Advances in Accounting, incorporating Advances in International Accounting 31 (2015) 150–164

Contents lists available at ScienceDirect

Advances in Accounting, incorporating Advances in International Accounting

journal homepage: www.elsevier.com/locate/adiac

Management accounting practices before and during economic crisis: Evidence from Greece

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ARTICLE INFO

Available online 3 April 2015

Keywords:
Economic crisis
Financial crisis
Management accounting practices
Greece

ABSTRACT

Economic crisis might affect management accounting and the use of its practices within the organizations. The purpose of this study is to investigate the impact of the Greek economic crisis in management accounting practices in the Greek industry and to examine shifts in trends in different accounting techniques' panels in usage and importance before (2008) and during (2013) the country's economic crisis. Empirical data were collected from 301 firms belonging to various Greek industries, which fully completed and returned a structured questionnaire regarding the perceived importance and actual usage of various management accounting techniques for these two periods. Sixty-two techniques were incorporated in the survey and were further subdivided into 5 panels: (a) cost accounting, (b) planning–budgeting, (c) decision support systems, (d) performance evaluation, and (e) strategic analysis. Factor analysis was employed to summarize and reduce the 62 variables into fewer factors for both surveys. The survey revealed that the importance and the usage of ABC systems, planning, strategy, and SMA techniques increased during the crisis, while at the same time the level of importance and usage of traditional cost accounting techniques was decreased. Budgeting techniques are still widely used.

1. Introduction

One of the most important features of the current economic environment is the global economic crisis. Although there exists a definitional ambiguity as of what consists an economic crisis (Waymire & Basu, 2011), it is widely accepted that today's major financial crisis is the accumulated outcome of a series of parameters, whose causes started in 2006.

Crescenzi (2008) states that the loss of investors' trust in the subprime mortgage segment in the USA led to a liquidity crisis. Although it was initially believed that the housing market triggered the crisis, performed research indicates that the banking system was already crisis-prone and sensitive, as it was subject to the following factors: low debt cost, US financial policy concerning complicated, and leveraged banking contracts and exposure of foreign banks—predominantly UK—to "toxic" products. A number of stateside companies specializing in housing loans and asset securitization were showing signs of entering a downward spiral, leading to a considerable number of them declaring bankruptcy. Litsis (2009) highlights the financial losses as experienced by Lehman Brothers resulting in their final collapse and allowing the spread of the financial crisis. On the other hand, Kapitsinis (2011) argues that the following factors were of predominant influence in triggering a major recession:

1. level of development
2. overdependence on the financial sector
3. applied politics, as a result of the accumulation of even higher capital in a global environment

Nevertheless, this new economic environment imposes the need for adaptation of management accounting practices to meet the dynamics of the markets. In the past decades, new management accounting techniques have emerged, which focus not only on financial information but also on non-financial information to give a strategic scope to a company's decisions. In the past, many studies have evaluated the extent of use of these management accounting practices in various settings, as well as the level of sophistication of management accounting practices in the firms under study (e.g., Amat, Carmona, & Roberts, 1994; Armitage & Nicholson, 1993). In recent years, various studies assess the level of employment of these management accounting practices in response to the changing business environment, such as the rapid developments in information and communication technology, the development of computer-based production systems, the integration of smaller firms into larger ones, etc. (e.g., Mat, Smith, & Djajadikerta, 2010). The relationship between management accounting (MA) techniques and economic crisis has also been reported (Arnold, 2009). The question of whether accounting contributes to making an economic crisis more likely or more

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http://dx.doi.org/10.1016/j.adiac.2015.03.016
0882-6110/

severe or whether weak accounting is a result of an economic crisis still remains unanswered (Waymire & Basu, 2011). Generally, it is undeniable that the crisis has had, and continues to have, implications for management accounting (Van Der Stede, 2011). As Arnold (2009) mentions, the magnitude of the financial and economic crisis calls for a fundamental reassessment of accounting research.

In the relevant literature, there exists empirical evidence in the area of financial reporting and financial analysis and their relation to the economic crisis (e.g., Boubakri, Guedhami, & Mishra, 2010; Iatridis & Dimitras, 2013), but to the best of our knowledge, there has been limited research of the effect of the economic crisis in management accounting. To this end, Van Der Stede (2011) offers some reflections on opportunities and challenges for management accounting research in the wake of the recent financial crisis. The present work responds to these reflections and offers some insights in management accounting practices in the current economic environment.

The reasoning behind the selected period of time under investigation is that the economic crisis offers opportunities for research that are not present in times of "normal" change (Van Der Stede, 2011). Moreover, the relevant literature offers many interesting similar examples of the interactive use and usefulness of management accounting practices in management accounting research.

1.1. The Greek economic crisis

The global financial crisis had at first not left Greece unaffected, even though the initial effects were relatively mild. This was related to the relative lack of connection of the Greek banking system to the American and British systems and to the lack of substantial investments of Greek financial institutions in "toxic "financial products (Kotios, Pavlidis, & Galanos, 2011). In 2009, the Greek budget deficit and debt rose to extreme levels and subsequently borrowing spreads increased significantly. As Kotios et al. (2011) mention, this was exploited by speculators in securities and currency. However, performed research reveals that Greece's current financial situation is primarily the result of financial mismanagement and unjust taxation. The study conducted by Polito and Wickens (2011) shows that indeed "…the debt problems of Greece are long-standing and are not due to the recent recession."

Nevertheless, in 2010, Greece requested public funding from the IMF and the EU Council; finally, in May 2010, the country was granted a loan of €110 billion (€80 billion from 15 EMU countries and €30 billion from the IMF). With the fear that there might be contagion effects, the Eurozone created a European stability Mechanism, which would secure financial stability of the Eurozone. The adjustment program developed for Greece has taken the form of a memorandum of understanding (MoU), subject to periodic reviews (European Commission, 2010; 2011). Taking into account the background of the Greek economic crisis and for the purpose of this study, the recession in Greece has been split into two distinct periods:

- the first, covering the period from August 2008 to May 2010, when the first signs of the crisis were observed, and
- the second from May 2010 continuing until present, when Greece officially entered a Loan Facility Agreement (Funded by IMF and the European Council-15 EMU countries)

The severity of the country's economic crisis means that Greece is particularly pertinent to the examination of the effect of the economic crisis in management accounting in firms. Greece was undergoing a growth phase, especially after the hosting of the 2004 Olympic Games in Athens; however, after 2008, the country's GDP dropped dramatically in line with other developed countries in the Eurozone (European Commission, 2010).

It is expected that relevant empirical research as far as the examination of MA techniques in actual usage and perceived importance is concerned has been conducted in other settings, developed or developing countries or industries (e.g., Abo-Alazm Mohamed, 2013; Hussain & Gunasekaran, 2002).

The purpose of this study is to fill the gap in the relevant literature as regards the effect of the economic crisis in MA techniques implemented by companies.

We investigated the perceived importance and actual usage of MA practices before and during the country's economic crisis by examining two relevant questions:

1. Are there any differences on perceived importance and actual usage of MA practices before and during the economic crisis?
2. Is there any association between the perceived importance and the actual usage of MA practices before and during the economic crisis?

In particular, this study performs empirical research and examines any statistical significant differences before and during Greece's economic crisis in the actual usage and perceived importance of MA practices in firms.

This study extends prior research in several ways. First, it adds to our understanding of the use and usefulness of particular management accounting techniques within the context of economic recession at two points in time (before and during a crisis.). It fills an existing empirical gap, as far as the effect of the recent economic crisis in the management accounting function within the firms is concerned. Up to date in the relevant literature, several research papers in management accounting in various countries (i.e., Abo-Alazm Mohamed, 2013; Chenhall & Langfield-Smith, 1998), and different settings have been presented. Comparisons have been made between management accounting practices used in two countries (i.e., Angelakis, Theriou, & Floropoulos, 2010; Israeli, Mohsin, & Kumar, 2011) or in a single industry (i.e., Pavlatos & Paggios, 2009). This study presents the diverse nature of the various management accounting tools used by firms before and during a country's economic crisis. The same firms were considered in these two periods of economic activity. To the best of our knowledge, this is the first research effort that has been attempted within this scope. On the contrary, there exists similar research that examines the effect of the economic crisis in financial analysis or financial accounting (e.g., Boubakri et al., 2010).

Furthermore, our analysis supports anecdotal evidence from prior research on a time-delayed increase in interactive use of management accounting systems (MAS) in times of externally induced crises. Thus, it expands the limited knowledge about the change of MAS in organizations facing an economic crisis. We can therefore put forward evidence to answer Hopwood's (2009) question of whether uniform patterns of MAS change can be observed in such times.

Methodologically, the contribution of this study is the inclusion of contemporary SMA practices that have not been incorporated elsewhere; other research papers investigate the role of only a few management accounting practices. Consequently, our study constitutes a holistic approach of all management accounting practices that can be used by a firm, therefore representing a measurement tool of all these practices. This study can also be seen as constituting an overdue inquiry into the validity of viewing management accounting practices as a coherent empirical construct. Furthermore, this study demonstrates the way contemporary MAPs, such as ABC and SMA tools that are implemented in a business environment are affected by recession. Most studies, as far as we know, have been applied in different environments of economic activity, such as countries under conditions of economic growth. Finally, this research enhances the understanding of management accounting practices among firms in Greece.

1.2. Literature review

In the past few decades, new management accounting practices have emerged in order to meet the growing needs of the larger firms,

as well as the challenges of the changing economic environment. Traditional management accounting techniques are regarded inappropriate to meet these needs, as well as to provide and handle data and information (non-financial, future, and external) to make strategic decisions (Ma & Tayles, 2009). These new techniques are, among others, activity-based costing (ABC), balanced scorecard, benchmarking, target costing, quality cost management, customer profitability analysis, and value chain analysis (Simon, 2006). It has been argued that these techniques have affected the role of management accounting and have resulted in creating value through improved deployment of resources (Ittner & Larcker, 2001).

For this reason, many studies that appear in the literature attempt an evaluation of the benefits of specific management accounting practices (like ABC) in different countries (Brierley, Cowton, & Drury, 2001; Lukka & Granlund, 1996). Due to the benefits of these techniques in decision making, controlling, and planning, during the last decades, research has focused on the usage of management accounting practices in various industries and countries. For example, a study conducted by Abdel-Kader and Luther in 2006 in 122 firms used questionnaires to collect empirical data from the food and drinks industry in the UK and concluded that traditional management accounting techniques were still widely used. The writers also reported that although many new MAP (such as non-financial performance measures) were perceived as "highly important" by the respondents, they were rarely used for strategic management decisions (Abdel-Kader & Luther, 2006). The findings of this work suggest that strategic management accounting techniques were ranked relatively low; this is contrary to the authors' expectations.

In a less recent study, Chenhall and Langfield-Smith (1998) explored the level of adoption of various MAP in the Australian manufacturing industry. They identified a growing adoption of newly developed techniques, such as activity-based costing. According to this work, budgeting techniques were reported to be highly adopted by the firms under study and although financial performance measures and traditional accounting techniques continued to be an important aspect of management accounting; these were being supplemented with a variety of non-financial measures (Chenhall & Langfield-Smith, 1998). Similar findings are reported in more recent studies. For example, evidence from 83 large-size manufacturing firms in Greece suggests that these firms use various traditional, as well as currently developed management accounting practices (MAP). While implementation rates for many currently developed practices are reported to be of a high level, on the whole, traditional management accounting practices were found to be implemented slightly more. However, one of the most important aspects of this work is evidence that there is an ever-increasing trend to place greater emphasis in the future on these currently developed techniques (Angelakis et al., 2010).

An inter-country comparison analyses the adoption rates of management accounting practices (planning and budgeting, costing systems, decision support, performance evaluation, and strategic analysis practices) in Turkey with those in six other studies. It is argued that traditional budgeting and costing practices are generally used more often than MAPs developed recently (Yalcin, 2012). Hyvonen (2005) describes the relative adoption rates, received benefits and future emphasis of management accounting practices in Finland. The most widely used practice in Finland is found to be budgeting for controlling costs, while strategic planning techniques, such as formal strategic planning, strategic plans developed together with budgets and long-range forecasting are also extensively used. The author concludes that while financial measures are widely applied and will be also important in the future according to the respondents, greater emphasis will be placed on newer practices. Also, by comparing these results with the ones presented in Chenhall and Langfield-Smith (1998), it is argued that Finnish firms put greater emphasis to recently developed non-financial measures than the Australian firms (Hyvonen, 2005).

Although it is evident from reported results that firms across Europe still widely use traditional cost accounting techniques, performed research indicates a growing adoption of newly developed MAPs. Recently, Abo-Alazm Mohamed (2013) explored the possible changes in the level of management accounting practices according to changes in the business environment (i.e., developments in information and communication technology and computer-based production systems, short product life cycles, the integration of local and international companies, competition etc.) in a group of companies in Egypt. He found that the technological developments and the increasing competition positively affect the level of MAPs, which in turn affect the company's ability to achieve competitive advantages. These findings are in line with findings from other studies (Garg, Ghosh, & Halper, 2004; Mat et al., 2010), which claim that in cases where the business environment changed, the role of management accounting also changed. In general, it seems that changes in the business and economic environment require the development of new strategies from the companies to achieve competitive advantages, which will be accomplished through the development and use of new management accounting practices that mainly utilize non-financial information. In view of the above and in light of the new economic conditions that followed the recent world economic crisis of 2007, the role of accounting might need further re-examination, especially in countries that were most affected by the crisis, like Greece.

Researchers have attempted to explain the relationship between accounting and the instability of an economy. In particular, in 2011, Waymire and Basu examined whether weak financial reporting can be a cause of destabilising an economy or whether weak accounting is evident in the aftermath of a crisis, that is, whether it is a causal factor or an effect. They also report that any overarching statements about how economic crises affect accounting cannot be made because generally little is known about how accounting evolves (Waymire & Basu, 2011).

In general, an economic crisis is characterized by periods of sharp inflation, external or domestic debt crisis, banking crisis, bursting of asset price bubbles, currency crashes, and debasements (Reinhart & Rogoff, 2009). The economic crisis in Greece that fully emerged in 2009 is mainly marked by the high external debt, sharp inflation and high unemployment rates, as well as low government revenues. Indeed, the government's revenues are below the EU averages (see, for example, Meghir, Vayanos, & Vettas, 2010), which is mainly due to the high tax evasion. However, Waymire and Basu (2011) conclude that there exists a definitional ambiguity as to what exactly defines an economic crisis or what really caused it.

Although in the last years there has been a progression in the relevant literature as far as crisis management (see, for example, Israeli et al., 2011) or financial reporting (Waymire & Basu, 2011) and financial analysis (Boubakri et al., 2010) and the economic crisis is concerned, to the best of our knowledge there has been no attempt up to date to assess the extent of use of management accounting practices during a sharp drop of the economic activity in a country.

Limited knowledge exists on the changes that management control systems (MCS) undergo as a result of externally induced organizational crisis situations, particularly economic crises (Janke, Mahlendorf, & Weber, 2014). Results of various studies suggest that firms that follow a prospector strategy expand the usage of their budgeting in times of perceived external crisis (Collins, Lowensohn, McCallum, & Newmark, 1995). Moreover, it is also suggested that in new firms the occurrence of externally caused cash flow crisis correlated with the introduction of cost management methods (Reid & Smith, 2000). Both of these studies consider potential reciprocal causal effects, indicating an impact of MCS on the perception of negative external crisis effects (Janke et al., 2014).

Furthermore, relevant research provides evidence on a possible change of MCS use in organizations in the wake of an external crisis and corresponding crisis perceptions (e.g., Ezzamel & Bourn, 1990). This study evaluates the level of employment of MAPs in various industries in Greece before and after 2009.

The theoretical background of this research work is based on diffusion theory, as presented in various research papers, such as Fiss and

Zajac (2004); Strang and Macy (2001) and Ansari, Fiss, and Zajac (2010), where it is explained how management accounting practices are adopted and implemented by companies and the patterns by which this diffusion of practices is governed.

2. Methodology

2.1. Sample characteristics and data collection

In order to examine the importance and usage of management accounting practices before the crisis in Greece (year 2008), empirical data were collected from the industry. The focus was on sizable companies that would have been likely to have an established management accounting function. The survey instrument was sent by e-mail to 2,500 large Greek companies, which are included in the ICAP database (Gallup's subsidiary in Greece). The selection criteria used for sampling purposes were the sales revenues and the number of employees for year 2008. The questionnaire, accompanied by a cover letter, which included a brief reference of the scope of the study, was addressed to the Chief Executive Officers (CEOs) of each firm. It should be noted that the questionnaire was accompanied also by one glossary that explained the terminology of the strategic management accounting tools adopted by Cadez and Guliding (2008).

The questionnaire was pilot-tested by the chief executive officers of ten firms and interviews were performed. Several procedures from Dillman (1999) were taken to optimize the response rate, such as the assurance of strict anonymity, the use of high-quality printing with handwritten signatures, and the use of pre-stamped envelopes and separate cards to request the study's results. A total of 301 firms fully completed and returned the questionnaire, yielding a 12% response rate. Companies that did not express interest in the research replied that the main reasons for not participating were the lack of time and the fact that answering questionnaires was not one of their top priorities.

Tests for non-response bias were performed in order to determine whether early and late respondents provided significantly different responses. Chi-square tests indicated that there were no significant differences in the demographic characteristics. Hotelling's t^2 statistic also indicated no significant differences in the multivariate means of early versus late respondents.

For year 2013, the same methodology and the same procedures were followed and questionnaires were only sent to those companies that had fully completed the questionnaire in the previous survey. From the first survey (2008), 14 more questionnaires were received, which were eventually excluded from the analysis, as these firms did not finally participate in the consecutive survey (2013). In both cases (years 2008 and 2013), the questionnaire was addressed to the CEO of each firm, who could direct it to any employee or executive he thought appropriate to answer. Table 1 shows the position in the firm of the respondents for both surveys. A chi-square test indicated no significant differences in the position of the respondents in the firms in the two surveys.

Table 1
Respondents of the two surveys.

Position of respondents	Number	%
Survey 1 (2008—before crisis)		
CEO	204	68
CFO	85	28
Other	12	4
Total	301	100
Survey 2 (2013—during crisis)		
CEO	196	65
CFO	97	32
Other	8	3
Total	301	100

The questionnaires were filled up mainly by CEOs who generally have firm knowledge of the management accounting practices used by their companies and have the primary responsibility for product costing, planning and control decisions.

The sample group demographics are presented in Table 2.

Table 2 shows that a total of 301 companies participated in both surveys, each belonging to a different industry group, as indicated in Panel A. For example, 10% of the firms belong to the constructions industry, while 11% each belong to the travel and the F&B industry. Finally, 9% of the companies that participated in the surveys are into the technology industry.

Panel B of Table 2 shows that most of the sampled companies are not listed in the ASE (72%), while most of them belong to the non-services industry (57%) (Panel C of Table 2).

Panel D of Table 2 provided a screening question, which was included in the questionnaire of the second survey (2013). The purpose of this question was to test whether potential differences in the importance and usage of management accounting practices between the two surveys (before and during the crisis) are attributable to the event of the crisis itself.

2.2. Survey instrument and measurements

In order to analyse the importance and usage of management accounting practices in these firms, 62 techniques were incorporated in the survey and were further subdivided into 5 panels: (a) cost accounting,

Table 2
Demographic characteristics of sampled companies.

	Frequency	%
Panel A: Industry classification of sampled companies		
Oil and gas	5	2
Chemicals	12	4
Basic resources	20	7
Constructions and materials	31	10
Food and beverage	34	11
Industrial goods and services	22	7
Personal and household goods	25	8
Health care	18	6
Retail	12	4
Media	11	4
Travel and leisure	32	11
Telecommunications	6	2
Utilities	6	2
Banks	9	3
Insurance	7	2
Real estate	12	4
Financial services	13	4
Technology	26	9
Total	301	100
Panel B: Listed–not listed companies on Athens stock exchange		
Listed	85	28
Not listed	216	72
Panel C: Services–no services companies		
Services	129	43
No services	172	57
Panel D: The financial crisis has affected usage of management accounting practices in your company		
Totally disagreed	8	2
Disagreed	24	8
No opinion	20	7
Agreed	125	42
Totally disagreed	124	41
Panel E: Company size (number of employees)		
0–200	57	18.9
201–500	91	30.3
501–1000	85	28.2
1001 +	68	22.6

(b) planning/budgeting, (c) decision support systems, (d) performance evaluation, and (e) strategic analysis (according to Chenhall & Langfield-Smith, 1998). This sub-division was also used by Angelakis et al. (2010). In the last panel, some tools of strategic management accounting were also added, as presented also in Cadez and Guliding (2008).

The questionnaire was identical in both surveys (except from Panel D of Table 2, which was only incorporated in the 2013 survey) and was developed in such a way, as to measure the importance managers assign to the various MAPs, as well as the actual usage of MAPs within the aforementioned companies.

2.2.1. Importance of MAPs

The importance of MAPs was measured using an instrument, which comprised of a sixty-two seven-point Likert scale instrument anchored by (1) "to no important" and (7) "to very important." Respondents were asked to indicate the importance of MAPs as perceived by them on the aforementioned scale. This scale has also been used by Abdel-Kader and Luther (2006).

Factor analyses were employed to summarize and reduce the data. Thus, the 62 variables were reduced into fewer factors for both surveys. For the first survey (2008—before crisis), a factor analysis shown in Table 3 revealed that the 62 items (practices) were loaded on 9 factors: *traditional cost accounting systems*, *cost accounting techniques*, *ABC techniques*, *planning*, *budgeting*, *decision support systems*, *performance evaluation*, *strategy*, and *strategic management accounting*.

Factor analysis (principle component analysis and varimax rotation method) for importance (Table 3) also showed that the nine factors accounted for 67.1% of the variance. The minimum loading for each practice in a factor was 0.503.

Further, a factor analysis was performed for the second survey (2013), regarding the importance of MAPs as perceived by the respondents. Table 4 shows that the 62 items (practices) were distributed on the same factors as in the first survey. The nine factors explained 72% of the variance. The Cronbach alpha, the internal composite reliability (ICR), and the average variance extracted (AVE) for the 9 measures, as well as the minimum loadings for each practice on a factor are shown in Table 4.

2.2.2. Usage of MAPs

The analysis was further applied to the usage of MAPs in the companies using a tool, which comprised of a sixty-two seven-point Likert scale instrument anchored by (1) "to no extent" and (7) "to a great extent." Respondents were asked to indicate the usage of MAPs in their companies on the aforementioned scale. This scale has also been used by Cadez and Guliding (2008) to measure the usage of strategic management accounting techniques.

Factor analyses were again employed to group the 62 variables into factors for both surveys. For the first survey (2008—before crisis) and for the second survey (2013—during crisis), the analysis showed that the 62 items (practices) were loaded on the same 9 factors, as in the first measurement (importance of MAPs).

Table 5 shows the different Cronbach alpha measurements, the internal composite reliability (ICR), and the average variance extracted (AVE), as well as the different minimum loadings of the practices on each factor.

Table 6 shows results of the factor analysis performed on data from the 2013 (during crisis) survey for the actual usage of MAPs, the Cronbach alpha measurements, the internal composite reliability (ICR), and the average variance extracted (AVE), as well as the different loadings for the 9 factors.

In order to assess the discriminant validity, we compared the constructs' AVEs with the squared correlations between variables. Results showed that discriminant validity was also satisfactory, as in all cases the AVE was higher than the squared correlation.

3. Research Findings

Table 7 and the corresponding descriptive statistics reveal the order of each MAP in importance and usage before and during the crisis.

Budgeting for planning cash flows (Practice 20) has been identified as the most important and the most widely used practice before the crisis (Rank 1) with a mean value of 6.12 (SD = 1.13) and 6.01 (SD = 1.24), respectively. It ranks second (Rank 2) in importance and usage during the crisis (mean = 6.22, SD = 1.24 and mean = 6.07, SD = 1.36 respectively), being overtaken by customer profitability analysis (CPA) (Practice 56) (Rank 1) with a mean value of 6.54 (SD = 1.29) and 6.23 (SD = 1.12), respectively. CPA ranks 14th in importance before the crisis with a mean value of 5.44 (SD = 1.01) and 25 in usage before the crisis (mean value = 5.12, SD = 1.04). This practice shows great deviation in importance and usage before and during the crisis. Other budgeting techniques seem to rank high in importance and usage before and during the crisis, such as budgeting for compensating managers, budgeting for planning financial position, and budgeting for controlling costs.

Strategic cost management (Practice 59) ranks 3rd in usage during the crisis (mean = 5.94, SD = 1.34), but only 47th in usage before the crisis (mean = 4.75, SD = 1.29). In importance, it ranks 47th before the crisis (mean value = 4.85, SD = 1.38) and 7th during the crisis (mean = 6.01, SD = 1.35). This practice shows great deviation in importance and usage before and during the crisis. The same applies for strategic pricing (Practice 60). Performance evaluation: budget variance analysis (Practice 37) ranks 4th in importance and usage before the crisis (mean = 5.99, SD = 1.1 and mean = 5.89, SD = 1.01, respectively) and also ranks high in both variables during the crisis (5th in importance and in usage with a mean value of 6.01 (SD = 1.19) and 5.92 (SD = 1.18) respectively).

Budgeting for evaluating managers' performance and CVP analysis are techniques that are perceived high in importance in both periods by managers, but at the same time score relatively low in usage, especially during the crisis. In contrast, absorption costing is a technique that ranks high in usage but low in importance in both surveys. Great variations in rankings also appear in practice 57 (competitor performance appraisal). It ranks high in usage and importance during the crisis but low in importance and usage during the crisis. Practices 54—competitor cost assessment, 52—analysis of competitive positions, and 31—benchmarking of strategic priorities also show high variations in some of their measurements. Performance evaluation: customer satisfaction surveys (Practice 40) is another technique that scores high in usage before the crisis (ranked 13th, mean = 5.3, SD = 1.19), while it ranks 30th in usage during the crisis (mean = 5.38, SD = 1.29). In importance, it ranks 19th before the crisis (mean = 5.36, SD = 1.32) and 32nd during the crisis (mean = 5.44, SD = 1.34).

A practice that is perceived to be relatively important during the crisis (ranked 15th with a mean value of 5.71 and an SD of 1.3) but of low importance before the crisis (rank = 50, mean = 4.62, SD = 1.37) is competitive position monitoring (Practice 55).

Practices with low or lowest rankings either in importance or in usage are also considered. There are many items in the list, which, while they rank very low in importance or/and in usage before the crisis, they rank considerably higher in both variables during the crisis. These techniques are valuation of customers as assets, ABP, brand valuation, lifetime customer profitability analysis, ABB, ABM, ABC, and product/service life cycle analysis. Some other practices lost in importance and usage during the crisis, such as process costing, Value chain analysis and Batch/ job order costing.

Table 7 reveals that some performance evaluation practices have also lost in perceived importance and in actual usage in the period of the crisis, such as cash flow return on ROI, EVA, ROI, residual income, production processes, controllable profit, employee attitudes, team performance, and divisional profit, which were relatively used and perceived as relatively important before the crisis (scored between 29th

Table 3
Factor analysis of practice importance (before crisis).

Practices	Factor 1 Traditional cost accounting systems	Factor 2 Cost accounting techniques	Factor 3 ABC techniques	Factor 4 Planning	Factor 5 Budgeting	Factor 6 Decision support systems	Factor 7 Performance Evaluation	Factor 8 Strategy	Factor 9 Strategic management accounting
Practice 3	0.824								
Practice 4	0.819								
Practice 1		0.811							
Practice 2		0.764							
Practice 5			0.794						
Practice 12			0.718						
Practice 22			0.764						
Practice 25			0.802						
Practice 7				0.634					
Practice 8				0.715					
Practice 9				0.804					
Practice 10				0.785					
Practice 6					0.701				
Practice 11					0.716				
Practice 13					0.614				
Practice 14					0.589				
Practice 15					0.604				
Practice 16					0.764				
Practice 17					0.801				
Practice 18					0.629				
Practice 19					0.802				
Practice 20					0.744				
Practice 37					0.542				
Practice 23						0.678			
Practice 24						0.701			
Practice 26						0.596			
Practice 27						0.755			
Practice 28						0.684			
Practice 29						0.604			
Practice 30						0.508			
Practice 38							0.659		
Practice 39							0.659		
Practice 40							0.711		
Practice 41							0.618		
Practice 42							0.589		
Practice 43							0.541		
Practice 44							0.694		
Practice 45							0.611		
Practice 46							0.521		
Practice 47							0.506		
Practice 48							0.634		
Practice 49							0.684		
Practice 50							0.702		
Practice 51								0.784	
Practice 52								0.762	
Practice 53								0.705	
Practice 31									0.584
Practice 32									0.564
Practice 33									0.503
Practice 34									0.504
Practice 35									0.512
Practice 36									0.562
Practice 54									0.684
Practice 55									0.715
Practice 56									0.730
Practice 57									0.736
Practice 58									0.801
Practice 59									0.731
Practice 60									0.684
Practice 61									0.711
Practice 62									0.736
Eigen value	1.25	1.18	2.12	2.24	3.14	2.62	3.24	1.34	3.29
% of variance	3.8	3.1	6.4	7.1	10.5	8.4	11.5	4.2	12.1
Cronbach Alpha	0.81	0.84	0.82	0.84	0.76	0.71	0.73	0.8	0.77
Internal composite reliability (ICR)	0.82	0.86	0.84	0.87	0.79	0.74	0.75	0.82	0.79
Average variance extracted (AVE)	0.61	0.68	0.65	0.69	0.63	0.6	0.62	0.65	0.62

Cumulative % variance 67.1; KMO = 0.912; Bartlett's test of sphericity: chi-square = 2,315.24, Sig = 0.000.

Table 4
Factor analysis of practice usage (before crisis).

Practices	Factor 1 Traditional cost accounting systems	Factor 2 Cost accounting techniques	Factor 3 ABC techniques	Factor 4 Planning	Factor 5 Budgeting	Factor 6 Decision support systems	Factor 7 Performance evaluation	Factor 8 Strategy	Factor 9 Strategic management accounting
Practice 3	0.736								
Practice 4	0.719								
Practice 1		0.736							
Practice 2		0.729							
Practice 5			0.764						
Practice 12			0.728						
Practice 22			0.789						
Practice 25			0.736						
Practice 7				0.629					
Practice 8				0.614					
Practice 9				0.701					
Practice 10				0.696					
Practice 6					0.638				
Practice 11					0.704				
Practice 13					0.512				
Practice 14					0.544				
Practice 15					0.712				
Practice 16					0.777				
Practice 17					0.736				
Practice 18					0.689				
Practice 19					0.736				
Practice 20					0.752				
Practice 37					0.589				
Practice 23						0.636			
Practice 24						0.589			
Practice 26						0.604			
Practice 27						0.736			
Practice 28						0.608			
Practice 29						0.682			
Practice 30						0.526			
Practice 38							0.624		
Practice 39							0.784		
Practice 40							0.614		
Practice 41							0.718		
Practice 42							0.512		
Practice 43							0.636		
Practice 44							0.589		
Practice 45							0.623		
Practice 46							0.549		
Practice 47							0.587		
Practice 48							0.612		
Practice 49							0.509		
Practice 50							0.736		
Practice 51								0.636	
Practice 52								0.589	
Practice 53								0.726	
Practice 31									0.536
Practice 32									0.601
Practice 33									0.533
Practice 34									0.536
Practice 35									0.614
Practice 36									0.634
Practice 54									0.605
Practice 55									0.736
Practice 56									0.618
Practice 57									0.776
Practice 58									0.789
Practice 59									0.796
Practice 60									0.504
Practice 61									0.744
Practice 62									0.718
Eigen value	1.15	1.05	2.21	2.25	3.62	2.58	3.34	1.29	3.54
% of variance	4.1	3.6	6.3	8.1	12.5	9.5	11.5	5.1	11.4
Cronbach Alpha	0.79	0.81	0.84	0.81	0.79	0.74	0.75	0.81	0.75
Internal composite reliability (ICR)	0.81	0.83	0.86	0.82	0.81	0.76	0.77	0.84	0.79
Average variance extracted (AVE)	0.67	0.68	0.69	0.66	0.65	0.61	0.63	0.67	0.62

Cumulative % variance 71.2; KMO = 0.903; Bartlett's test of sphericity: chi-square = 2154.10, Sig = 0.000.

Table 5
Factor analysis of practice importance (during crisis).

Practices	Factor 1 Traditional cost accounting systems	Factor 2 Cost accounting techniques	Factor 3 ABC techniques	Factor 4 Planning	Factor 5 Budgeting	Factor 6 Decision support systems	Factor 7 Performance Evaluation	Factor 8 Strategy	Factor 9 Strategic management accounting
Practice 3	0.624								
Practice 4	0.736								
Practice 1		0.624							
Practice 2		0.705							
Practice 5			0.784						
Practice 12			0.736						
Practice 22			0.789						
Practice 25			0.724						
Practice 7				0.654					
Practice 8				0.736					
Practice 9				0.785					
Practice 10				0.595					
Practice 6					0.724				
Practice 11					0.636				
Practice 13					0.674				
Practice 14					0.509				
Practice 15					0.636				
Practice 16					0.724				
Practice 17					0.806				
Practice 18					0.689				
Practice 19					0.741				
Practice 20					0.721				
Practice 37					0.602				
Practice 23						0.654			
Practice 24						0.736			
Practice 26						0.614			
Practice 27						0.589			
Practice 28						0.624			
Practice 29						0.574			
Practice 30						0.522			
Practice 38							0.636		
Practice 39							0.744		
Practice 40							0.636		
Practice 41							0.624		
Practice 42							0.524		
Practice 43							0.724		
Practice 44							0.624		
Practice 45							0.544		
Practice 46							0.704		
Practice 47							0.534		
Practice 48							0.699		
Practice 49							0.604		
Practice 50							0.689		
Practice 51								0.794	
Practice 52								0.604	
Practice 53								0.604	
Practice 31									0.524
Practice 32									0.601
Practice 33									0.624
Practice 34									0.524
Practice 35									0.701
Practice 36									0.681
Practice 54									0.606
Practice 55									0.736
Practice 56									0.724
Practice 57									0.642
Practice 58									0.836
Practice 59									0.754
Practice 60									0.636
Practice 61									0.589
Practice 62									0.605
Eigen value	1.15	1.21	2.21	2.34	3.02	2.58	3.32	1.24	3.44
% of variance	2.7	2.9	7.4	8.2	11.4	9.4	12.3	3.2	14.5
Cronbach Alpha	0.78	0.79	0.81	0.82	0.77	0.75	0.76	0.75	0.81
Internal composite reliability (ICR)	0.79	0.81	0.82	0.83	0.8	0.78	0.79	0.77	0.82
Average variance extracted (AVE)	0.61	0.68	0.68	0.68	0.66	0.64	0.65	0.62	0.69

Cumulative % variance 72; KMO = 0.897; Bartlett's test of sphericity: chi-square = 2254.14, Sig = 0.001.

Table 6
Factor analysis of practice usage (during crisis).

Practices	Factor 1 Traditional cost accounting systems	Factor 2 Cost accounting techniques	Factor 3 ABC techniques	Factor 4 Planning	Factor 5 Budgeting	Factor 6 Decision support systems	Factor 7 Performance evaluation	Factor 8 Strategy	Factor 9 Strategic management accounting
Practice 3	0.804								
Practice 4	0.809								
Practice 1		0.799							
Practice 2		0.784							
Practice 5			0.736						
Practice 12			0.764						
Practice 22			0.784						
Practice 25			0.812						
Practice 7				0.712					
Practice 8				0.701					
Practice 9				0.602					
Practice 10				0.734					
Practice 6					0.624				
Practice 11					0.724				
Practice 13					0.509				
Practice 14					0.612				
Practice 15					0.624				
Practice 16					0.736				
Practice 17					0.814				
Practice 18					0.699				
Practice 19					0.684				
Practice 20					0.702				
Practice 37					0.612				
Practice 23						0.636			
Practice 24						0.724			
Practice 26						0.612			
Practice 27						0.736			
Practice 28						0.654			
Practice 29						0.636			
Practice 30						0.589			
Practice 38							0.636		
Practice 39							0.761		
Practice 40							0.724		
Practice 41							0.589		
Practice 42							0.624		
Practice 43							0.724		
Practice 44							0.596		
Practice 45							0.636		
Practice 46							0.544		
Practice 47							0.536		
Practice 48							0.724		
Practice 49							0.539		
Practice 50							0.572		
Practice 51								0.624	
Practice 52								0.701	
Practice 53								0.584	
Practice 31									0.614
Practice 32									0.624
Practice 33									0.589
Practice 34									0.534
Practice 35									0.602
Practice 36									0.579
Practice 54									0.624
Practice 55									0.589
Practice 56									0.684
Practice 57									0.703
Practice 58									0.544
Practice 59									0.754
Practice 60									0.636
Practice 61									0.752
Practice 62									0.709
Eigen value	1.25	1.18	2.12	0.79	3.14	2.62	3.24	1.34	3.29
% of variance	3.1	3.8	3.7	7.5	10.9	8.4	11.5	5.2	12.1
Cronbach Alpha	0.81	0.8	0.79	0.78	0.76	0.7	0.72	0.79	0.76
Internal composite reliability (ICR)	0.82	0.81	0.8	0.79	0.78	0.72	0.73	0.81	0.79
Average variance extracted (AVE)	0.68	0.67	0.67	0.66	0.64	0.61	0.61	0.68	0.65

Cumulative % variance 66.2; KMO = 0.922; Bartlett's test of sphericity: chi-square = 2318.15, Sig = 0.000.

Table 7
Descriptive statistics.

	Importance				Usage			
	Before crisis		During crisis		Before crisis		During crisis	
Practices	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Absorption costing (Practice 1)	4.86	1.53	4.81	1.34	5.74	1.34	5.68	1.28
Variable costing (Practice 2)	5.39	1.65	5.51	1.28	4.9	1.18	4.99	1.23
Batch/job order costing (Practice 3)	5.28	1.12	4.78	1.24	5.12	1.54	4.62	1.62
Process costing (Practice 4)	4.18	1.22	3.38	1.31	4.10	1.59	3.25	1.32
ABC (Practice 5)	4.52	1.51	5.51	1.46	4.45	1.64	5.39	1.54
Capital budgeting tools (Practice 6)	5.01	0.99	5.12	1.11	4.89	1.24	5.11	1.29
Formal strategic planning (Practice 7)	5.37	1.15	5.55	1.23	5.29	1.34	5.47	1.24
Long-range forecasting (Practice 8)	5.29	1.36	5.49	1.28	5.21	1.21	5.42	1.14
Strategic plans developed with budgets (Practice 9)	5.09	1.41	5.29	1.27	5.00	1.44	5.18	1.39
Strategic plans developed separately with budgets (Practice 10)	4.92	1.36	5.11	1.18	4.79	1.31	5.01	1.32
Flexible budgeting (Practice 11)	5.64	0.93	0.93	1.05	5.41	1.03	5.49	1.16
ABB (Practice 12)	4.42	1.62	5.24	1.58	4.30	1.44	5.19	1.46
Zero based budgeting (Practice 13)	5.01	1.01	4.97	1.09	4.94	1.12	4.91	1.02
Budgeting for controlling costs (Practice 14)	6.03	1.10	6.06	1.19	5.89	1.01	5.92	1.18
Budgeting for planning financial position (Practice 15)	5.94	1.15	6.02	1.23	5.75	1.24	5.82	1.31
Budget linking financial position, resources, and activities (Practice 16)	5.78	1.14	5.70	1.19	5.54	1.01	5.49	1.18
Budgeting for compensating managers (Practice 17)	6.05	1.19	5.92	1.04	5.90	1.24	5.79	1.21
Budgeting for coordinating activities across the business units (Practice 18)	5.19	1.14	5.17	1.19	5.21	1.10	5.22	1.05
Budgeting for evaluating managers' performance (Practice 19)	5.94	0.85	5.97	0.92	5.21	1.15	5.29	1.19
Budgeting for planning cash flows (Practice 20)	6.12	1.13	6.22	1.24	6.01	1.24	6.07	1.36
Budget for planning day-to-day operations (Practice 21)	5.85	1.29	5.89	1.32	5.69	1.31	5.74	1.29
ABM (Practice 22)	4.45	1.54	5.57	1.49	4.35	1.59	5.29	1.61
CVP analysis (Practice 23)	5.89	1.65	6.01	1.28	5.28	1.18	5.44	1.23
Product profitability analysis (Practice 24)	5.24	1.12	5.20	1.21	5.01	1.23	4.91	1.31
ABP (Practice 25)	4.20	1.41	4.98	1.36	4.10	1.36	5.09	1.44
Operations research techniques (Practice 26)	5.05	0.99	5.11	1.12	4.92	1.24	5.10	1.29
Benchmarking carried out within the wider organization (Practice 27)	5.44	1.24	5.49	1.36	5.41	1.29	5.47	1.18
Benchmarking of management processes (Practice 28)	5.52	1.34	5.56	1.26	5.40	1.24	5.44	1.34
Benchmarking of operational processes (Practice 29)	5.39	1.62	5.36	1.44	5.01	1.21	4.96	1.26
Benchmarking of product/service characteristics (Practice 30)	5.24	1.18	5.22	1.14	5.19	1.31	5.11	1.36
Benchmarking of strategic priorities (Practice 31)	5.30	1.48	5.49	1.22	5.20	1.09	5.52	1.28
Benchmarking with outside organizations (Practice 32)	5.34	1.36	5.55	1.26	5.18	1.12	5.42	1.28
Value chain analysis (Practice 33)	4.42	1.44	4.78	1.56	4.40	1.24	4.76	1.30
Product/service life cycle analysis (Practice 34)	4.59	1.36	5.48	1.44	4.50	1.30	5.41	1.32
Target costing (Practice 35)	4.33	1.32	4.89	1.39	4.24	1.36	4.81	1.36
Performance evaluation: balanced scorecard (Practice 36)	5.01	1.26	5.49	1.19	4.98	1.12	5.41	1.10
Performance evaluation: budget variance analysis (Practice 37)	5.99	1.10	6.01	1.21	5.89	1.01	5.92	1.18
Performance evaluation: cash flow return on ROI (Practice 38)	4.85	1.24	4.84	1.21	4.78	1.24	4.76	1.34
Performance evaluation: controllable profit (Practice 39)	5.01	1.26	5.03	1.28	4.98	1.26	5.05	1.26
Performance evaluation: customer satisfaction surveys (Practice 40)	5.36	1.32	5.44	1.34	5.30	1.19	5.38	1.29
Performance evaluation: divisional profit (Practice 41)	5.14	1.21	5.10	1.16	5.00	1.14	4.96	1.37
Performance evaluation: employee attitudes (Practice 42)	5.12	1.36	5.08	1.19	5.01	1.22	4.95	1.12
Performance evaluation: non-financial measures (Practice 43)	5.46	1.28	5.50	1.24	5.45	1.31	5.51	1.24
Performance evaluation: ongoing supplier evaluations (Practice 44)	5.21	1.24	5.18	1.2	5.14	1.29	5.10	1.36
Performance evaluation: production processes (Practice 45)	5.05	1.16	4.98	1.39	4.95	1.20	4.91	1.19
Performance evaluation: qualitative measures (Practice 46)	5.11	1.12	5.14	1.24	5.08	1.05	5.12	0.99
Performance evaluation: residual income (Practice 47)	4.94	1.31	4.96	1.29	4.85	1.18	4.86	1.27
Performance evaluation: EVA (Practice 48)	4.85	1.36	4.89	1.26	4.82	1.23	4.88	1.31
Performance evaluation: ROI (Practice 49)	5.02	1.34	4.94	1.27	4.86	1.34	4.90	1.38
Performance evaluation: team performance (Practice 50)	5.14	1.28	5.09	1.37	5.02	1.39	4.98	1.19
Industry analysis (Practice 51)	5.45	1.24	5.92	1.12	5.20	1.01	5.64	0.95
Analysis of competitive position (Practice 52)	5.34	1.39	5.71	1.14	5.29	1.12	5.61	1.14
Shareholder value analysis (Practice 53)	5.22	1.02	5.63	1.19	5.09	1.24	5.41	1.19
Competitor cost assessment (Practice 54)	4.51	1.35	5.62	1.28	4.40	1.25	5.62	1.15
Competitive position motoring (Practice 55)	4.62	1.37	5.71	1.30	4.21	1.32	5.44	1.24
Customer profitability analysis (Practice 56)	5.44	1.01	6.54	1.29	5.12	1.04	6.23	1.12
Competitor performance appraisal (Practice 57)	4.71	1.41	5.92	1.24	4.50	1.36	5.71	1.37
Lifetime customer profitability analysis (Practice 58)	4.40	1.36	5.39	1.34	4.01	1.37	5.12	1.45
Strategic cost management (Practice 59)	4.85	1.38	6.01	1.35	4.75	1.29	5.94	1.34
Strategic pricing (Practice 60)	4.81	1.27	5.96	1.31	4.70	1.30	5.82	1.24
Valuation of customers as assets (Practice 61)	4.12	1.41	5.41	1.24	4.01	1.34	5.22	1.38
Brand valuation (Practice 62)	4.24	1.37	5.42	1.20	4.10	1.36	5.34	1.44

and 46th in ranking). They lost in perceived importance and actual usage during the crisis (ranked between 58th and 47th). On the contrary, some practices gained in importance and usage during the crisis. These include shareholder value analysis and performance evaluation: balanced scorecard.

Then we utilized the 9 sub-categories that resulted from the factor analysis (traditional cost accounting systems, cost accounting techniques, ABC techniques, planning, budgeting, decision support systems, performance evaluation, strategy, and strategic management accounting) to perform paired sample *t*-tests and examine whether there were any statistically significant differences in perceived importance and usage of these resulting 9 variables before and during the economic crisis.

Table 8 summarizes the mean values of each of the 9 variables. The *t*-test statistics and related significance levels are also reported. Based

Table 8
Differences of management accounting practice importance and usage before and during economic crisis.

	Importance						Usage					
	Before crisis		During crisis				Before crisis		During crisis			
Practices	Mean	SD	Mean	SD	*t*-value	Sig.	Mean	SD	Mean	SD	*t*-value	Sig.
Traditional cost accounting systems	4.73	1.17	4.08	1.28	3.119	0.006	4.61	1.57	3.94	1.47	3.124	0.006
Cost accounting techniques	5.13	1.59	5.16	1.31	−1.117	0.129	5.32	1.26	5.34	1.26	−1.105	0.134
ABC techniques	4.4	1.52	5.33	1.47	−5.249	0.001	4.3	1.51	5.24	1.51	−5.253	0.001
Planning	5.17	1.32	5.36	1.27	−1.618	0.026	5.07	1.33	5.27	1.27	−1.68	0.025
Budgeting	5.59	1.11	5.67	1.17	−1.254	0.104	5.41	1.15	5.52	1.22	1.301	0.094
Decision support systems	5.40	1.31	5.42	1.26	−1.104	0.134	5.17	1.24	5.20	1.28	1.116	0.128
Performance evaluation	5.16	1.26	5.17	1.25	−1.024	1.412	5.08	1.22	5.09	1.21	−1.001	0.413
Strategy	5.34	1.22	5.75	1.15	−2.019	0.013	5.19	1.12	5.55	1.09	−2.236	0.01
Strategic management accounting	4.71	1.34	5.58	1.31	−4.069	0.002	4.55	1.26	5.45	1.30	−4.129	0.002

on the results of the paired sample *t*-tests, the two measurements (surveys) were significantly different in five constructs in importance, as well as in usage (traditional cost accounting systems, ABC techniques, planning, strategy, and strategic management accounting). Non-statistically significant differences in importance and in usage include cost accounting techniques, budgeting, decision support systems, and performance evaluation.

The next step was to divide the sample data into the following sub-samples:

a. firms that belong to the services industry ($N = 129$) vs. firm that belong to non-services industries ($N = 172$)
b. firms that are listed in the ASE ($N = 85$) vs. firms that are not listed in the ASE ($N = 216$)

Table 9
Differences of management accounting practice importance and usage before and during economic crisis for services–services and listed–not listed firms.

	Paired mean differences (SD)	*t*-value (Sig.)	Paired mean differences (SD)	*t*-value (Sig.)	Paired mean differences (SD)	*t*-value (Sig.)	Paired mean differences (SD)	*t*-value (Sig.)
	Listed ($N = 85$)				Not listed ($N = 216$)			
Practice	Importance		Usage		Importance		Usage	
Traditional cost accounting systems	0.641	3.006	0.661	3.112	0.662	3.314	0.683	3.416
	(1.210)	(0.007)	(1.290)	(0.006)	(1.240)	(0.005)	(1.190)	(0.004)
Cost accounting techniques	−0.022	−0.985	−0.013	−0.876	−0.042	−1.102	−0.032	−1.123
	(1.160)	(0.152)	(1.260)	(0.156)	(1.290)	(0.142)	(1.220)	(1.190)
ABC techniques	−0.901	−5.146	−0.914	−5.784	−0.963	−5.482	−0.991	−5.564
	(1.190)	(0.002)	(1.340)	(0.002)	(1.390)	(0.001)	(1.410)	(0.001)
Planning	−0.162	−1.578	−0.182	−1.311	−0.224	−1.889	−0.223	−1.762
	(1.240)	(0.023)	(1.150)	(0.031)	(1.140)	(0.017)	(1.170)	(0.02)
Budgeting	−0.063	−1.114	0.083	−1.126	−0.104	−1.021	−0.126	−1.202
	(1.220)	(0.102)	(1.160)	(0.122)	(1.160)	(0.131)	(1.200)	(0.064)
Decision support systems	−0.015	−0.994	−0.024	−1.102	−0.026	−1.145	−0.036	−1.189
	(1.240)	(0.146)	(1.290)	(0.139)	(1.190)	(0.125)	(1.210)	(0.115)
Performance evaluation	−0.01	−0.865	−0.012	−0.934	−0.011	−0.891	−0.012	−0.975
	(1.150)	(0.152)	(1.140)	(0.146)	(1.230)	(0.148)	(1.240)	(0.137)
Strategy	−0.352	−1.867	−0.508	−1.992	−0.456	−1.892	−0.612	−2.164
	(1.340)	(0.015)	(1.210)	(0.013)	(1.310)	(0.014)	(1.320)	(0.010)
Strategic management accounting	−0.81	−4.162	−0.852	−4.364	−0.912	−5.202	−0.961	−5.254
	(1.350)	(0.002)	(1.340)	(0.002)	(1.410)	(0.001)	(1.290)	(0.001)
	Services ($N = 129$)				No Services ($N = 172$)			
Practice	Importance		Usage		Importance		Usage	
Traditional cost accounting systems	0.673	3.129	0.698	3.289	0.621	3.089	0.652	3.184
	(1.230)	(0.005)	(1.460)	(0.004)	(1.190)	(0.007)	(1.380)	(0.004)
Cost accounting techniques	−0.021	−1.124	−0.014	−1.002	−0.042	−1.284	−0.032	−1.254
	(1.160)	(0.146)	(1.190)	(0.152)	(1.220)	(0.122)	(1.140)	(0.135)
ABC techniques	−1.03	−5.64	−1.04	−5.658	−0.832	−4.162	−0.864	−4.212
	(1.360)	(0.001	(1.410)	(0.001)	(1.440)	(0.002)	(1.390)	(0.001)
Planning	−0.25	−1.634)	−0.211	−1.574	−0.152	−1.469	−0.19	−1.502
	(1.150)	(0.026)	(1.360)	(0.031)	(1.190)	(0.039)	(1.230)	(0.036)
Budgeting	−0.07	−1.124	−0.11	−1.136	−0.09	−1.13	−0.091	−1.122
	(1.040)	(0.124)	(1.200)	(0.119)	(1.120)	(0.12)	(1.260)	(0.124)
Decision support systems	−0.025	−1.014	−0.035	−1.112	−0.03	−1.129	−0.025	−1.018
	(1.240)	(0.136)	(1.360)	(0.124)	(1.190)	(0.128)	(1.270)	(0.132)
Performance evaluation	−0.008	−0.984	−0.01	−0.991	−0.012	−1.004	−0.011	−1.001
	(1.240)	(0.156)	(1.110)	(0.150)	(1.140)	(0.146)	(1.140)	(0.148)
Strategy	−0.51	−3.124	−0.67	−3.128	−0.31	−2.004	−0.44	−2.124
	(1.190)	(0.004)	(1.230)	(0.006)	(1.190)	(0.014)	(1.260)	(0.010)
Strategic management accounting	−1.08	−6.022	−1.12	−6.124	−0.67	−3.124	−0.78	−3.216
	(1.420)	(0.001)	(1.120)	(0.001)	(1.410)	(0.003)	(1.240)	(0.003)

The purpose was to examine whether there were any statistically significant differences between these categories (services and non-services firms, listed and not listed firms) in perceived importance and usage before and during the economic crisis. Table 9 summarizes the paired mean differences of these sub-samples, as well as the *t*-test statistics and related significance levels.

Statistically significant differences appear in traditional cost accounting systems (both listed and non-listed firms, as well as services and non-services firms before and during the crisis), ABC techniques, planning techniques, strategy techniques, and strategic management accounting techniques.

Practices whose paired mean differences before and during the crisis that are not statistically significant include the following: cost accounting techniques, budgeting techniques, decision support systems, and performance evaluation techniques. The correlations between the different factors were explored, with the purpose of examining whether they have been altered as far as perceived importance and actual usage are concerned, before and during the economic crisis.

Table 10 shows the correlation coefficients between the 9 factors, as well as their statistical significance (marked with asterisks). Statistically significant correlations involve the following practices. It is shown that there is a negative correlation between ABC techniques and traditional cost accounting systems in their importance and usage before the crisis, as well as during the crisis. A positive correlation relates the importance of budgeting and cost accounting techniques before (0.229) and during the crisis (0.294), as well as the usage of these practices before (0.225) and during the crisis (0.274).

Between the importance and usage of cost accounting techniques and decision support systems, there exists a positive correlation before and during the crisis. There is also a positive and statistical significant correlation between the importance of ABC techniques and budgeting before the crisis (0.212) and during the crisis (0.272), as well as between the usage of these techniques before (0.201) and during the crisis (0.254). Moreover, a positive correlation relates the importance and usage of ABC techniques and strategic management accounting techniques before and during the crisis (0.412). Planning and budgeting are also positively correlated as far as their importance and usage are concerned. It is also shown that between the importance and usage of planning and strategy, a positive correlation before and during the crisis exists (0.324). The same applies between budgeting and performance evaluation techniques.

The last statistical significant difference exists between strategy and strategic management accounting techniques. Between their importance, there is a positive correlation before (0.321) and during the crisis (0.364). The same positive correlation exists between their usage before (0.301) and during the crisis (0.358).

Table 10
Correlations of management accounting practice importance and usage before and during economic crisis.

Practices	Traditional cost accounting systems	Cost accounting techniques	ABC techniques	Planning	Budgeting	Decision support systems	Performance evaluation	Strategy	Strategic management accounting
Panel A: Before crisis importance									
Traditional cost accounting systems	1.000								
Cost accounting techniques	−0.162	1.000							
ABC techniques	−0.231*	0.205	1.000						
Planning	0.099	0.224	0.212	1.000					
Budgeting	0.112	0.229*	0.212**	0.274*	1.000				
Decision support systems	0.141	0.205**	−0.152	0.141	−0.252	1.000			
Performance evaluation	0.224	−0.184	0.121	0.236	0.222*	0.201	1.000		
Strategy	0.205	0.124	0.231	0.298*	0.231*	0.219	0.136	1.000	
Strategic management accounting	0.222	0.152	0.231*	0.212	0.164	0.204	−0.226	0.321*	1.000
Panel B: During crisis importance									
Traditional cost accounting systems	1.000								
Cost accounting techniques	−0.152	1.000							
ABC techniques	−0.402*	0.204	1.000						
Planning	0.014	0.264	0.214	1.000					
Budgeting	0.052	0.294*	0.272**	0.301*	1.000				
Decision support systems	0.124	0.255**	−0.214	0.122	−0.15	1.000			
Performance evaluation	0.189	−0.134	0.124	0.189	0.233*	0.209	1.000		
Strategy	0.195	0.124	0.244	0.324*	0.249*	0.214	0.122	1.000	
Strategic management accounting	0.236	0.115	0.412*	0.205	0.165	0.204	−0.196	0.364*	1.000
Panel C: Before crisis usage									
Traditional cost accounting systems	1.000								
Cost accounting techniques	−0.144	1.000							
ABC techniques	−0.222*	0.189	1.000						
Planning	0.022	0.205	0.194	1.000					
Budgeting	0.034	0.225*	0.201**	0.274*	1.000				
Decision support systems	0.122	0.199**	−0.124	0.104	−0.222	1.000			
Performance evaluation	0.201	−0.124	0.105	0.205	0.215*	0.189	1.000		
Strategy	0.189	0.105	0.224	0.289*	0.220*	0.204	0.112	1.000	
Strategic management accounting	0.21	0.136	0.224*	0.184	0.144	0.181	−0.201	0.301*	1.000
Panel D: During crisis usage									
Traditional cost accounting systems	1.000								
Cost accounting techniques	−0.152	1.000							
ABC techniques	−0.382*	0.204	1.000						
Planning	0.014	0.264	0.214	1.000					
Budgeting	0.052	0.274*	0.254**	0.301*	1.000				
Decision support systems	0.124	0.244**	−0.214	0.122	−0.15	1.000			
Performance evaluation	0.189	−0.134	0.124	0.189	0.229*	0.209	1.000		
Strategy	0.195	0.124	0.244	0.312*	0.242*	0.214	0.122	1.000	
Strategic management accounting	0.236	0.115	0.401*	0.205	0.165	0.204	−0.196	0.358*	1.000

* Significant at the 0.05 level (two-tailed).
** Significant at the 0.01 level (two-tailed).

Evidently, the statistical significant correlations described between the various factors remain the same before and during the crisis in their importance, as well as in their usage; however, there has been an increase in all these correlations during the crisis in both variables (importance and usage).

4. Discussion and conclusions

This study responds to recent calls from Van Der Stede (2011) regarding the challenges and opportunities in management accounting research in the business environment in the light of the recent economic crisis. As Van der Stede mentions, the global financial crisis occurred between 2008 and 2009 and was followed by a global economic recession. Many researchers investigate the role of various factors and practices within the firms and the institutions, as well as their implications in the financial crisis (e.g., Davies, 2010), such as incentive systems (Bebchuk & Fried, 2010), performance measurement, and risk management; however, it has been argued that problems that arise with these practices do not develop separately from organizational design features, such as governance or the economic climate or even regulatory context (Van Der Stede, 2011). Moreover, Van der Stede suggests that the crisis has provided researchers with many opportunities to continue to investigate topics in management accounting research, some of which have arisen due to the new economic conditions.

To this extent, the purpose of this study has been to investigate the role of various MAP techniques in the management of Greek enterprises before (2008) and during (2013) the country's economic crisis, to assess the change in the usage and perceived importance of these techniques during this period, as well as to enlighten the understanding of management accounting practices among firms in Greece in the period of the recent economic crisis.

For this purpose, two surveys were performed with 301 companies in Greece from various industries: one before the crisis occurred (2008) and the other during the country's economic crisis (2013). The questionnaires in both surveys were filled up mainly by CEO's.

Sixty-two practices were incorporated in the surveys and were further subdivided into 9 panels, according to their actual usage and their perceived importance by the companies: (1) traditional cost accounting systems, (2) cost accounting techniques, (3) ABC techniques, (4) planning, (5) budgeting, (6) decision support systems, (7) performance evaluation, (8) strategy, and (9) strategic management accounting. Data analysis showed that before the crisis, budgeting tools, decision support systems, and strategy techniques were ranked high in importance, as compared to other contemporary management accounting tools, such as ABC systems and strategic management accounting tools, but also traditional cost accounting systems, which occupy the lowest positions. After the crisis, strategy, budgeting techniques, and strategic management accounting tools were ranked the highest in importance, as compared to traditional cost accounting systems, cost accounting techniques, and most of performance evaluation techniques, which are ranked comparatively low.

As far as their usage before the crisis is concerned, the tools that occupy the highest positions in ranking are as follows: (a) budgeting, (b) cost accounting techniques, and (c) strategy, while those that occupy the last positions are as follows: (a) ABC, (b) SMA, and (c) traditional cost accounting systems. During the crisis and regarding their level of usage, the tools that are ranked the highest are as follows: (a) strategy, (b) budgeting, and (c) SMA, while those that are ranked the lowest are as follows: (a) traditional cost accounting systems, (b) performance evaluation, and (c) decision support systems.

Statistical analysis showed that the importance and the usage of ABC systems, planning, strategy, and SMA techniques increased during the crisis, while during the same period the level of importance and usage of traditional cost accounting techniques was decreased. This means that in order to cope with the current financial conditions during the period of the economic crisis and the recession, the companies that participated in the survey were regarded as more important and turned into contemporary costing systems, such as ABC systems, which broadly provide higher quality of information for the cost compared to traditional cost accounting systems. Traditional cost accounting tools were regarded as less important and consecutively were less used during the crisis due to their inherent inability to provide quality information. Information of lower quality may lead to false management decisions. Therefore, the economic crisis imposed the need for more reliable and accurate information, as far as the cost and its role in decision making is concerned. During the crisis, companies were interested in better and more accurate information for cost controlling and cost management, which can be mainly provided by contemporary costing systems. These systems (ABC systems) are now regarded as more appropriate and are more used for management and controlling (ABM), for pricing policies (ABP), as well as budgeting development (ABB), as compared to the period before the crisis.

Moreover, results showed that during the crisis, strategic and planning tools as well as SMA techniques were considered more important and thus were used more extensively by companies as compared to the period before the crisis. The crisis has prompted a more profound analysis by the companies relating to their external environment and their weaknesses and strengths. It also motivated companies to use benchmarking tools to compare themselves with outside organizations and not only their internal environment. For better crisis management, companies implemented contemporary management accounting tools, in particular SMA tools, which can be more effective in tracking the operations of the competitors, their cost, their performance, but also the customer. Data analysis also showed that some tools, such as competitor cost assessment, competitive position motoring, customer profitability analysis, competitor performance appraisal, lifetime customer profitability analysis, strategic cost management, strategic pricing, life cycle analysis, valuation of customers as assets, brand valuation, target costing, and balanced scorecard were regarded as more important and were also more used during the crisis than before. These tools are capable of providing companies with better information regarding the competition, the customer, and the profitability per industry group, but also their external environment.

Our analysis shows that some practices, such as shareholder value analysis and product life cycle analysis, gained in importance and usage during the crisis. These techniques are reported to be relatively low in ranking in other studies that were conducted before the crisis (i.e., Abdel-Kader & Luther, 2006; Chenhall & Langfield-Smith, 1998) and as explained by the authors this might be due to the fact that the existence of such practices may not be known about by companies' management accountants, which are usually carried out by production specialists. Nevertheless, our results show that such techniques gain in importance and usage during the economic crisis. The same aforementioned studies also report high adoption and importance of some strategically focused techniques such as “analysis of competitive position” and budgeting tools, such as budgeting for controlling costs. This is consistent with our results. However, while in the research performed by Chenhall and Langfield-Smith (1998) return on investment (ROI) is a technique that is ranked high, our analysis shows that it lost in importance and usage during the crisis.

Our research shows that the crisis increased the importance and usage of long-term planning techniques, such as long-range forecasting, strategic plans developed with budgets, and strategic plans developed separately with budgets. This means that in this period of economic crisis, companies do not rely on short-term planning and the development of yearly budgets for cost controlling, performance evaluation, and planning day-to-day operations, but they adhere to long-term solutions and create long-term action plans and forecasting, thus trying to incorporate uncertainty in the long-run period to follow.

Management accounting tools, such as decision support systems, some performance evaluation techniques, budgeting, and cost accounting techniques did not display major discrepancies in their importance

and usage before and during the crisis. In particular, most of budgeting techniques are still considered important and are still widely used by management in cost controlling and planning, as they are still ranked very high. This finding is consistent with findings from similar studies (i.e., Hyvonen, 2005). In conclusion, it is evident that the crisis has imposed the need for a better analysis and appraisal of the internal environment of the companies (by using tools, such as ABC and ABM), their external environment (customers, competitors), and also a better strategic planning and management. Statistical analysis also showed that there were no significant differences between listed and non-listed firms or services and non-services firms, as far as their importance and usage is concerned.

The research also identified some correlations between the various techniques and tools in importance and usage. Thus, a correlation analysis showed that there exists a strong and negative correlation between traditional cost accounting systems and ABC systems in importance and in usage, which was intensified during the crisis. This typically means that the crisis directed the companies to turn into contemporary management accounting techniques, as opposed to traditional cost accounting systems. Moreover, the strong and positive correlation that existed before the crisis between ABC systems and SMA tools (in importance, as well as in usage) was increased during the crisis. This shows that managers who regard ABC tools as important and also implement them within their organizations also use SMA tools. This relationship between the two factors is also confirmed by the relevant literature, as some writers fundamentally incorporate ABC tools in SMA tools (Cinquini & Tenucci, 2010). The use of both tools within the organizations results in better management information as regards their internal and external environment. Better information means better crisis management.

Furthermore, some statistical significant correlation exists between other tools under investigation, which are less intense than the ones previously mentioned. For example, positive and statistical significant correlations exist between the following: cost accounting techniques–budgeting, cost accounting techniques–decision support systems, ABC–budgeting, planning–strategy, budgeting–strategy, budgeting–performance evaluation, strategy–SMA. It is somehow obvious that the crisis was responsible for maintaining the correlation between the same factors, as far as their importance and usage is concerned, and was also responsible for intensifying this correlation. This means that when the importance of one tool was increased, the importance of the other tool was also increased. The crisis improved the positive correlation between the importance of the aforementioned tools. The same applied to their usage.

Moreover, the research revealed that between the importance and usage of various practices there exists a strong and positive statistically significant relation before, as well as during the crisis. This typically denotes that the management of the companies under study has been effective. The CEOs who are responsible for strategic decisions apply the various MAP tools, when they think they are important for the company's management. This finding comes in line with findings from relevant studies, which conclude that managers are generally consistent to their perceptions and use practices they regard as important (Israeli et al., 2011).

Overall, the findings of the present study provide a framework to evaluate the response of upper management in the light of an economic crisis, as far as cost accounting systems and their usage is concerned. budgeting and planning remain high in importance and usage after the crisis occurred, while new cost accounting techniques are increasing in importance.

The analysis presented is subject to a number of limitations, some of which are inherent to the survey method itself, such as the use of perceptual measures and the potential of common-method bias. By consistently following the guidelines of Dillman (1999), however, an effort has been made to confine the various effects of these limitations. Also, data were collected from the Greek industry, and consequently, the results may be generalizable only to that population. However, objective data have been used, where possible. Another factor that may affect these results is the disorderliness of the measures used. Typically, an e-mail survey prevents effective assessment of the respondent's actual knowledge on the management accounting practices. An e-mail survey also prevents the respondent from effectively clarifying his or her understanding of the questions.

Future research should consider examining some contingent factors, which can affect the study's results, such as Strategy. Moreover, the study can be extended in other countries with similar economic conditions, such as Ireland and Portugal. Results can then be compared between the countries and useful conclusions can be reached. Also, future research could incorporate CEOs' characteristics (such as age, tenure, educational background) and their skills and examine whether these factors have an impact in the usage of management accounting tools during the crisis. Finally, similar analysis can be carried out per industry group in the same data set, in order to identify which of these groups have been more affected by the crisis. Results would most probably reveal that one such industry is financial companies (banks), an argument that is supported by many researchers, including Van Der Stede (2011).

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