The indirect effect of strategic management accounting in the relationship between CEO characteristics and their networking activities, and company performance

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Abstract

Purpose – The purpose of this paper is to investigate the effect of chief executive officer (CEO) characteristics and involvement in networks on strategic management accounting (SMA) and, in turn, the indirect effect of SMA on company performance.

Design/methodology/approach – A model is advanced and tested using partial least-squares path modelling and data were collected from a sample of 121 service small and medium-sized enterprises (SMEs) in Malaysia.

Findings – The results indicate significant and positive relationships between the CEO education and the application of SMA as well as between involvement in networks and SMA. Moreover, it is found that SMA has an indirect effect in relations of CEO education, involvement in networks and company performance.

Practical implications – SMEs' leaders may realize their important role in affecting outcomes by their choices, which are in turn affected by their characteristics and activities.

Originality/value – This study provides an empirical evidence on the impact of two new factors on the SMA by considering contingency theory and upper echelons theory simultaneously for explaining relationships and developing a new model.

Keywords Contingency theory, Upper echelons theory, CEO characteristics,
Involvement in networks, Small and medium enterprises, Strategic management accounting

Paper type Research paper

1. Introduction

Typically, the decision-making process in small and medium-sized enterprises (SMEs) is highly centralized, and chief executive officers (CEOs) play a key role in important decisions, such as the adoption of new practices (Ahn *et al.*, 2014; Lubatkin *et al.*, 2006; Papadakis and Barwise, 2002). According to upper echelons theory, the psychological and social characteristics of top executives drive their behaviour and shape their organization outcomes (Hambrick, 2007; Hambrick and Manson, 1984). With this as a starting point, this

paper focuses on three important characteristics of CEOs, namely, their education, experience, and involvement in networks. Management accounting and control systems (MACS) can be seen as an organizational outcome or as an aspect of organizational structure (Hiebl, 2014; Strauß and Zecher, 2013) and, consistent with upper echelons theory, is likely to be influenced by CEO characteristics and activities (Kalkhouran *et al.*, 2015). The theory also argues that the personality, experience and activities of top managers significantly influence their strategic choice. (Hambrick, 2007). Strategic management accounting (SMA) as one of the management accounting practices, which have strategic orientation and developed owing to widely published criticisms of conventional management accounting practice (Cadez and Guilding, 2008), can be affected by CEO characteristics and activities. In this regard, review of previous literature supported the association between the CEO-related factors and MACS (Naranjo-Gil and Hartmann, 2006, 2007). However, very few studies have investigated the relationship between CEO characteristics, their involvement in networks and SMA.

In addition, in the way of developing an appropriate SMA framework for SMEs, this study adopts a contingency perspective. Based on the basic principle of contingency theory, there is no single MACS suitable for all businesses (Chenhall, 2003). Drawing upon contingency theory, the dependant variable in the model is company performance. The fundamental tenet of contingency theory holds that company performance is a product of an appropriate fit between the structure (SMA system) and context (contingency factors). Consequently, it is assumed that both high- and low-performing companies exist as a result of more or less compatible combinations of context and structure (Gerdin and Greve, 2004; Ittner and Larcker, 2001). Stated alternatively, good fit implies enhanced performance, while poor fit implies diminished performance (Chenhall, 2003). This study uses contingency theory in conjunction with upper echelons theory. The aim is to find the best fit between CEO characteristics (education, experience) and their involvement in networks, and SMA to improve firm performance. Although earlier empirical research examined the relationship between CEO characteristics and company performance, the findings are inconsistent. Some studies found a positive relationship (Kaplan *et al.*, 2012; Peni, 2012; Kalm, 2012; Kenny and Fahy, 2011; Tendai, 2013), while others have noted a significant negative relationship (Amran *et al.*, 2014; Hamori and Koyuncu, 2015). Furthermore, a few studies have failed to find any association (Bhagat *et al.*, 2010; Peng and Luo, 2000). These mixed results motivated this investigation into the factors that may affect the relationship between CEO characteristics and company performance. Therefore, this study focuses on the indirect effect of SMA. However, to the best of the authors' knowledge, no study has investigated the indirect effect of SMA practices in the relationship between CEO characteristics and involvement in networks, and firm performance. Therefore, the second objective of this research is to examine if there is an indirect effect of SMA techniques in the relationship between CEO characteristics, involvement in networks and performance.

Finally, there is still a relative dearth of empirical research into SMA practices in the SME context (Santini, 2013). It is not surprising, as, traditionally, SMEs were understood to not need or use MACS owing to their simple structure and limited resources. Recent findings in both developed and developing countries have shown the importance of such practices for SMEs (Ahmad, 2013; López and Hiebl, 2015). Therefore, this study offers valuable information by enhancing awareness and knowledge related to usage and role of SMA in the SMEs context. It also provides a better understanding of the role of CEOs in SMEs. It may help them to understand the significant influence of their choices on outcomes, choices that are in turn affected by individual characteristics and activities.

The remainder of this paper is structured as follows. Section 2 examines the concept of SMA. Section 3 proposes a contingency-based framework for SMA and develops a set of testable hypotheses. Section 4 describes the research method and summarizes the findings. Finally, Section 5 proposes some conclusions and outlines the most important issues arising from the study.

2. Background

2.1 Strategic management accounting

Conventionally, management accounting has focused on the provision of historical financial information. This is gradually being replaced by a new trend that takes a more proactive stance, arising from interest in competitive management information that generates value for the firm (Cadez, 2006; Hoffjan and Wompener, 2005). These advanced practices are often overtly strategic, and use both past and future, non-financial and financial data gathered from internal and external sources (Kalkhouran et al., 2015; Abdul Rasid et al., 2011). Interest in SMA seems to have been motivated by widespread criticism of traditional management accounting practice (Bhimani and Bromwich, 1992). This has led to their reconsideration, integrating a strategic role based on a range of relatively new methods in the fields of investment appraisal, costing and performance management (Cadez and Guilding, 2008).

2.2 Definitions and techniques

SMA first appeared in a paper by Simmonds (1981). Simmonds described it as the analysis of management accounting (MA) information related to a business and its competitors to develop strategy. While there has been increased interest in SMA in recent years, there is as yet no universally accepted SMA framework, and the area is still in the process of being defined (Cadez and Guilding, 2008; Roslender and Hart, 2003). Table I summarizes the various SMA definitions.

Here, we use Cadez and Guilding's (2008) perspective, whereby SMA can be considered as a set of strategically oriented accounting practices. While many studies have examined different SMA techniques (Cadez et al., 2005; Cadez and Guilding, 2012), most have focused on large-scale enterprises (Cescon et al., 2013; Cadez and Guilding, 2008). Only a few studies have looked at the adoption of SMA techniques in the SME context (Ahmad, 2013; Santini, 2013).

Authors	SMA definition
Simmonds (1981)	The analysis of MA information related to a business and its competitors to develop business strategy
Dixon (1998)	A mean which helps an organization to know more about its environment, to put more effort into expecting changes and to be more adjustable in the face of change
Bromwich (1990)	It is observed as going beyond gathering information on businesses and their competitors, to covering the advantages that products offer to customers, and how these advantages contribute to building and sustaining competitive advantage
Hoque (2004)	A process of identifying, gathering, choosing and analysing accounting data for helping the management team to make strategic decisions and to assess organizational effectiveness
Cadez and Guilding (2008, 2012)	SMA can be considered as a set of strategically oriented accounting techniques

Table I.
SMA definitions

2.3 Upper echelons theory

The central idea of upper echelons theory states that the organization is a reflection of its top managers (the so-called "upper echelons") (Hambrick and Manson, 1984). The theory acknowledges that the characteristics of individual top administrators affect their strategic choices. Hambrick and Manson (1984) further postulated that these strategic choices help to describe the performance of an organization. The theory is founded on two interrelated ideas:

(1) executive's actions are based on their personal interpretation of the strategic circumstances they face; and

(2) these individual constructs are a function of their personality, experience and values (Hambrick and Manson, 1984).

Past decades have seen increasing academic interest in top managers (Wei *et al.*, 2005; Kaplan *et al.*, 2012). Upper echelons theory has accompanied and most likely fostered this upsurge (Finkelstein *et al.*, 2009; Nielsen, 2010). More recently, scholars have drawn upon it to analyse the association between the characteristics of top executives and MA and control systems (Hiebl, 2014). The theory argues that the personality, experience and values of top managers significantly affect their interpretation of the situations they face and, in turn, influence their strategic choices (Hambrick, 2007). Hambrick and Manson (1984) highlight the influence of top managers on "administrative complexity", composed of several key ingredients:

• thorough formal planning systems;

• complex structures;

• coordination devices;

• detailed budgeting; and

• incentive compensation schemes.

These elements can be collectively grouped as MA or control systems (Chenhall, 2003; Guenther, 2013) and seen as an organizational outcome or as an aspect of organizational structure (Chenhall, 2003; Strauß and Zecher, 2013). Consistent with this view, in their influential paper on management control systems, Malmi and Brown (2008) acknowledged that organizational controls are something that managers can change, as opposed to something that is imposed on them. Consequently, we can assume that the characteristics of top managers are very influential in the design of MA and control systems (Hiebl, 2014).

This study examines two important CEO characteristics and their involvement in networks to determine how these factors influence the adoption of SMA practices in their enterprises.

2.4 The SMA conceptual framework

The basic principle of contingency theory holds that company performance depends on the match between its structure (SMA usage) and context (contingent variables). Thus, high (low)-performance firms reflect more (less) good matches between structure and context (Gerdin and Greve, 2004). A good fit indicates improved performance, while a poor fit indicates poorer performance (Chenhall, 2003).

A parallel objective of this paper is to develop a new SMA contingency-based framework, founded on a systems approach (Van de Ven and Drazin, 1985). It is in the form

of contingency theory which takes a holistic, universal approach to the examination of interdependencies in corporations (Chenhall and Langfield-Smith, 1998; Selto *et al.*, 1995).

Assuming that the objective of contingency-based MA research is to examine a model that includes accounting systems, contingency factors and outcome variables (Fisher, 1995), this study constitutes a step in the desired direction (Cadez and Guilding, 2008). The framework is used here to examine the association between contingent variables, namely, CEO characteristics and their involvement in networks, and the use of SMA techniques. These techniques are at the heart of the model. Consistent with earlier contingency-based research (Chenhall and Langfield-Smith, 1998; Gerdin, 2005), various dimensions of SMA are modelled at a general level. The dependent variable in the model is company performance. The proposed framework is illustrated in Figure 1.

3. Hypotheses
This section reviews the SMA literature that forms the basis for hypotheses related to:

- contingent variables (CEO characteristics and their involvement in networks) and their predicted association with SMA; and
- the relationship between SMA and company performance.

3.1 CEO characteristics and SMA usage
Among the key characteristics of CEOs are quantifiable and observable features such as education and previous work experience (Jorissen *et al.*, 2002, 2008). Education has been identified as a good indicator of an individual's perceptions, values and cognitive preferences (Hambrick and Manson, 1984; Hambrick, 2007). It is one aspect of human capital, and its role in business survival has received much attention from scholars (Soriano and Castrogiovanni, 2012; Boden and Nucci, 2000; Cooper *et al.*, 1994). Moreover, it can be very influential in companies' strategic decisions (Papadakis, 2006) and a high level of formal education can improve a company's knowledge resources (Hambrick and Manson, 1984).
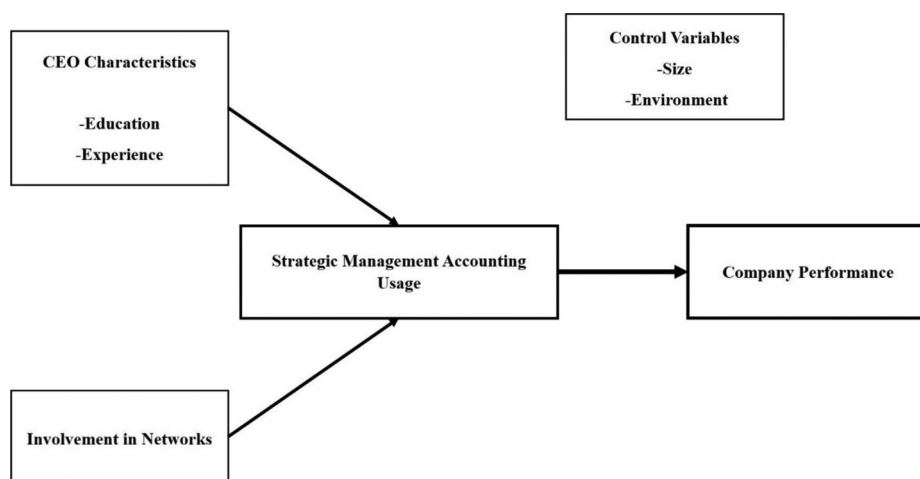

Figure 1.
Contingency model of strategic management accounting

Top administrators also have considerable experience gained from their operational responsibilities. Firms can benefit from their long tenure in the same position (Peni, 2012), as they develop richer, more comprehensive knowledge about the company (Finkelstein, 1992; Peni, 2012). They are able to interpret and perceive situations drawing upon their operational knowledge and training (Barker and Mueller, 2002; Hambrick and Manson, 1984; Peni, 2012). As CEOs may favour a particular strategy as a function of their experience (Hambrick and Manson, 1984), their career track is expected to be a significant factor.

The literature confirms that a high level of CEO education and experience indicates a high level of ability to develop strategic decisions, innovate and process information (Xiaowei and Zhang, 2010; Naranjo-Gil *et al.*, 2009; Finkelstein and Hambrick, 1996). It also shows that individual CEOs can have a key role in deciding the direction of the company (Ahn *et al.*, 2014). Therefore, as CEOs of small and medium-sized firms are more constrained and have greater opportunities to act than their counterparts in big firms, their impact is likely to be more pronounced (Daily and Dalton, 1992).

As stated earlier, an educated and experienced CEO enhances a firm's information and knowledge resources (Hambrick and Manson, 1984). Combined with the important role that these individuals play in strategic decision-making (Xiaowei and Zhang, 2010, Papadakis, 2006), the relationship between CEO characteristics and SMA appears interesting. We predict that higher levels of education and experience are consistent with greater use of SMA techniques, as top managers seek to deploy their knowledge resources more effectively and efficiently. Specifically, we predict that they are more open to changing existing systems to make greater use of SMA. Therefore, the following hypotheses are proposed:

H1. There is a positive relationship between CEO education and the extent of adoption of SMA techniques.

H2. There is a positive relationship between CEO work experience and the extent of adoption of SMA techniques.

3.2 Involvement in networks and SMA usage
Involvement in networks is another contingent variable that has been recognized as an area of concern for mangers of SMEs, and one that should be given more attention by companies (Minai *et al.*, 2012). SMEs must participate in the global business world or marketplace (Zizah *et al.*, 2007). This was underlined in the study by Eberhard and Craig (2013), who found a positive relationship between interpersonal networking and SME's exploration of international markets.

The second subordinate idea in upper echelons theory argues that the demographic characteristics can be used as "valid, albeit incomplete and imprecise, proxies of executives' cognitive frames" (Hambrick, 2007). However, it is generally accepted that use of demographic indicators alone fails to address the psychological and social processes that drive executive behaviour (Lawrence, 1997), and it is also important to focus on social processes, in this case, involvement in networks.

Networking activities enable SME owner/managers to formulate strategies to gain a competitive advantage (Beal and Yasai-Ardekani, 2000; Jorissen *et al.*, 2002). This requires environmental and future-oriented information (Cadez and Guilding, 2008). SMA, with its strategic focus, can provide this information. We predict that increased involvement in networks leads to a greater need for strategically oriented information such as that provided by an SMA system. Based on the above, the following hypothesis is proposed:

H3. There is a positive relationship between involvement in networks and the extent of adoption of SMA techniques.

3.3 SMA usage and company performance

The relationship between the adoption of MA and organizational performance has been the subject of much empirical research. Most studies support the idea that greater adoption of MA (broad-scope information) is positively associated with organizational performance (Baines and Langfield-Smith, 2003; Cravens and Guilding, 2001; Hoque and James, 2000; Mahama, 2006). However, very few studies have investigated the relationship between SMA and company performance (Cadez and Guilding, 2008; Chenhall and Langfield-Smith, 1998; Şener and Dirlik, 2012). It has been argued that business leaders draw upon SMA as an information support in strategic decision-making and control activities (Cinquini and Tenucci, 2010). Therefore, management activities that involve the use of competitive strategies and methods reflect an investment in the long-term performance of the business (Aykan and Aksoylu, 2013). We predict that better information (provided by SMA) improves the effectiveness of administrative decisions, which in turn improves organizational performance (Baines and Langfield-Smith, 2003).

Accordingly, the following hypothesis is proposed:

H4. There is a positive relationship between the extent of adoption of SMA techniques and company performance.

3.4 CEO characteristics and involvement in networks, SMA and firm performance

H1, H2, H3 and *H4* postulate that SMA usage has the indirect effect in the relationship between the CEO characteristics and involvement in networks and performance. An indirect effect relationship exists when the relationship between independent and dependent variables exists through a third variable. In that case, the third variable has the indirect effect in the relationship between the other two variables (Xiao *et al.*, 2011). Therefore, if *H1, H2, H3* and *H4* are supported, then use of SMA has an indirect effect in the relationship between CEO characteristics and involvement in networks and performance (see Figure 1).

Based on the above, the following hypotheses are proposed:

H5. There is a positive indirect effect of SMA in the relationship between CEO education and company performance.

H6. There is a positive indirect effect of SMA in the relationship between CEO work experience and company performance.

H7. There is a positive indirect effect of SMA in the relationship between CEO involvement in networks and company performance.

4. Method

The model presented here is in two parts, the measurement model (the outer model) and the structural model (the inner model). The measurement model concentrates on the association between latent variables (constructs) that cannot be directly determined and measurable (observed) indicators (Henseler *et al.*, 2009). The structural model focuses on the hypothesized associations between the constructs (Hair *et al.*, 2013). All of the items used in this research are considered to be reflective measures.

4.1 Data collection and sample

An online survey was carried out to collect data from target respondents, who are managers and directors mostly working in accounting and finance (such as finance managers and senior accountants), as they were expected to have a good understanding of accounting procedures, company practice and CEOs characteristics and activities[1], in service sector SMEs. To determine the population of this study, reference was made to a sampling frame that was obtained from the SME business directory in year 2015. One thousand service SMEs operating in Malaysia were randomly selected using a probability sampling technique. The main intention for adopting proportionate stratified random sampling was to reduce the variability between the samples by creating relatively homogenous strata. Through classifying the sampling frame into non-overlapping service activities, as shown below in Table II, the variation attributed to the services industries effect could be reduced. Subsequently, the sample was drawn from each stratum (i.e. service activity) proportionate to the relative size of that stratum in the total population to ensure that each firm had an equal chance to be selected. Of the 1000 questionnaires that were sent, 129 were returned, representing a response rate of about 12.9 per cent. Of the surveys that were returned, eight were excluded because they were incomplete. The final sample therefore consisted of 121 complete responses, a response rate of 12.1 per cent. To exclude any potential response bias, the first 37 responses were compared to the last 84 responses using the independent-samples *t*-test (Hair *et al.*, 2010). The analyses showed that for all constructs, the difference in the means of earlier and later responses was not significant.

4.2 Measurement of variables

The initial questionnaire was pre-tested and later modified based on discussions between seven academics and SME managers. The questionnaire aimed to collect data on the effect of CEO characteristics and involvement in networks on SMA usage and the indirect effect of SMA on company performance.

4.2.1 SMA usage. SMA techniques were based on the 16 SMA indicators developed by Cadez and Guilding (2012). Value stream costing (based on Fullerton *et al.*, 2013) and customer segment profitability analysis (Guilding and McManus, 2002) were added to complete the list. SMA usage was measured on a five-point Likert scale ranging from 1 (not

Service activities	Frequency	(%)
Computer and related services	15	12.4
Education	14	11.5
Health services	12	10
Hotels	9	7.4
Insurance	11	9.1
Post and telecommunication	12	10
Professional (i.e. consultancy, engineering, legal firms)	17	14
Restaurants	6	4.9
Transportation	11	9.1
Wholesale and retail trades	12	10
Others	2	1.6
Number of employees		
Small	39	32.2
Medium	82	67.8

Table II.
Demographic
statistics

at all) to 5 (to a great extent). Following the pre-test, definitions of some SMA techniques were added to the questionnaire to clarify respondent's understanding.

4.2.2 CEO characteristics. This measure drew on the instrument developed by Ahn *et al.* (2014) to assess the status of the firm's CEO. The measure simply asks respondents to indicate their level of qualifications and years of experience. Level of education was assessed on a five-point ordinal scale, where 1 corresponded to secondary school and 5 to a doctoral degree. Experience was measured by the length of work experience in the surveyed firms using a five-point ordinal scale, where 1 corresponded to less than five years' work experience and 5 to more than 20 years.

4.2.3 Involvement in networks. This measure was based on the instrument developed by Jorissen *et al.* (2002). The instrument considers two important aspects of networking, namely, frequency of contacts with relevant parties and participation in activities that involve the CEO or other directors. Involvement is measured using a five-point Likert scale ranging from 1 (not at all) to 5 (to a great extent).

4.2.4 Company performance (dependent variable). This study used the instrument adopted by Jusoh *et al.* (2008), following Mia and Clarke (1999) and Govindarajan (1984), to measure company performance. The instrument enables outcomes to be compared. The scale is based on multiple indicators and incorporates quantitative, qualitative, financial and non-financial performance (Mia and Clarke, 1999). Respondents were asked to indicate their company's performance relative to their competitors using 12 indicators on a scale ranging from "1" (below average) to "5" (above average).

4.2.5 Control variables. Size and environment were considered as control variables. To realize whether there is an important dissimilarity between coefficients, scholars require to use the partial least-squares structured equation modelling (PLS-SEM) multigroup analysis (PLS-MGA). It is presumed that there is a categorical moderator factor (e.g. size) that effects the relations in the PLS path model. The main goal of multi-group analysis is therefore to reveal the influence of these categorical moderator factors (Hair et al, 2013, 2014). This study adopted the nonparametric process which is proposed by Sarstedt *et al.* (2011). This study based on the nonparametric PLS-MGA considered the effect of firm size and environment on path coefficients of relationships in the model of this study. As this study focuses on SMEs, thus observations are divided based on small and medium-sized companies as well as high and low environmental uncertainty. According to the sample of study, there are 39 small and 82 medium firms. Results indicated that there is no significant difference in the effect of most relationships with regard to the firm size and environment.

Several statistics confirmed the factorability of the items. Statistics from Bartlett's test of sphericity were significant for all factors, and the Kaiser–Meyer–Olkin measures of sampling adequacy were greater than 0.60. All Cronbach's alphas exceeded 0.70 (Nunnally, 1978), in support of the satisfactory internal reliability of measures. The descriptive statistics, based on the weighted average scores of the multi-item variables, appear in Table III.

Variables	Mean	SD
SMA	3.15	1.103
CEO education	3.55	0.801
CEO experience	3.23	1.118
Involvement in networks	3.3	0.916
Company performance	3.42	0.92

Table III.
Descriptive statistics

4.3 Data examination
SmartPLS 3.0 and SPSS 21 were used to analyse the model and estimate the quality of the survey data. SmartPLS is a second-generation PLS-SEM method that has been applied in other accounting research (Hall, 2008). PLS-SEM was used for various reasons: it performs well under small sample size and non-normal conditions and imposes minimal demands on measurement scales (Henseler *et al.*, 2009). The PLS approach was used to estimate the model because its formal premises make it applicable to a range of flexible applications (Hoeck *et al.*, 2010).

Each completed questionnaire was screened for errors and omissions. Normality tests were not necessary, as PLS regression analysis does not require the data to be distributed normally (Chin *et al.*, 2003). Instead, as in earlier PLS research, fit was assessed by the overall significance of the relationships between latent variables and the explained variance of endogenous constructs (Chapman and Kihn, 2009). Three exogenous (independent) variables and two endogenous (dependent) constructs were used in this research. The number of items used to measure each of the constructs ranged from 9 to 18. CEO characteristics (education and experience) were considered as single item constructs, measured by a single indicator (Falk and Miller, 1992). These constructs can be used like any other variable in SmartPLS because the trait (education) increases with the response. A value of 2 (short-term vocational education) indicates less education than 5 (doctoral level). The variable is therefore ordinal, rather than categorical. Therefore, it is included in SmartPLS as the only indicator of a latent variable.

4.4 Model assessment
4.4.1 Internal consistency. The two most common methods used to evaluate internal consistency are composite reliability (CR) and Cronbach's alpha (Hulland, 1999). As Cronbach's alpha has some restrictions in the sample population, it was better to apply CR, which is generally interpreted in the same way as Cronbach's alpha. In exploratory research, CR values of 0.60-0.70 are acceptable. However, in advanced studies, values of 0.70-0.90 are considered satisfactory (Nunnally and Bernstein, 1994). Table IV shows the CR for the reflectively measured constructs used in this study. This shows that the criterion is met, as the CR is above 0.70.

4.4.2 Convergent validity. To establish convergent validity, most researchers consider outer loadings of items and the average variance extracted (AVE). At a minimum, all items' outer loadings should be statistically significant. Because a significant outer loading could still be fairly weak, a common rule of thumb is that the (standardized) outer loadings should be 0.7 or higher (Hair *et al.*, 2014). Rather than automatically eliminating indicators when their outer loading is below 0.70, researchers should carefully examine the effects of item removal on the CR and on content validity. Generally, indicators with outer loadings of 0.40-0.70 should be considered for removal from the scale only if, by deleting the indicator, the CR increases (Hair *et al.*, 2013). Indicators with outer loadings below 0.40, however, should always be eliminated from the scale (Hair *et al.*, 2011).

	Composite reliability
Networks	0.852
PERFORMANCE	0.912
SMA usage	0.906

Table IV.
CR for reflectively measured constructs

An AVE value of 0.50 or higher indicates that, on average, the construct explains more than half of the variance of its indicators. On the other hand, an AVE of less than 0.50 indicates that, on average, more errors remain in the items than the variance explained by the construct (Henseler *et al.*, 2009). Therefore, the desired level for convergent validity are outer loadings more than 0.7 and an AVE value of 0.50 or higher. To meet these criteria, several indicators were eliminated. Specifically, five networking indicators (NET1, NET2, NET3, NET4 and NET 5), 11 SMA usage (SMA1, SMA2, SMA3, SMA4, SMA5, SMA6, SMA12, SMA13, SMA14, SMA15 and SMA18) and seven performance indicators (PER4, PER5, PER6, PER9, PER10, PER11, and PER12) were removed. Following elimination, all of the constructs presented here meet the AVE requirement. Table V shows the convergent validity for reflectively measured constructs in terms of outer loadings and AVE.

4.4.3 Discriminant validity. Discriminant validity depends on whether each construct shares more variance with its measures than with other constructs in the model (Chin, 1998; Hulland, 1999); thus, the square root of the AVE must exceed the construct intercorrelations in the model. As Table VI reveals, the construct intercorrelations in the model did not exceed the square root of the AVE for the constructs. Therefore, the psychometric properties of the instruments were adequate to support our interpretation of the structural model.

Constructs and measurement items	Standardized loadings	Average variance extracted
Involvement in networks (NET)		0.591
NET6	0.758	
NET7	0.824	
NET8	0.77	
NET9	0.721	
Firm performance (PERFORMANCE)		0.676
PER1	0.842	
PER2	0.865	
PER3	0.832	
PER7	0.821	
PER8	0.744	
Strategic management accounting techniques (SMA)		0.548
SMA10	0.744	
SMA11	0.759	
SMA13	0.701	
SMA16	0.729	
SMA17	0.725	
SMA7	0.736	
SMA8	0.785	

Table V.
Convergent validity for reflectively measured constructs

	Education	Experience	Networks	PERFORMANCE	SMA usage
Education	1				
Experience	0.33	1			
Networks	0.38	0.37	*0.769*		
PERFORMANCE	0.35	0.276	0.363	*0.822*	
SMA usage	0.323	0.544	0.452	0.406	*0.74*

Table VI.
Discriminant validity for reflectively measured constructs (Fornell–Larcker)

4.5 Structural model

According to Hair *et al.* (2013) and Henseler *et al.* (2009), evaluating the inner model consists of several steps. The first is to assess the amount of variance explained in the endogenous constructs (R^2). R^2 is a measure of the model's predictive accuracy and is calculated as the squared correlation between a specific endogenous construct's actual and predicted values. The R^2 value ranges from 0 to 1, with higher levels indicating higher levels of predictive accuracy. It is difficult to provide a rule of thumb for acceptable R^2 values, as this depends on the model complexity and the research discipline (Hair *et al.*, 2013). According to Cohen (1988), R^2 values of 0.2, 0.13 and 0.26 are considered as small, medium and large, respectively. In this study, R^2 values for SMA and PERFORMANCE are 0.34 and 0.142, respectively (Table VII). This indicates that the ability of the model to explain variance ranges from moderate to substantial (Cohen, 1988).

4.6 Hypotheses testing

The structural model represents the hypothesized relationships between constructs. The path coefficient (β) shows the power of the relationship between the latent variables (Idris and Mohammad, 2014). Whether a coefficient is significant ultimately depends on its standard error that is obtained by means of bootstrapping. The bootstrap standard error makes it possible to compute the empirical t-values (Hair *et al.*, 2013, Henseler *et al.*, 2009). When this value is greater than a critical value, we can say that the coefficient is significant at a certain error probability (i.e. significance level). Commonly used critical values for two-tailed tests are 1.65 (significance level = 10 per cent), 1.96 (significance level = 5 per cent) and 2.57 (significance level = 1 per cent) (Hair *et al.*, 2011). Overall, the results show that all path coefficients were statistically significant at 0.05 levels (Table VIII). Rather than simply reporting the significance of a parameter, it is also valuable to report the bootstrap confidence interval, as it provides additional information on the stability of a coefficient estimate. If zero does not fall in this confidence interval, we can conclude that the outer weight is significant (Hair *et al.*, 2014, Henseler *et al.*, 2009). As Table VIII shows, education and networking were positively and significantly correlated with SMA usage, while experience was positively but not significantly correlated. This provides support for *H1* and *H3*. Moreover, SMA and PERFORMANCE were positively and significantly correlated, which supports *H4*.

H5, *H6* and *H7* stated indirect effect of SMA in the relationships between contingency variables and company performance. To examine the indirect effect, the PLS algorithm and

	R^2
PERFORMANCE	0.142
SMA usage	0.34

Table VII.
Structural model evaluation

	Suggested direction	β	t-value	Support
Education -> SMA usage	+	0.381	4.54	Yes
Experience -> SMA usage	+	0.028	0.38	No
Networks -> SMA usage	+	0.312	3.922	Yes
SMA usage -> PERFORMANCE	+	0.299	3.15	Yes

Table VIII.
Path coefficient and hypothesis testing

bootstrapping procedures with 1000 resamples were ran on the full model to obtain the path coefficient and the significance level of these paths. As illustrated in Table IX, all paths other than experience were statistically significant, which provides empirical evidence of an indirect effect. To examine the statistical significance of the indirect effect, bootstrapping procedures with 5000 resamples were used (Preacher and Hayes, 2008). Based on the bootstrapping analysis, shown in Table IX, the indirect effect $\beta 1 = 0.0933$ was significant with a t-values of 2.23. Therefore, it can be concluded that the indirect effect of SMA is statistically significant in the relation between education and PERFORMANCE. The bootstrapping procedure demonstrates that the indirect effect $\beta 2 = 0.0798$ was significant with a t-values of 2.35, which confirmed the indirect effect of SMA in the relation between networking and PERFORMANCE.

5. Discussion and conclusion
This study makes several contributions to the literature. First, it offers a conceptual SMA framework that expands on the earlier literature. Second, it uses quantitative empirical data to examine several hypotheses developed from contingency theory. The results support the main postulates of contingency theory, which states that organizational performance depends on the fit between its structure and context. Three factors (qualifications, experience and involvement in networks) were shown to have a potential contingency-based relationship with SMA. The result from the PLS path model supports most of the hypothesised relationships. In particular, SMA usage is positively associated with education and involvement in networks. In turn, SMA usage is shown to have a positive effect on company performance. This finding confirms the important role of SMA practices in SMEs in improving performance. It seems likely that SMA usage and other competitive strategies and techniques are indicators of an investment in its long-term performance (Aykan and Aksoylu, 2013).

The PLS path model fit was statistically significant and indicated an indirect effect (Gerdin and Greve, 2004), which provides support for the contingency theory premise. Moreover, the relatively large proportion of explained variance in SMA usage and company performance shows that these factors are relevant in the SMA framework. The results showed that education is indirectly related to company performance through SMA. This finding is unsurprising within the framework of upper echelons theory (Hambrick and Manson, 1984). MACS can be seen as an organizational outcome or as an aspect of organizational structure (Chenhall, 2003; Strauß and Zecher, 2013), and the characteristics of top managers can affect their design (Hiebl, 2014; Malmi and Brown, 2008; Naranjo-Gil and Hartmann, 2007).

SMA can provide information support for strategic decision-making and control activities and, consequently, assist businesses to achieve profitability (Cinquini and Tenucci, 2010). It can be concluded that SMA has a significant indirect effect in the relationship between education and company performance. The same argument can be extended to the role played by SMA in the relation between involvement in networks and company performance. On the other hand, the findings showed that the relationship

Hypotheses	Indirect effect	t-value	Support
EDU-> SMA-> PERF	$\beta 1 = 0.0933$	2.2336	Yes
Networks-> SMA-> PERF	$\beta 2 = 0.0798$	2.3529	Yes

Table IX.
Hypotheses test for indirect effect

www.

between experience and SMA usage was not statistically significant (despite positive beta path coefficients).

As contingency-based management accounting research is often criticized for the piecemeal way in which it is conducted (Chenhall and Langfield-Smith, 1998; Fisher, 1995; Cadez and Guilding, 2008), this study contributes to the literature by examining the effect of upper echelon characteristics and SMA practices on company performance. If the goal of contingency-based management accounting studies is to examine a model that includes several accounting systems, several contingent variables and several outcome variables (Fisher, 1995), this study is a step in the right direction. A further contribution is to increase the explanatory power of management accounting research.

Overall, the study contributes to knowledge by integrating contingency theory and upper echelons theory into a new framework that is empirically tested. The model provides insights into the relations between contingency factors (independent variables) and company performance (dependent variable) via the indirect effect of SMA. The study also extends knowledge about the contingent variables that affect SMA use in SMEs. It considers three important factors (education, work experience and involvement in networks). The results confirm that these three novel factors, which emerge from upper echelons theory, should be added to the contingency paradigm as new variables that significantly influence SMA use. In addition, while contingency theory emphasizes the importance of the indirect effect of MACS in the relationship between contingency factors and organizational performance, only a few studies have evaluated the role of SMA (Cadez and Guilding, 2008; Santini, 2013). Thus, this study expands on the SMA literature.

However, the study has a number of limitations. First, it does not take into account the possible effects of different industry categories. In the context of contingency theory, it might be valuable to focus on a sample from one specific category of service activities. Such a sample would be more standardized and may predict the adoption of certain kinds of SMA techniques. In turn, this might make the contribution of contingent variables to dissimilarities clearer. In addition, a case study could highlight dissimilarities and provide a detailed rationale outlining how and why different techniques are used or not.

Furthermore, this study concentrated on the service sector. The design of the sample thus limits the generalizability of the findings. Therefore, future studies could look at more than one segment. Finally, the limitations of the survey method mean that the results should be treated with caution. Future work that adopts a more intensive, case study methodology has great scope to improve our understanding of the drivers and outcomes of SMA adoption.

Note

1. Kindly it was requested in the cover letter of the questionnaire that the parts related to the CEOs field by themselves, if target respondents do not have enough information about CEOs' characteristics and activities.

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