Management control systems combinations and improvement in financial performance

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Abstract

This research explores the improvement in financial performance that is associated with the implementation of certain management control systems and the conditions under which such improvement is accomplished. Also to verify the interactions that occur between management accounting practices, contingent internal and external factors, and financial performance. Confirmatory factor analysis is used to investigate the relationship among management accounting practices, internal and external organizational factors and financial performance.

Results show that there is indeed a positive association between certain management accounting practices when are used concurrently with other strategic initiatives and improvement in financial performance indicators such as market and corporate performance.

Key words: management accounting, performance measurement, financial performance, market performance, corporate performance.

1. Introduction

Management accounting (MA), management accounting systems (MAS), management control systems (MCS), and organizational control (OC) are terms with similar content and many times are used interchangeably. The first, MA, refers to various practices such as budgeting or product costing, etc., while MAS refers to the systematic use of MA to achieve some goal, MCS is a wider term which includes MAS and other types of controls such as personal or mass controls. OC could be used for controls included in activities or processes such as statistical quality control or just in time management (Chenhall, 2003, p.129).

Besides management's opinion that management accounting systems (MAS) pass the cost-benefit test (Foster and Young, 1997) there is no significant research results to validate the alleged benefits of MAP combinations and their interaction with internal and external environmental and organizational factors and its impact on organizational performance. MAP are considered as a vital part of management control systems (MCS), Chenhall (2003). He suggests that MCS are useful, improve job satisfaction and enhance organizational performance, however, he argues that there is no evidence to suggest that such links exist. He also proposes the investigation of contextual settings within which they maybe most beneficial (Ibid, pp.130-132).

2. Development of Hypotheses

Management accounting research presents evidence for some selective management accounting practices which combined with various internal and external factors lead to improved organizational performance, both financial and non-financial (Chenchall and Langfield-Smith, 1998a, 1998b, 1998c; Cagwin and Bouwman, 2002; Chenhall, 2003; Cohen et al, 2005). The arguments in support of MAP are generally based on the comparative advantage that organizations can gain from the valuable information generated through MAP and eventually improve financial performance. Although MA tools as a basic component of an MCS have strong theoretical support, various researchers (Otley, 1986; Ward, 1992; Otley, 1999; Chenhall and Langfield-Smith, 1998a; 1998b; 1998c; Chenhall, 2003) suggest that practitioners should be cautious in selecting the appropriate tools suitable for their organizations attempting to gain maximum benefits and eventually to maximize performance, because not every MAP will produce the same benefits across the

firms. Also the selection of these tools rely heavily on various internal and external organizational factors.

The first issue for investigation here is whether increasing use of MAP (more MA tools) is directly associated with improvement of financial performance without regard to firm and sector-specific environmental characteristics. The second is, what is the "best" combination of the MA tools (or the most prevalent tools) available that maximize performance. Both issues have not been empirically tested simultaneously. This leads to the following alternative hypotheses.

H1.   There is a positive association between the extent of use of MAP and relative improvement in financial performance (compared with other firms in the industry).

With null hypothesis:

H1_0. There is no positive association between the extent of use of MAP and relative improvement in financial performance (compared with other firms in the industry).

Financial (market and corporate) performance are measured relatively to other firms in the industry while some variables of interest and some independent variables are tested. The evaluation of the aforementioned hypotheses consist a baseline for this research. If MAP provide a comparative advantage, on average, for every firm, regardless of its circumstances then confirmation would be expected for the alternative hypotheses. Also, if as expected realization of the benefits of MAP require some other specific conditions then the focus will shift to hypotheses two.

H2. The association between the extent of use of MAP and relative improvement in financial performance is impacted by specific contingent factors and organizational characteristics.

With null hypothesis:

H2_0. The association between the extent of use of MAP and relative improvement in financial performance is not impacted by specific contingent factors and organizational characteristics.

3. Model development – research design

For the purposes of this study the impact of MAP on financial performance whith interactions from internal and external organizational factors is examined based on the following relationship:

$$\Delta\textbf{FP} = \mathfrak{f}\ (\textbf{MAP, contingencies, control variables})$$

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Where, ΔFP is the change in the composite construct of financial performance measurement including both the Market Performance (MP) construct and the Corporate Performance (CP) construct. The relationships between the constructs are presented graphically in Figure 1. The figures show that MAP is a latent construct that consists of five components or endogenous constructs : Planning and Budgeting Tools (PB Tools), Decision Support Tools (DS Tools), Cost Analysis Tools (CA Tools), Performance Evaluation Tools (PE Tools), and Strategic Management Accounting Tools (SMA Tools). The figure also identifies five specific enabling conditions: Management Techniques (MAN.TEC), Other Influences (OTH.INF), Business Philosophy (BUS.PHI) and Basic Factors (BAS.FRS) and Other Practices (OTH.PRA). Control variables include: Type (TYP), Size (SIZ) and Time (TIM). Variable names are capitalized (Table 1). The literature used to identify an appropriate measure for each construct is included in Appendix – Table 1. Most constructs are latent constructs composed of two or more manifest variables (items). Composite scores of multiple variables have the advantage of capturing more of a construct's multi dimensionality than individual questions (Foster and Swenson, 1997). Use of multi item measures also reduces the effect of random and measurement errors.

4. Sample selection - survey instrument

The sample of this research was the top 415 Greek companies which were selected from the ICAP (2008) list. ICAP S.A. is a Greek financial and business information company which issues various reports and statistics concerning all Greek industry sectors on an annual basis and is considered a very reliable source.

Based on the sales revenue, firms should belong in the large (>40m euro) and medium-size (>5 and <40 m euro) categories. Concerning the manpower, firms should also belong in the large (>250 employees) and medium-size organizations (50-250 employees). This is because the small ones present some difficulties and, more important, these companies do not have the tools, information is rare, and in some cases, the available information is far from reliable. In Greece, as anywhere else, larger companies are those expected to use most of the tools and practices proposed. The aforementioned classification is according to EU directive 96/280/EC 03-04-1966. Rest of demographic data see Appendix-Table 2.

Regarding collection of data from 415 companies, 214 returned the questionnaire which corresponds to 51.57% response rate. After excluding 16 incomplete questionnaires, a total of 198 questionnaires (or 48%) retained for analysis.

Concerning the suitability of the sample size most of researchers normally work to a 95 per cent level of accuracy. Taking into consideration the fact that the total number (population) of Greek private companies listed in ICAP SA with more than 50 employees and also between 5 and 40 million euro (i.e., the medium and large companies) are 415 out of the total 600, the sample of this research should be 196 companies at a 95 per cent level of confidence (Saunders, Lewis, and Thornhill, 2000, p.156).

Prior to official hypothesis testing a rough approximation of the main model was tested. The model produced information regarding the overall efficacy of variables. One construct composed of two performance variables and were regressed against constructs of the thirteen independent variables. Survey items are weighted equally within constructs and constructs are weighted equally within composite constructs. The regression models is:

$$\Delta FP = \alpha_{FP} + b_{1FP}*x_1 + b_{2FP}*x_2 + \ldots b_{13FP}*x_{13}.$$

Where:

ΔFP = the average of five-point measures of industry improvement of financial performance items over three years (composite construct of market and corporate performance).

b_{1FP}, b_{2NFP} = the respective beta coefficients of independent variables.

$x_{1 \ldots} x_{13}$: The respective thirteen independent variables.

As mentioned above all items carry equal weight in the analysis, this was necessary in order to avoid any bias in manipulating the data. Cronbach's coefficient alpha (α) used to measure the reliability of scale (Cronbach, 1951). The total number of items of all units was 118. It was necessary to remove some items from each dimension to improve the value of α. Therefore after removing 50 items, the coefficient a was calculated from the beginning and the new values ranging from 0.633 to 0.860.

Exploratory factor analysis (EFA) was used in order to verify and validate the construct of the remaining items and to further reduce the number of them (Chu and Murrmann, 2006), The final number of variables to be analysed were 54.

Also, the coefficients of reliability of the correlated variables (factors) were fluctuated between 0.633 and up to 0.853 showing that the internal consistency of

factors is good. Finally, the most common form of validity is the validity of content (Zikmund, 1997) which in sum refers to the acceptance from practitioners that the variables proposed are appropriate to measure and test the concept or hypothesis in question. Academics and practitioners of management accounting were asked to give their professional opinion for the constructs created after the factor analysis and the majority agreed that the variable content is appropriate and their concept is suitable for the respective factors. SPSS 12 was the statistical software employed for all aforementioned analyses.

6. Results

The analysis comprised from four models. First, only the ten MAPs are regressed against financial performance. Then in the next three following models every time is added one additional contingent factor to examine the impact of these factors to financial performance, analytically for the synthesis of each model see Appendix-Table 3. For the synthesis of each independent variable see Appendix-Table 4 and for the dependent variables see Appendix-Table 5.

Model 1: The model is statistically significant (F=4.681 and Sig=0.000) and the ten (10) independent variables explain the dependent variable by 27.3 percent (adjusted R^2 = 0.273). More specifically, for MAP: Detail budgeting systems, Value chain analysis, Cost analysis methods, SMA techniques, beta coefficients are positive and statistically significant at 0.01 level, thus H1 is accepted (H1: There is a positive association between the use of MAP and relative improvement in financial performance). The rest independent variables are statistically insignificant; therefore do not support the suggested model.

Model 2: The model is statistically significant (F=5.389 and Sig=0.000). By adding one more independent variable in the previous model, the R^2 increases by 26.22 percent (from R^2 0.347 to 0.438). This additional contingent variable has a positive beta coefficient (0.215) and it is statistically significant at 0.10 level. Thus H2 is accepted (H2: The association between the use of MAP and relative improvement in financial performance is impacted by specific contingent factors, i.e., the 'Other Practices').

Model 3: The model is statistically significant (F=4.86 and Sig=0.000). By adding one more independent variable in the previous model, the R^2 increases by 0,30 percent (from R^2 0.438 to 0.441). However, this additional contingent variable has a negative

beta coefficient (-0.055) and it is statistically insignificant at 0.10 level. Thus $H2_0$ is accepted for this specific contingent variable 'Other influences' (The association between the use of MAP and relative improvement in financial performance *is not* impacted by specific contingent factors).

Model 4: The model is statistically significant (F=4.474 and Sig=0.000). By adding one more independent variable in the previous model, the R^2 increases by 6 percent (from R^2 0.441 to 0.480). This additional contingent variable has a positive beta coefficient (0.234) and it is statistically significant at 0.10 level. Consequently, H2 is accepted (The association between the use of MAP and relative improvement in financial performance is impacted by specific contingent factors, i.e., the 'Management techniques').

Financial performance - Analysis

According to practitioners the following combinations of practices (variables) provide positive synergies for the financial performance improvement: Detail budgeting systems, Value chain analysis, Cost analysis methods, SMA techniques. Also their interaction on *financial performance* is positive and significant therefore these practices are positively related with market and corporate performance improvement.

According to them the following practices have improved their companies' *financial performance* indicators (Market performance: Sales, Growth in sales volume, Market share, Growth in market share, and Corporate performance: ROI, Net profit, Profit margin, Asset turnover).

The items of the practices are the following:

Detail budgeting systems for: Compensating managers, Planning - Cash flows, Planning - Financial position.

Value chain analysis: same item, Value chain analysis.

Cost analysis methods: Absorption or Full costing, Process Costing, Job Order Costing, Standard Costing.

SMA techniques: Life cycle costing, Quality costing, Strategic costing, Strategic pricing, Target costing, Value chain costing, Brand value budgeting and monitoring, Competitor appraisal based on published financial statements.

Also the following contingent factors have a significant impact in *financial performance* improvement.

Other practices (B): Just-in-Time, Total Quality Management (TQM), Materials requirements planning (MRPI), Manufacturing resource planning (MRPII).

Management techniques (D): Integrating information systems with supplier and/or distributors, Downsizing the organization, Reorganizing existing manufacturing/service processes.

These findings are consistent with statements by researchers that MAS meant to be efficient in supporting operational effectiveness (Granlund and Lukka, 1998; Cooper, 1996; Granlund, 1997, Cagwin and Bouman, 2002, Sulaiman *et al.*, 2004), and that MAP have contributed positive effects to the practicing firms (Ghosh and Chan, 1997; Chenhall and Langfield-Smith, 1998; Guilding *et al*., 1998, Chenlall, 2003; Shilelds, 1998; Hadma and Laats, 2002; O'Connor *et al.*, 2004) .

Figure 2 represents graphically the new model after the final regression analysis.

According to practitioners involved in this study their financial performance indicators have been improved in the last three years in relation with the respective industry averages, declaring a further organizational performance improvement. This leads to the conclusion that when companies implement the aforementioned bundles of suggested MCS there is a great probability to enjoy an improvement in their respective financial performance indicators.

7. Directions for the future

This article suggests several extensions for future research. One direction involves extending the sample. Both the number of firms and industries could be increased.

Even it is difficult to have both large sample sizes and the volume of information necessary for making correct construct measurements this could be a significant issue to consider. First, tests involving additional organizations in all size categories would increase the sample size and, therefore, allow for more powerful statistical analysis. Second, industry segmentation will provide further insights into the role that industry plays in the relationships outlined in our research. In particular, expansion of the study to industries which face more or less hostile and competitive environments may increase understanding of the respective practices. Also, companies in less hostile environments may implement different practices from those in more aggressive ones. Also a better understanding is necessary of the factors that influence differences in the levels of adoption and benefits received of different bundles of systems between industries and countries.
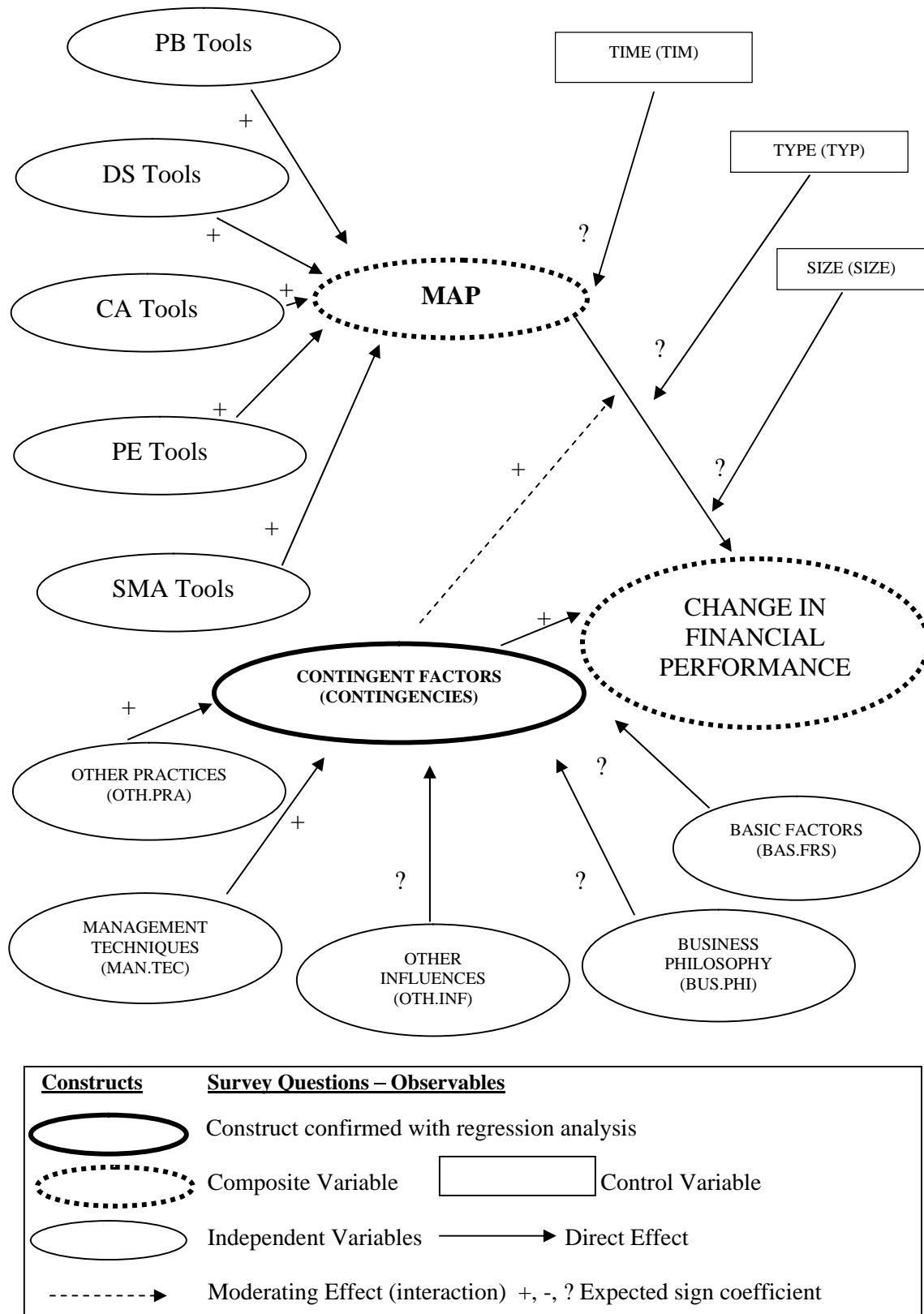
Figure 1: The association of MAP and contingent factors with financial performance – Proposed Model

Table 1 – Definition Of Questionnaire Variables

Abbreviation	Name	Definition
PB Tools	Planning & Budgeting Tools	Analytical list of tools, group questions A1, adapted from Chenhall and Langfield-Smith, (1998), Ernst and Young and IMA, (2003), Baines and Langfield-Smith, (2003).
DS Tools	Decision Support Tools	Analytical list of tools, group questions A2, adapted from Chenhall and Langfield-Smith, (1998), Ernst and Young and IMA, (2003), Baines and Langfield-Smith, (2003).
CA Tools	Cost Analysis Tools	Analytical list of tools, group questions A3, adapted from Chenhall and Langfield-Smith, (1998), Ernst and Young and IMA, (2003), Baines and Langfield-Smith, (2003).
PE Tools	Performance Evaluation Tools	Analytical list of tools, group questions A4, adapted from Chenhall and Langfield-Smith, (1998), Ernst and Young and IMA, (2003), Baines and Langfield-Smith, (2003).
SMA Tools	Strategic Management Accounting Tools	Analytical list of tools, group questions A5, adapted from Guilding *et al.* (2000)
OTH.PRA	Other Practices	Operationalized through the eight items in section B of the survey instrument. The items developed based on Kotha and Swamidass (2000), and Rimmer *et al..*, (1996).
OTH.INF	Other Influences	Operationalized through the nine items in section C of the survey instrument. The items developed based on Bhimani (1996) and Lizcano (1996), Blake *et al.* (2003).
MAN.TEC	Management Techniques	Operationalized through the fourteen items in section D of the survey instrument. The items developed based on Chenhall and Langfield-Smith (1998c).
BAS.FRS	Basic Factors	Operationalized through the five items in section E of the survey instrument. The items developed based on Hoftstede (1984), Miller *et al.* (1992), Parthasarthy and Sethi (1993), Reeve (1996), Krumwiede

Abbreviation	Name	Definition
		(1996;1998), Perrera *et al.* (1997), Chenhall and Langfield-Smith (1998a; 1998c), Hofstede and Bond (1998).
BUS.PHI	Business Philosophy	Operationalized through the ten items in section F6 of the survey instrument. The items developed based on. Hussain (2002; 2003), Miles and Snow (1978), Gordon and Narayana (1984), Mia and Ghenhall (1994), Morissette (1998), Chenhall and Langfield-Smith (1998a).
MAR.PER	Market Performance	Industry median adjusted, measured by self-reported five point Likert responses provided by appropriate company staff. Questionnaire items G2, 1-4. (Spanos and Lioukas, 2003).
COR.PER	Corporate Performance	Industry median adjusted, measured by self-reported five point Likert responses provided by appropriate company staff. Questionnaire items G2, 5-8. (Friedlob *et al.* 2002).
OPE.PER	Operational Performance	Industry median adjusted, measured by self-reported five point Likert responses provided by appropriate company staff. Questionnaire items G2, 9-14. (Israelsen, 1996 ; Bruggeman, 1996; Groot, 1996).
TIM	Time since implementation of MAP tools	Operationalized through the items G1, General Questions. Adopted from Cagwin and Bouwman, (2002).
SIZ	Size	Operationalized through the items G4 and G5 in General Questions section of the survey instrument. Adopted from Krumwiede (1996).
TYP	Type of business	Operationalized through the items Reid and Smith (2000)Business type, General Questions, G 3 and G6.
MAP	Management Accounting Practice	The extent and depth use of MAP. Composite of the variables PB Tools, DS Tools, CA Tools, PE Tools, SMA Tools.
ΔFP	Change in Financial Performance	Composite of the variables MAR. PER and COR.PER.

Table 2: Demographic Data

Company classification		**Position of Respondent**	
Manufacturing	53	Financial Manager	91
Services	52	Financial Controller	71
Commerce	93	Sr Management Accountant	34
Total sample	**198**	Sr Accountant	1
		Accountant	1
Listed in Athens Stock Exchange		Total sample	**198**
Listed	105		
Non Listed	93		
Total sample	**198**		
Size of Organizations:		**Size of Organizations:**	
Turnover - m Euro		*Manpower – employees*	
0-300	149	0-200	67
301-600	36	201-500	57
601-900	7	501-1000	34
901-1,000	2	1001-2500	29
1,001-2,000	3	2501-7000	8
2,001-3,500	1	7001+	3
Total sample	**198**	Total sample	**198**
According to EU statistics		**According to EU statistics**	
<=5m (small)	0	<50 employees (small)	13
>5m and <=40m (medium)	9	50-250 employees (medium)	62
>40m (large)	189	>250 employees (large)	123
Total sample	**198**	Total sample	**198**

Table 3. Financial performance models

| Independent Variables	Model 1			Model 2			Model 3			Model 4		
	Beta	**t**	**Sig.**	**Beta**	**t**	**Sig.**	**Beta**	**t**	**Sig.**	**Beta**	**t**	**Sig.**
(Constant)		**5,213**	**0,000**		**3,955**	**0,000**		**3,982**	**0,000**		**4,002**	**0,000**
Formal strategic planning	0,020	0,215	0,830	0,150	0,159	0,874	0,021	0,216	0,829	-0,013	-0,125	0,901
Capital budgeting techniques	0,133	1,123	0,264	0,138	1,231	0,222	0,128	1,117	0,268	0,085	0,678	0,500
Long range forecasting	-0,024	-0,266	0,791	-0,049	-0,544	0,588	0,046	0,500	0,618	-0,181	-1,520	0,133
Detail budgeting systems	**0,420**	**3,234**	**0,002*****	0,187	1,641	0,105*	0,184	1,601	0,114	0,156	1,291	0,201
Decision support systems	0,035	0,300	0,765	-0,032	-0,253	0,801	-0,032	-0,249	0,804	-0,028	-0,204	0,839
Value chain analysis	**0,313**	**3,180**	**0,002*****	0,148	1,353	0,180	0,154	1,381	0,172	0,211	1,650	0,104*
Operations research techniques	0,132	1,022	0,310	0,004	0,030	0,976	0,012	0,101	0,920	0,041	0,315	0,754
Cost analysis methods	**0,365**	**3,901**	**0,000*****	0,490	4,496	0,000***	0,484	4,409	0,000***	0,561	4,585	0,000***
Performance evaluation methods	0,070	0,657	0,513	0,095	0,935	0,352	0,113	1,070	0,288	0,074	0,660	0,512
SMA techniques	**0,349**	**2,930**	**0,004*****	0,327	1,982	0,051**	0,329	1,966	0,053*	0,349	1,974	0,053
Other practices (B)	**-**	**-**	**-**	**0,215**	**1,808**	**0,075***	0,199	1,654	0,102*	0,150	1,097	0,277
Other influences (C)	**-**	**-**	**-**	**-**	**-**	**-**	-0,055	-0,542	0,589	0,110	0,837	0,406
Management techniques (D)	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**0,234**	**1,807**	**0,075***
*** significant at 0.01 level	F=4,681	Sig.=0,000		F=5,389	Sig.=0,000		F=4,86	Sig.=0,000		F=4,474	Sig.=0,000	
** significant at 0.05 level	R^2 =	0,347		R^2 =	0,438		R^2 =	0,441		R^2 =	0,48	
* significant at 0.10 level	Adg.R^2=	0,273 =	27,30%	Adg.R^2=	0,34 =	34,00%	Adg.R^2=	0,35 =	35,00%	Adg.R^2=	0,373 =	37,30%
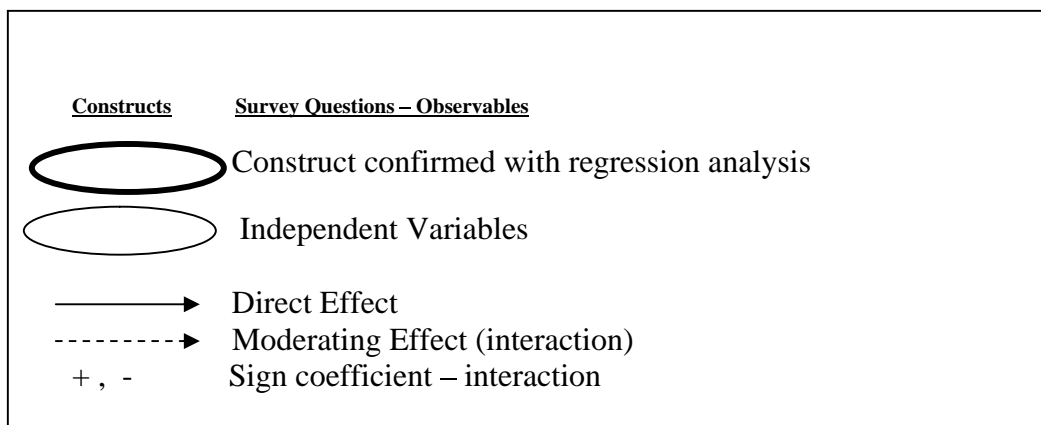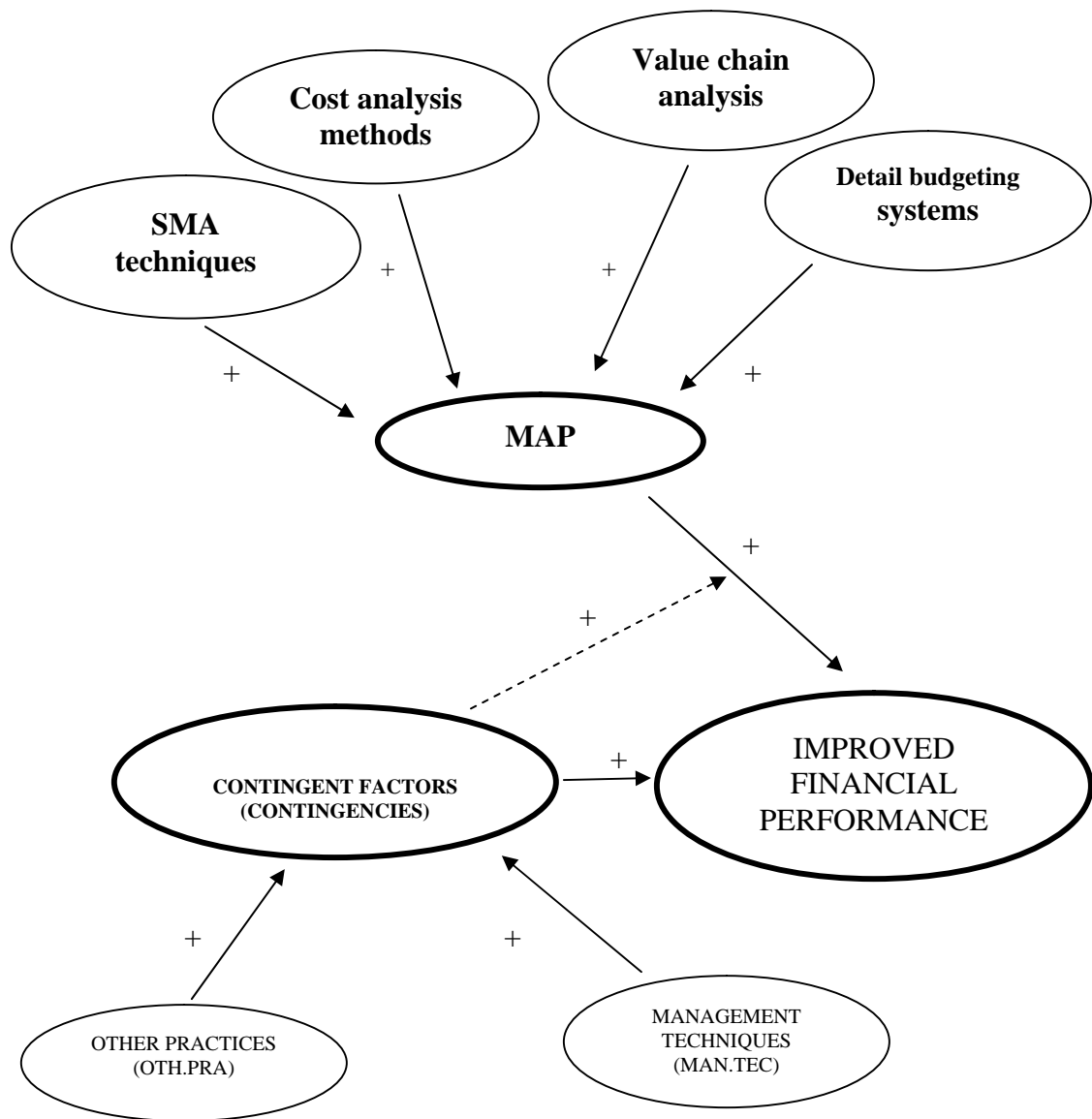
Figure 2: The association of MAP, contingent factors and improvement in financial performance

Table 4: Final Regression Analysis, Questionnaire Items –

Independent Variables (after final reduction)

Questionnaire Item	Independent Variables	Items
Formal strategic planning	Formal Strategic planninig	1
Capital Budgeting: Return on Investment (ROI)	Capital Budgeting Techniques	3
Capital Budgeting: Net present value (NPV)		
Capital Budgeting: Internal rate of return (IRR)		
Long Range Forecasting	Long Range Forecasting	1
Detail budgeting systems for: Compensating managers	Detail Budgeting Systems	3
Detail budgeting systems for: Planning - Cash flows		
Detail budgeting systems for: Planning - Financial position		
Decision support systems: Product life cycle	Decision Support Systems	2
Decision support systems: Activity based management		
Value chain analysis	Value Chain Analysis	1
Operations research techniques	Operations Research Techniques	1
Cost analysis: Absorption or Full costing	cost Analysis	4
Cost analysis: Process Costing		
Cost analysis: Job Order Costing		
Cost analysis: Standard Costing		
Performance evaluation is based on: Divisional profit	Performance Evaluation Methods	9
Performance evaluation is based on: Residual income (e.g. interested adjusted profit)		
Performance evaluation is based on: Return (profit) on investment		
Performance evaluation is based on: Non – financial measures		
Performance evaluation is based on: Team performance		
Performance evaluation is based on: Employee attitudes		
Performance evaluation is based on: Qualitative measures		
Performance evaluation is based on: Balance scorecard (mix of financial and non-financial measures)		
Performance evaluation is based on: Customer satisfaction surveys		
Strategic Man. Accounting: Life cycle costing	SMA Techniques	8
Strategic Man. Accounting: Quality costing		
Strategic Man. Accounting: Strategic costing		
Strategic Man. Accounting: Strategic pricing		
Strategic Man. Accounting: Target costing		
Strategic Man. Accounting: Value chain costing		
Strategic Man. Accounting: Brand value budgeting and monitoring		

Questionnaire Item	Independent Variables	Items
Strategic Man. Accounting: Competitor appraisal based on published financial statements		
Just-in-Time (JIT)	Other Practices (B)	4
Total Quality Management (TQM)		
Materials requirements planning (MRP)		
Manufacturing resource planning		
Academics	Other Influences - C	4
Professional associations : which promote specific management accounting practices		
Protection and Competition		
Bonus schemes		
Integrating information systems with supplier and/or distributors	Management Techniques (D)	3
Downsizing the organization		
Reorganizing existing manufacturing/service processes		
Independent Variables - Total Items		**44**

Table 5: Questionnaire Items - Dependent Variables –

Performance Measurement

Questionnaire Item	Dependent Variables	Items
Sales Volume	Market Performance	4
Growth in Sales Volume		
Market Share		
Growth in Market Share		
Return on investment (ROI)	Corporate Performance	4
Net profit		
Profit margin		
Asset turnover		
Dependent Variables - Total Items		**8**

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