*

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* Dipl.-Kfm. Klaus Flacke, Dipl.-Kfm. Klaus Segbers, Doctoral students at the Chair of Management Accounting, University of Münster.

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1. Introduction

Empirical studies on management accounting in SME (small and medium enterprises) have shown a wide range of different implementations of management accounting in such enterprises. Contingency theory is often used to explain this varienty. Based on the contingency theory, factors such as company size, environment, technological dynamic or competition, as well as specific internal factors such as strategic orientation are used to explain these differences. These factors usually apply to companies of all sizes and are not able to cover all peculiarities of SME. SMEs are mostly characterised by the identity of ownership and management in one or more individuals. According to JENSEN and MECKLING (Jensen/Mecklig 1976, pp. 305), they thus do not have the classical incentive problem between managers and owners. This and classical criterium of small size (definition of EU-comission: 10-249 employees, revenues of 2-50 Mio. €, total assets of 2-43 Mio. €) lead to a very high influence of the entrepreneur on all decisions in the company. Consequently he or she has a potentially high influence on the implementation of management accounting within the company. This paper tries to consider the individual entrepreneur and his or her traits as an explaining factor for the design of management accounting systems (MAS) in SME. We examine whether different types of entrepreneurs cause different types of management accounting.

2. Literature Review

Survey based empirical research on management accounting can be devided into two main types of studies. The first group of studies refers to management accounting as the independent variable (for an overview see e.g. Chenhall, 2003). Such surveys examine in which way management accounting has a significant impact on outcome-variables which differ with the respective studies. Some of these outcome-variables are the usage respectivly the usefulness or the efficency of the information generated by management accounting, the effect of changes in the MAS on stock prices or the impact of the structure and sophistication of the MAS on corporate performance.

The second group of studies refers to management accounting as the dependent variable. These studies are driven by the question whether there are contextual factors which have a significant contribution to explain the wide range of structures, sophistication and use of instruments of management accounting systems observed in practice. Such a search for contextual factors is often preceded by basic considerations of the contingency theory. This

theory proposes that special organisational features of companies and institutions are mainly caused by certain external and internal factors (for an overview of relevant studies and the examined contextual factors see Luft/ Shields, 2003, Chenhall, 2003, Covaleski/ Dirsmith/ Samuel., 1996). Contingency theory originally referred to the influence of contextual factors on the organisation as a whole (Burns/ Stalker, 1961, Woodward, 1965, Thompson, 1967, Lawrance/ Lorsch, 1967, Perrow, 1970, Galbraith, 1973). Transferred to management accounting, this leads to the assumption that structure, organisation and functions of specific MASs depend on certain contextual variables (Gordon/ Miller, 1976, Hayes, 1977). The most important variables to which former studies attribute a significant impact on management accounting comprise the external environment, especially its uncertainty, production technology, the organisational structure, the company size, the strategic orientation and national culture. Furthermore in other studies an influence of IT (Xiao/ Dyson/ Powell, 1996) and the grade of diversification (Amshoff, 1993) could be identified.

A major part of contingency theory based surveys focus on large-scale enterprises, which differ significantly with respect to specific features and the relevant contextual factors when compared to SMEs. Due to the pivotal role of the entrepreneur respectively the management in SME, studies suggest that the entrepreneuer/ management has a crucial influence on the constitution of the MAS (see e.g. Perren/ Grant, 2000). In the context of the Theory of Entrepreneurship exists a large body of literature, which deals with specific characteristics of entrepreneurs in comparison to other individuals, e.g. managers. In these studies several types of entrepreneurs are identified (basing on Collins/Moore/Unwalla, 1964, and Smith, 1967). One extreme is the Craftsman Entrepreneur (CE). This type can be characterised by a limited, often technical education, a strong focus on high quality products and a short time horizon. His motives of being an entrepreneur are mainly autonomy and to maintain a secure existence. Typically, the CE is a relatively narrow-minded person. The other extreme is the Opportunistic Entrepreneur (OE), which can be described by a broad education with some economic background. He often has got entrepreneurial experience from former jobs. His main motives are market success and achieving a good economic performance. In contrast to the CE, the OE is relatively open-minded. Of course, reality provides for several additional types between these two extremes (for an extensive overview, see e.g. d'Amboise/Muldowney, 1988, Chell/Haworth/Brearley, 1991, or Fallgatter, 2001, 2004).

Previous studies of management accounting in SME have tried to verify the interrelation for different contextual factors. It is striking that variables regarding the characteristics of the entrepreneur/ management only occur in a few of these studies. Moreover those variables were rarely used in such studies. Table 1 gives an overview over past studies on management accounting in SME which examine the influence of contextual variables on management accounting.

Author(s)	Year	Region	N	Influence of management factors considered?
Gaydoul	1980	Germany	538	No
Pohl/ Rehkugler	1986	Germany	217	manager- vs. ownerleadership; Part of academics
Kosmider	1991	Germany	440	manager- vs. ownerleadership
Niedermayr	1994	Austria	292	manager- vs. ownerleadership; leadership suitable for management accounting
Matthews/ Scott	1995	USA	130	no
Legenhausen	1998	Germany	139	no
Dintner/ Schorcht	1999	Germany	128	leadership style (willingness to delegate)
Reid/ Smith	2000	Scotland	150	no
Zimmermann	2001	Germany	84	delegation; central leadership style; low context- vs. high context leadership
Gibson/ Cassar	2002	Australia und Newsealand	3,500	management training; experience and education of entrepreneur

Table 1: Selected empirical studies on the impact of contextual factors on MAS in SME

POHL and REHKUGLER (Pohl/Rehkugler, 1986) come to the conclusion that the use of management accounting instruments is more distinct in companies without owner-leadership, whereas companies with owner-leaders use significantly less of such instruments. KOSMIDER (Kosmider, 1991) and NIEDERMAYR (Niedermayr, 1994) have similar findings. NIEDERMAYR conducts a more sophisticated analysis than Pohl/ Rehkugler. She is not only able to find proof for a connection between the type of entrepreneur and the use of management accounting instruments but also to the organisation of management accounting. Beyond the fact that NIEDERMAYR uses a statistical factor to represent the suitability of ledership for the implementation of management accounting, she finds significant interrelations between this factor and specific parts of the MAS. DINTNER and SCHORCHT as well as ZIMMERMANN follow a similar approach. They try to link the leadership style with the design of the MAS., While DINTNER and SCHORCHT do not find proof for a link between the willingness to delegate and MAS (Dinter/ Schorcht, 1999), ZIMMERMANN shows a week connection between

the leadership style and certain goals of management accounting (Zimmermann, 2001). GIBSON and CASAR highlight further aspects (Gibson/ Casar, 2002). They find a significant interrelation between the frequent usage of training courses, the experience and education of the entrepreneur and the implementation of corporate planning. Their study is based on data of Australian and New Zealand start up companies. However, the results of their study are limited to the extend that they do not discriminate between different implementations of MASs, but only for the existence of corporate planning. POHL and REHKUGLER find a weekly significant interrelation between the percentage of academics among employees and the MAS. However, the analysis was also conducted in a quite undifferentiated way. Overall it can be stated that there is a lack of studies on management accounting in SME in general and specially on studies on the influence of the entrepreneur on the MAS. Thus the aim of our analysis is to further contribute to this field of research.

3. Hypotheses

Based on the existing results of contingency theoretical studies potential influences of exogenous variables on the implementation of MAS will be examined in this paper. The size of a company, its dynamics and strategy are considered. In addition,further variables are taken into account to examine the potential influence of the entrepreneur on management accounting.

Companay size has a potential positive influence on management accounting. Larger enterprises have a higher grade of specialisation and division of work. This leads to more interfaces in the workflow and processes. Additionally, from the leader's point of view, the transparency of the company decreases because they are no longer involved in all processes and information are usually generated locally.. These factors increase the necessity of a more sophisticated MAS to ensure a consistent supply of information and the coordination of the interfaces within a company. This leads to the hypothesis that *larger companies have implemented more sophisticated MAS.*

Company and environmental dynamics have a potential positive impact on management accounting, too. In a highly dynamic environment, a company needs to adapt to a changing general framework. Those changes could result from new technologies, new competitors with new strategies or changed conditions of the purchase market. Companies need to identify these changes as early as possible to react in an appropriate time and way. Especially in an

dynamic environment, management is often overburdened due to its engagement in operative work. This should breed a *more sophisticated design of MAS in companies which work in a more dynamic environment.*

According to Porter, potential strategies can be distinguished into a cost leader and a quality leader strategy. Because of the small size of SME, such companies may also consider a niche strategy which is accompanied by a low number of products. Moreover, SMEs have to consider in how far their sales markets should be expanded geographically. These factors have a potential influence on the implementation of management accounting. A cost leader strategy should be accompanied by more sophisticated cost accounting instruments. A company following a quality leader strategy will presumably focus on instruments of marketing management accounting. The implications of a niche strategy are not clearly predictable.

As the context variables discussed so far are relevant for companies of all sizes, we introduce variables concerning the characteristics of entrepreneurs because of the SME specific unity of ownership and management. We expect a potentially high influence on the design of the MAS. The entrepreneur exerts a high influence on all parts of the company. E.g. he is decisively responsible for the company's strategic orientation which depends on his attitudes and personal background. At the same time, personal characteristics of the entrepreneur have a high impact on the set up of the MAS. A profound economic education should presumably lead to a higher understanding of the benefits of a sophisticated management accounting and therefore to a higher extent of implementation and usage. Additionally, a greater openness for external advisors and consultants should lead to a bigger susceptibility to management accounting information. The reason for this can be seen in the principal acceptance of the restricted rationality of the individual and the necessity of the use of additional sources of information. Open mindedness of the entrepreneur therefore should have a positive influence on the scale of the MAS. Vice versa, a stronger desire for autonomy should potentially have a negative influence. The greater this desire is, the less important are highly rational financial targets. This could potentially imply a negative influence on the scale of the MAS as the intensive use of management accounting could be viewed as a restriction of his entrepreneurial autonomy.

4. Empirical Analysis

4.1. Data Set

The results of the empirical analysis are based on a written survey conducted between June to August 2004. Information about all functions and parts of the companies was subject of this survey. One part of the questionnaire extensively dealt with different matters of management accounting as well as the structure of the management. Before conducting the survey, the completeness and understandability of the questionnaire was tested with the help of twelve companies of different sizes and from different industries. Aftwerwards it was modified in order to resolve any weaknesses.

After the pretest about 3,500 companies, mainly from the federal states of Northrhine-Westfalia and Rhineland-Palatinate, were contacted.[1] The contact was either made via a representative of the companies' cooperative bank or telephonically. The questionnaire was then sent to the respective company. The rate of return was about 15%. The survey included a industry specific sample with differing questions in some parts. This specific sample was therefore excluded from our analysis leaving 212 questionaires. Furthermore 12 questionnaires were excluded because they did not contain answers to the relevant questions. To avoid any bias, we eliminated all questionnaires from companies including all of their respective subsidiary companies which did not fulfill the quantitative criteria for number of employees or revenues of the SME-criteria of the EU-commission . Thus another 33 questionnaires were eliminated. In the end, datasets from 167 companies could be used for the analysis.

Descriptive statistics

To describe the companies included in the data sample we use the company size, expressed by revenue and total employees in 2003, the company's age, the legal form and the industry.

The average annual revenue of all companies amounts to 13.3 Mio. €, the Median is 6.2 Mio. €. With respect to the employees, the average size is 69 employees with a median of 41. Related to the definition of the EU most companies are part of the small companies. The average enterprise is 44 years old. The median being at 31 years. Despite the relatively little revenues, the enterprises are rather old; this reveals only little dynamic.

[1] About 26.5% of all German companies are based in these two federal states.

81.4% of all companies in the sample are incorporated enterprises, only 16.8% are business partnerships and the rest (1.8%) have different legal forms. Although the majority of the firms are incorporated, they do mostly fulfill the qualitative criterion of unity of ownership and management. This is shown by the fact that in 80.8% of the sampled firms the management has a stake of 90 or more percent in the equity of the company.

Concerning the industry, 44.9% of all enterprises are categorised as industrial companies, 28.7% are traders, 12.0% are building companies and the rest of 14.4% are from other branches including service providers. Compared to the German industry structure, our sample is clearly concentrated in the industrial sector and underrepresented in the service sector. This is mainly a result of the design of the questionnaire which excluded certain branches, especially from the service sector

4.2. Methodology and Definition of Variables

A two-stage analysis is used to examine the interrelations postulated before. In a first step, companies are grouped by the level of implementation of management accounting. The second step examines whether the hypothetical context factors have a significant influence on the affiliation to a certain group of implementation of management accounting.

To conduct the first step of the analysis, a cluster analysis was undertaken. A wide range of input variables were included to determine the level of implementation of management accounting. Factors of the organisational structure and technical equipment of management accounting, information supply, planning and control and the influence of management accounting were taken into account. For a detailed description of input variables see Appendix A1. Missing values were either eliminated by the calculation of the median or, concerning questions on the intensity of the usage of instruments, replaced by the answer “no usage”. The rate of missing values of 6% at the highest can be regarded as low.

A pre-clustering with the Single Linkage-method was processed to eliminate potential outliers. All variables were standardised by Z-transformation to potentiate the pre-clustering. The squared euclidic distance was used as the distance measure. A weighting of variables was not used. One outlier could be identified by the pre-clustering comprising for 45.8% of the overall measure of error variance which hence was eliminated from the further analysis. The

main-clustering was performed afterwards using the Ward-method. As before, variables were Z-transformed and the squared euclidic distance was used as the distance measure.

The resulting clusters were described by means of the contingency factors and the factors characterising the entrepreneur. For this means a univariate analysis on significant differences between the clusters was executed. As a Levene-test showed no homogeneity of variances in the single clusters and thus the use of an oneway ANOVA was not possible we used the Welch- and the Brown-Forsythe-test as robust test procedures. We alternatively tested the difference by the nonparametric Kruskal-Wallis-Test.

The analysis concludes with a multivariate multi-stage discriminant analysis to test the interrelation of explaining factors and management accounting. The affiliation to a cluster was used as the dependent variable. The contingency factors and characteristics of the entrepreneur were used as the independent variables. For a detailed description of the used variables see Appendix A2 and A3. We used Wilks´ Lambda as a selection criterion. The significance level for the acceptance was 5%, for the exclusion 10%.

5. Results

The result of the cluster analysis was a three-cluster scenario. This makes up for 24% of the whole measure of error variance. Moving back to a two-cluster scenario would lead to a rise to 40%. A detailed description of the clusters can be found in Appendix A4. The largest cluster (no. 2) comprises 69 companies followed by cluster no. 1 (58 companies) and cluster no. 3 (39 companies). The clusters do not differ significantly regarding branch and legal form whereas a weekly significant difference with respect to company size was observed.

Appendix A5 gives detailed information about the differences of the input variables between the three clusters. For reasons of clearness we did not give a description of mean values. Instead in row 3, a ranking of the mean values of the variables for the clusters is provided.[2] A low rank indicates a more sophisticated management accounting. It is obvious that all clusters differ significantly in nearly all variables. Only the variables applying to the organisation of management accounting do not differ significantly. With respect to the sophistication of management accounting, a definite ranking can be noted. Cluster no. 1 includes the companies with the most sophisticated MAS followed by no. 2 and no. 3. The results of a

[2] Regarding the question for the intensity and the horizon of planing the lower the rank mor often respectively the longer the planing is processed.

multivariate discriminant analysis to identify the most selective variables are provided in Appendix A6. This analysis reveals that a sound selection is feasible with the help of 15 variables. Only 13.5% of the variance of all input-variables cannot be explained. 84.3% of cross-validated groupings are successful.

As a clear classification and ranking of the clusters concerning the implementation of management accounting was successful, the next step of our study is to analyse the interrelation between contextual factors and controlling implementation. Appendix A 7 reviews the descriptive statistics of the clusters regarding the different factors. It is obvious that the clusters only differ significantly in a few factors. The most significant difference can be noted for the grade of stake holding of the company leaders and the openness to the advice from external management consultants. The conclusion is that management accounting is more sophisticated the less the grade of stake holding of the company-leaders is and the more open minded the company is with regard to external consulting. This finding is interesting as the clusters do not differ significantly with respect to company revenues. It only differs significantly with regard to the number of employees, but as we found cluster no. 2 ranked above cluster no. 1 concerning the number of employees, we cannot state a positive correlation between this variable and the sophistication of management accounting. The same is true for the number of hierarchy levels. This leads to the conclusion that cluster no. 2 comprises companies, which, on average, are larger in size and show a higher degree of unity of leadership and ownership. These companies do not seem to have an adequate implementation of management accounting in comparison to their higher need for coordination.

The other hypotheses are falsified by the conducted descriptive analysis. The clusters do not differ significantly with regards to dynamic or strategic variables. Only the number of product groups shows a weekly significant connection. This could lead to the conclusion that the companies in cluster no. 2 tend to follow a niche strategy. This could be a reason for the relatively low degree of implementation of management accounting than in cluster no. 2. However this cannot explain the higher degree of implementation compared to cluster no. 3. The other hypotheses on the influence of the characteristics of the entrepreneur on the MAS cannot be verified. This is especially surprising for the interrelation between the assumed influences of the education of the entrepreneur on management accounting. Consequently the

descriptive analysis does not find proof for a high potential of explanation of the different variables.

Finally, we examined the influence with the help of a multivariate approach. Appendix A8 provides the results of a multivariate discriminant analysis for classification. This analysis reinforces the results of the descriptive examinations as only two variables are picked to build the discriminant function. 83.7% of the variance of all input-variables can not be explained. Only 39.6% of cross-validated groupings are successful which only slightly differs from a random grouping.

The most interesting finding of the analysis is that some intuitively plausible hypotheses were falsified. Thus for the companies in our data set we could not find proof that the company size affects management accounting significantly. Furthermore the education of the entrepreneur has no significant influence either. This is remarkable, as these findings do not result from a lacking variance of the variables in our data set (see Appendix A9).

6. Conclusion

The goal of our study was to find different context factors to explain differences in the implementation of management accounting in SMEs. We added factors concerning the characteristics of entrepreneurs to classical contingency factors.

The results of the conducted cluster analysis pointed out the wide range of the implementations and intensity of usage of management accounting. The analysis of the influencing factors surprisingly did not reveal a significant interrelation of management accounting and company size. Instead the univariate analysis showed a significant positive correlation between management accounting and the grade of stake holding of the company leaders and a negative interrelation with the open mindedness for external advice form management accountants. These results could not be consolidated in a satisfactorily multivariate analysis. Thus the results have to be seen interpreted as preliminary results.

Further examinations should be interested in a more differentiated analysis. E.g. the influence of the different factors on different parts of the MAS should be tested. Moreover a more differentiated analysis of the personality of the entrepreneur could be used to create a more

detailed picture. Finally, a larger data set could lead to better results because the size of the used data set may have resulted in a bias.

Appendix

A1 Input variables for cluster analysis

Variable set	Description	Definition / Measure
Organisation	organisational integration of management accounting in an SME	three categories: institutional/internal, non-institutional/internal, external
	quantitative personal endowment	share of employees in management accounting of total employees
Technical Support	quality of data	three categories: integrated database, decentral file system, only data from external accounting
	sophistication of software endowment	five dummy variables for the use of specialised software for strategic planning, cost accounting, planning, risk management and reporting
Accounting information for decision making	intensity of use of external information	4 point scale (very often, often, sometimes, never)
	intensity of use of cost accounting (cost center, calculation (full costing and direct costing), operating results)	4 point scale (very often, often, sometimes, never)
	intensity of use of performance measures (return on sales, return on investment, shareholder value, cash flow, working capital ratio, bad debts ratio, cost ratios, productivity measures, marketing measures, organisational measures)	4 point scale (very often, often, sometimes, never)
	use of risk management	dummy variable
	frequency of kind of reporting (standard reporting, exception reporting, management information system)	4 point scale (very often, often, sometimes, never)
	frequency of reporting contents (cost und budgetary information, liquidity information, sales information, risk information, quality information, competition information)	4 point scale (very often, often, sometimes, never)
	timeliness of reporting information (two statements)	6 point scale (from "I fully agreee" to "I fully disagree")

Planning		
Use and frequency of planning instruments	frequency of planning (investments, need for capital, balance sheet, income statement, sales, production, human resources, research and development)	times in a year
	horizon of planning (investments, need for capital, balance sheet, income statement, sales, production, human resources, research and development)	horizon in years
	frequency of liquidity planning	4 point scale (very often, often, sometimes, never)
	planning of costs	dummy variable
	frequency of use of strategic planning instruments (competitor analysis, gap analysis, portfolio analysis, scenario analysis, SWOT analysis, benchmarking, balanced scorecard)	4 point scale (very often, often, sometimes, never)
Quality of planning	Deviations of planned to realised values have been very low in past 3 years	6 point scale (from "I fully agreee" to "I fully disagree")
	Plans have been fully integrated	6 point scale (from "I fully agreee" to "I fully disagree")
Cost Management	frequency of use of cost management instruments (budgeting, multi-level fixed cost absorption, break even analysis, activity based costing, floor pricing, outsourcing, analysis of overhead costs, target costing)	4 point scale (very often, often, sometimes, never)
Investment appraisal	frequency of use of investment appraisal instruments (NPV, payback period, value benefit analysis)	4 point scale (very often, often, sometimes, never)
	always use of risk adjusted discount factors	6 point scale (from "I fully agreee" to "I fully disagree")

Control	always comparison of planned to realised values	6 point scale (from "I fully agreee" to "I fully disagree")
	ex post calculation of efficiency of investments	6 point scale (from "I fully agreee" to "I fully disagree")
	ex interim calculation of efficiency of investments	6 point scale (from "I fully agreee" to "I fully disagree")
	frequency of use of marginal contribution analysis (for products, product groups, customers, customer groups, business areas)	4 point scale (very often, often, sometimes, never)
	frequency of use of ABC analysis of customers	4 point scale (very often, often, sometimes, never)
Importance of management accounting	management accounting information is always used for management decisions	6 point scale (from "I fully agreee" to "I fully disagree")
	benefit of management accounting is much higher than ist costs	6 point scale (from "I fully agreee" to "I fully disagree")

A2 Contingency variables

Variable set	Description	Definition / Measure
Size variables	sales	Sales in year 2003
	employees	number of employees in year 2003
	internal complexity	number of hierarchies
Dynamics variables	dynamics of enterprise	development of sales in comparison to market (strong growth, moderate growth, unchanged, moderate decline, strong decline)
	dynamics of market	market development (strong growth, moderate growth, unchanged, moderate decline, strong decline)
Strategy	cost leadership vs. quality leadership	percentage of importance of price for success
	geographical market expansion	four categories: global, national, regional, local
	product diversification	number of product lines
Control variables	industry	4 categories: manufacturing, trade, construction, rest
	legal form	partnership, corporation
	age	2004 - year of foundation

A3 Entrepreneurship variables

Variable set	Description	Definition / Measure
Motivation	Attitude to growth	Agreement on a 6 point scale (from "I fully agreee" to "I fully disagree") to the statement "To secure our autonomy we would consciously abstain from growth"
	Importance of autonomy	Importance of the goal "Autonomy" on a 4 point scale
Traits	Education	Two measures: percentage of executives with an university degree, percentage of executives with an economic education
	Openness	Intensity of use of external advice (tax consultants, lawyers, loan officers and management consultants) on a 4 point scale
Rest	Age	Average age of executives
	Property	Percentage of executives with an equity stake

A4 Description clusters control variables

	Cluster		
	1	**2**	**3**
number of companies	58	69	39
industry	37,9 % manufacturing, 37,9 % trade, 12,1 % construction, 12,1 % rest	49,3 % manufacturing, 24,6 % trade, 15,9 % construction, 10,1 % rest	46,2 % manufacturing, 23,1 % trade, 5,1 % construction, 25,6 % rest
legal form	20,7 % partnerships, 79,3 % corporates	10,1 % partnerships, 87,9 % corporates, 2,9 % rest	23,1 % partnerships, 74,4 % corporates, 2,6 % rest
age*	48	36	50

*** 1 % significance, ** 5 % significance, * 10 % significance

A5 Inputvariables for cluster analysis

Variable set	Description	Ranking	Comment
Organisation	organisational integration of management accounting in an SME	1. Cluster 1; 2. Cluster 3; 3. Cluster 2	
	quantitative personal endowment	1. Cluster 2; 2. Cluster 1; 3. Cluster 3	
Technical Support	quality of data***		
	sophistication of software endowment***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	Risk management 5 % significance
Accounting information for decision making	intensity of use of external information***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	intensity of use of cost accounting***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	clear advantage of cluster 1
	intensity of use of performance measures***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	clear advantage of cluster 1
	use of risk management***		
	frequency of kind of reporting***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	frequency of reporting contents***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	timeliness of reporting information***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	High average scores (> 5,2) in all clusters
Planning			
Use and frequency of planning instruments	frequency of planning***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	R & D with 5 % significance; Cluster 2 with most frequent production plans
	horizon of planning***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	production planning with 5 % significance
	frequency of liquidity planning***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	planning of costs***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	Cluster 3 particularly weak
	frequency of use of strategic planning instruments***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	Cluster 3 particularly weak
Quality of planning	Deviations of planned to realised values have been very low in past 3 years**	1. Cluster 1; 2. Cluster 3; 3. Cluster 2	
	Plans have been fully integrated***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
Cost Management	frequency of use of cost management instruments***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	Outsourcing not significant
Investment appraisal	frequency of use of investment appraisal instruments***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	always use of risk adjusted discount factors***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	

Control	always comparison of planned to realised values***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	ex post calculation of efficiency of investments***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	ex interim calculation of efficiency of investments***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	frequency of use of marginal contribution analysis***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	Cluster 1 particularly strong
	frequency of use of ABC analysis of customers***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
Importance of management accounting	management accounting information is always used for management decisions***	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	
	benefit of management accounting is much higher than ist costs**	1. Cluster 1; 2. Cluster 2; 3. Cluster 3	

*** 1 % significance, ** 5 % significance, * 10 % significance

A6 Results Discriminance analysis

Standardized coefficients of discriminance function

	Function	
	1	**2**
Cost center accounting	0,561	0,271
Shareholder Value measure	0,224	-0,299
Productivity measure	0,304	0,081
Marketing measure	0,320	0,078
Sales information	0,146	0,412
Risk information	0,276	-0,299
Frequency production planning	-0,760	0,473
Horizon balance sheet planning	0,273	0,058
Horizon capital need planning	0,323	-0,086
Scenario analysis	0,308	-0,244
Balanced Scorecard	-0,361	0,226
Activity Based Costing	0,208	-0,289
Analysis of overhead costs	0,316	0,276
Marginal contribution analysis for customers	0,389	-0,528
Importance of mgt. accounting information for decisions	0,357	0,365

Wilks-Lambda									
Step	**Number of Variables**	**Lambda**	**df1**	**df2**	**df3**	**Exact F**			
						statistics	**df1**	**df2**	**significance**
1	1	0,694	1	2	163	35,946	2	163	0,000
2	2	0,471	2	2	163	36,974	4	324	0,000
3	3	0,387	3	2	163	32,622	6	322	0,000
4	4	0,334	4	2	163	29,205	8	320	0,000
5	5	0,299	5	2	163	26,315	10	318	0,000
6	6	0,267	6	2	163	24,625	12	316	0,000
7	7	0,238	7	2	163	23,565	14	314	0,000
8	8	0,217	8	2	163	22,342	16	312	0,000
9	9	0,201	9	2	163	21,215	18	310	0,000
10	10	0,184	10	2	163	20,514	20	308	0,000
11	11	0,173	11	2	163	19,491	22	306	0,000
12	12	0,163	12	2	163	18,742	24	304	0,000
13	13	0,153	13	2	163	18,103	26	302	0,000
14	14	0,143	14	2	163	17,652	28	300	0,000
15	15	0,135	15	2	163	17,144	30	298	0,000

A7 Description cluster by contingency and entrepreneurship variables

		Cluster		
Variable set	**Description**	**1**	**2**	**3**
Contingency variables				
Size variables	sales	13,4	13,1	13,3
	employees**	67,1	83,8	44,3
	internal complexity**	2,9	3,4	2,2
Dynamics variables	dynamics of enterprise	3,6	3,4	3,8
	dynamics of market	3,3	3,2	3,3
Strategy	cost leadership vs. quality leadership	35,1	41,6	40,8
	geographical market expansion	regional/local	regional/local	regional/local
	product diversification*	5,5	3,7	4,5
Entrepreneurship variables				
Motivation	Attitude to growth	2,7	2,8	2,5
	Importance of autonomy	1,3	1,6	1,4
Traits	Education			
	degree university	40,2	51,8	49,1
	economic	51,7	57,4	57,5
	Openness			
	tax consultant	5,4	5,3	5,1
	lawyer*	4,5	4,3	4,0
	loan officer	4,2	4,1	3,9
	management consultant***	3,8	3,8	3,1
Rest	Age	45,1	45,3	46,1
	Property***	83,2	92,9	100,0

*** 1 % significance, ** 5 % significance, * 10 % significance

A8 Results discriminance analysis contingency and entrepreneurship variables

Standardized coefficients of discriminance function

	Function	
	1	**2**
Number of hierarchies	0,775	-0,632
Openness Management consultant	0,607	0,795

Wilks-Lambda									
Step	Number of variables	Lambda	df1	df2	df3	Exact F			
						Statistics	df1	df2	Significance
1	1	0,891	1	2	140	8,579	2	140	0
2	2	0,837	2	2	140	6,463	4	278	0

A9 Descriptive statistics

Variable set	Description	Minimum	Maximum	Mean	Standard deviation
Contingency variables					
Size variables	sales	0,65	200	13,25	20,67
	employees	1	540	68,70	85,41
	internal complexity	0	35	2,96	2,67
Dynamics variables	dynamics of enterprise	1	5	3,59	1,10
	dynamics of market	1	5	3,26	0,97
Strategy	cost leadership vs. quality leadership	0,00%	100,00%	39,15	21,20
	geographical market expansion				
	product diversification	0	38	4,52	4,69
Entrepreneurship variables					
Motivation	Attitude to growth	0	6	2,69	1,38
	Importance of autonomy	1	4	1,44	0,87
Traits	Education				
	degree university	0%	100%	47,12%	0,45
	economic	0%	100%	55,44%	0,42
	Openness				
	tax consultant	0	6	5,28	0,89
	lawyer	0	6	4,10	1,13
	loan officer	0	6	4,29	1,14
	management consultant	0	6	3,60	1,17
Rest	Age	30	58	45,41	7,04
	Property	0,00%	100,00%	91,11%	0,23

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