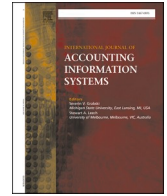




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Disentangling the effects of top management on management accounting systems utilization[☆]

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ABSTRACT

Top managers have a decisive role in managing business organizations, including linking the effective use of their organizational resources with the corporate strategy. This study aims to analyze the influence of top management support on the utilization of management accounting systems (MAS) in SMEs. For this purpose, we explored the mediating role of four variables related to organizational decision-making orientation and user issues and concerns. The findings of our study suggest that top management can use these variables to improve the utilization of the information provided by MAS in the SMEs' decision processes. They also show the decisive role of user satisfaction and training in improving MAS utilization. We discuss these findings and present theoretical and practical contributions to the management accounting literature.

1. Introduction

Small and medium-sized enterprises (SMEs) significantly contribute to world economic growth, representing 99,8 % of all businesses in European countries, including Portugal (Gorgels et al., 2022). During past economic crises, SMEs showed high resilience and the ability to transform themselves and adapt to the global market's needs. With fewer financial and human resources than large companies, SMEs resort to innovative organizational solutions, making them less formal, more agile, and consequently more competitive. These characteristics were decisive in overcoming their most significant challenges during the pandemic COVID crisis when they were forced to change their processes and rapidly integrate digital technology (Perdana et al., 2022) while increasing competitiveness.

In this competitive context, information management is a central issue for managers of SMEs who want to compete in the global marketplace. These managers need frequently updated and reliable information about their company's functional areas to plan and control operational activities effectively. They also need external information to quickly respond to market changes and align their resources with their corporate strategy (Latifah et al., 2021).

Therefore, SMEs should have management accounting systems (MAS) that include information with these characteristics and are not restricted only to productivity and costs (Sharma et al., 2006). The MAS development and utilization also need to be focused on the type and quality of the information they should provide (Ghasemi et al., 2019). Given the specific organizational nature of each SME and the recent challenges relating to digital capabilities (Rikhardsson and Yigitbasioğlu, 2018) and environmental requirements

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(Solovida and Latan, 2017), this is not an easy task.

In this context, management accounting systems (MAS) have undergone substantial changes to adapt to new technological and environmental realities (Chenhall and Moers, 2015) and have become an increasingly valuable instrument to support the managers' decision-making processes (Soobaroyen and Poorundersing, 2008).

Several organizational factors can improve MAS and, consequently, the quality of decision processes. The top managers' support (TMS) for their implementation and use is one of the most relevant contributions to achieving high effectiveness levels of MAS (Firk et al., 2019). In a highly competitive context where continuous improvement of resources and processes is essential, TMS plays a critical role in reducing barriers to change (Chanegrih, 2008). It can contribute to the development and use of the MAS through technological innovation (Clohessy and Acton, 2019). It also can play a decisive role in integrating and using environmental information, which is one of the most important competitive factors today (Wang et al., 2019b).

However, TMS does not always extract the same levels of effectiveness from MAS or even achieve the planned objectives. These differences in the research results may indicate the lack of analysis of other organizational variables through which top managers influence the increasing use of information MAS provides.

Based on a comprehensive literature review, we found a lack of recent research on four variables that could mediate the relationship between TMS and MAS. These variables relate to decision-making orientation and MAS users' issues and concerns.

From the perspective of decision-making orientation, SMEs have undergone significant organizational changes to respond more effectively to market competition. The increasing digitalization of processes has changed the organizational design, facilitating the decentralization of decision-making and increasing employees' autonomy (Knudsen, 2020; Kretschmer and Khashabi, 2020). In the case of SMEs, the decentralization of decisions, which was mostly studied in the context of large organizations (e.g., Chenhall and Morris, 1986; Hammad et al., 2013; Soobaroyen and Poorundersing, 2008), became an instrument for SMEs to respond to market volatility (Ghorbel, 2019). In the current competitive context, accountants are no longer mere information providers for managers' decision-making process, becoming actively involved in strategy formulation (Rieg, 2018). This way, they improve the information quality and increase their influence in managing SMEs (Jackson et al., 2022; ten Rouwelaar et al., 2021).

From the perspective of MAS users, SMEs face increasing challenges. They need to provide technical training for the design and implementation of the MAS and how to update and use the information related to the most recent competitive issues, including new environmental innovation practices (Gomez-Conde et al., 2019) and ethical challenges (van der Kolk, 2019). We also verified that the satisfaction of MAS users could increase the use of the information provided by these systems and consequently increase the quality of decisions (Rikhardsson and Yigitbasioğlu, 2018).

Despite a solid body of research on the relationship between TMS and various organizational resources and processes, studies are scarcer when we focus more specifically on SMEs. Therefore, additional empirical evidence is needed to disentangle the relationship between TMS and the use of MAS, specifically in the context of SMEs. For this purpose, we will explore the mediation role of these two groups of variables.

Our study takes a contingency theory approach to analyze the relationships in the following research framework (Fig. 1).

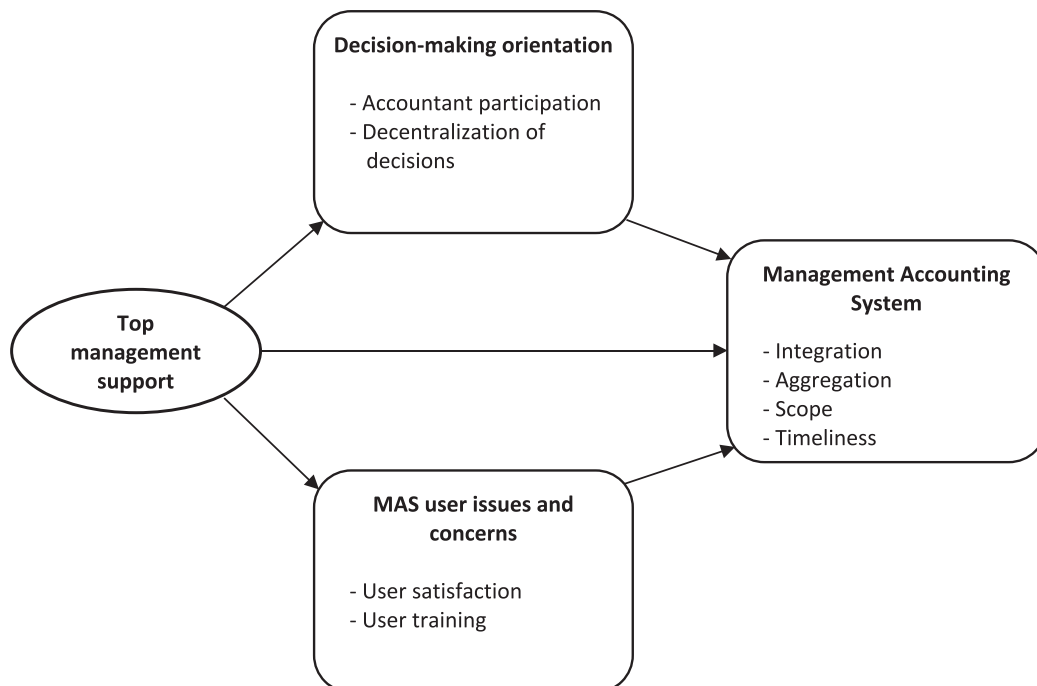


Fig. 1. Research framework.

The data used to analyze this framework came from a sampling of 255 Portuguese small and medium enterprises.

This paper is structured as follows. Section two presents the literature review and the development of hypotheses. Section three provides the research methodology, while section four presents and discusses the results. Finally, section five presents the conclusions, implications, limitations, and suggestions for future research.

2. Literature review and hypotheses development

2.1. Management accounting systems

Management accounting systems (MAS) are essential resources to provide managers with information for their decision-making processes (Hoozée and Mitchell, 2018). These systems have shifted their focus from traditional financial reporting to embracing a broader scope of information (Chenhall, 2003). It means including internal and external variables to increase the performance of companies (Appelbaum et al., 2017). Thus, it seems that SME managers have realized that the multidimensional characteristics of the information provided by MAS can significantly contribute to the competitiveness of their business organizations (Maelah et al., 2021).

According to Chenhall & Morris (1986), multidimensional management accounting systems should be defined by four key dimensions of information characteristics: i) scope, ii) timeliness, iii) aggregation, and iv) integration.

The *scope* characteristic is related to the information's focus, quantification, and time horizon (Chenhall and Morris, 1986; Hammad et al., 2013). The smaller or larger scope depends on whether the information is internal or external, financial or non-financial, historical or future-oriented (Hammad et al., 2013; Soobaroyen and Poorundersing, 2008). The smaller scope has been associated with traditional accounting systems that provide internal, financial, and historical information (Chenhall and Morris, 1986). The more extensive information scope is related to the external environment and may be financial or non-financial (Chenhall and Morris, 1986; Sharma et al., 2006).

The *timeliness* characteristic is related to the frequency and the speed of the information reporting (Fong and Quaddus, 2010). It can also be related to the readiness for information upon request (Hammad et al., 2013) and the slow or rapid response to requests for standardized or personalized information (Soobaroyen and Poorundersing, 2008). Timely information increases MAS's ability to report recent events and provide faster feedback on decisions (Chenhall and Morris, 1986).

The level of *aggregation* is related to the systematization of information by period, functional areas, or even formats consistent with formal decision models (Chenhall and Morris, 1986; Hammad et al., 2013). Information aggregated at the functional area level provides managers with information on the results of other departments (Fong and Quaddus, 2010).

The level of information *integration* includes the precise definition of goals for the various activities and their interrelationships within the sub-units, as well as reporting on intra-sub-unit interactions (Chenhall and Morris, 1986; Soobaroyen and Poorundersing, 2008). The level of information integration deals with data that cross functional boundaries and help to coordinate multiple segments within a sub-unit (Hammad et al., 2013).

To evaluate the informational characteristics of MAS, Chenhall & Morris (1986) developed an instrument to measure each of these dimensions, which several authors have used. However, it has been applied differently in various studies. While some researchers used the four dimensions (e.g., Hariyati et al., 2019; Le et al., 2020; Liem and Hien, 2020; Ngo, 2020), others used just a few (e.g., Chang et al., 2003; Ghorbel, 2019; Heidmann et al., 2008), or even just one (e.g., Do et al., 2020; Harrison, 2009; Naranjo-Gil and Hartmann, 2007; Nguyen et al., 2017).

Several relationships between MAS information dimensions and other business variables have been studied. They have been analyzed as dependent variables (Bouwens and Abernethy, 2000; Chenhall and Morris, 1986; Chiou, 2011), independent variables (Agbejule, 2005; Chang et al., 2003; Mollanazari and Abdolkarimi, 2012), and sometimes as mediating variables (Etemadi et al., 2009; Ghasemi et al., 2019; Soobaroyen and Poorundersing, 2008). The results for the same relationships analyzed in different studies are not consensual. They seem to be contingent on the internal and external circumstances, the MAS dimensions used, and the number of items used to measure each of these dimensions.

Pedroso and Gomes (2020) recently proposed and validated a MAS multidimensional approach. In this approach, MAS is measured with a second-order construct comprised of the four first-order constructs identified by Chenhall and Morris (1986). This new instrument enables analysis of the relationship between contingent variables and MAS in a comprehensive and systemic approach. As such, this new MAS approach will be used as the dependent variable in our research study.

2.2. Top management support

Top management support (TMS) is widely used in management and business literature, especially in organizational change contexts. It can be defined as the degree of aid senior-level managers give to developing, implementing, and using new organizational techniques, methods, processes, and systems (Foster and Swenson, 1997; Krumwiede, 1998; Shields, 1995). TMS should be implemented through an open and active promotion by these managers in financial or spiritual terms (Fong and Quaddus, 2010).

When top managers support the adoption, implementation, or use of a particular technology, system, technique, or method, they communicate to the whole organization their commitment to maintaining it as a priority (Mukred et al., 2021). This support will encourage employees to be more cooperative and accept the changes, as they will be assumed to be strategic for the organization (Martins et al., 2019).

Top management support is essential when SMEs compete with large companies to sell their products and services in the global market. For this purpose, SMEs must continuously improve their processes through innovation, ensuring reliable and updated

information to managers at all hierarchical levels. In this context, the top management has a crucial role in overcoming resistance to change and providing technical support and training to facilitate organizational change (Munir et al., 2013). Given the specific characteristics of SMEs, the top management team includes a few elements in which the CEO and CFO stand out (Naranjo-Gil, 2009).

Most recent literature has demonstrated the positive influence of TMS in the development, implementation, and use of resources, techniques, and methods in management accounting, especially in the context of ongoing digitization processes. In a context of increasing complexity and diversity of information, TMS is decisive in adopting solutions that involve the storage and use of this information in the cloud (AlBar and Hoque, 2019; Wang et al., 2019a), which can become a competitive advantage for SMEs. TMS is crucial for information technology (IT) innovation, as with blockchain, which quickly spread across several sectors and increased the effectiveness of supply chain management (Clohessy and Acton, 2019). It can also influence digital reporting in small business organizations (Alkhatib et al., 2019) and the adoption of computer-assisted audit tools and techniques (Siew et al., 2020).

In addition to top management support for tangible assets, its positive effect on intangible assets, such as knowledge management systems, has also been verified (Okour et al., 2019).

Despite the important role of TMS in supporting the use and innovation of SME resources, limited studies have been carried out in the field of MAS.

As a result of the above discussion, the following hypothesis is formulated:

Hypothesis 1: Top management support positively influences MAS utilization.

2.3. Decision-making orientation

Top management and accountants are the two main actors in the management of SMEs (Alcalde-Heras et al., 2019; Bi et al., 2019; De Bruyckere et al., 2020; Weigel and Hiebl, 2023). Given the specific characteristics of SMEs, the accountant could be internal or external to these companies. However, their role is no longer to provide only performance reports. They need to have a broader view of the business and be able to link financial information to the strategic development of the business (Scapens and Jazayeri, 2003), being now more involved in participating in business decisions (Enslin et al., 2023). This paradigm shift in the accountant's role has been supported by top management (Järvenpää, 2007).

Participation in the strategic decision-making process is not a recent role of accountants. It can be defined by their degree of involvement in formulating and implementing the company's strategy (Wooldridge and Floyd, 1990). Their participation in strategic decisions can improve the use of a management accounting system (Cadez and Guilding, 2008). Business organizations with greater accountant participation in strategic decisions follow a more analytical strategy, have a greater propensity to look for new products or market opportunities, and are more focused on the domestic market (Cadez and Guilding, 2012).

It seems that the role of accountants in organizations has evolved from its traditional profile to a more strategic one (Boulianne, 2007; Joseph, 2006; Robalo and Moreira, 2020). As such, accountants are not limited to providing information for managers' decisions but have begun to participate in strategic decision-making processes (Aver and Cadez, 2009). They are now influencing strategic and operational decisions (ten Rouwelaar et al., 2018), and can also influence MAS design (Hoozée and Mitchell, 2018). As such, attributing simple labels to their roles should be avoided (Rieg, 2018).

In this context, accountants working in SMEs, in addition to traditional internal controls over costs and financial reporting, need to know customers, human resources, and strategy processes (Berthelot and Morrill, 2016). The availability of new analysis techniques and large amounts of data allows management accountants to help management design an appropriate strategy (Appelbaum et al., 2017).

In the literature review, we did not find studies that analyzed the mediation effect of the accountant's participation in strategic decisions on the relationship between top management support and MAS. Even so, TMS can positively influence the accountants' participation in strategic decisions, which in turn influences MAS utilization. Based on this premise, the following hypothesis is formulated:

Hypothesis 2a: Accountant participation in strategic decisions mediates the relationship between top management support and MAS utilization.

Decentralization, commonly used as a response to environmental uncertainties, can be defined as the degree of autonomy delegated to lower-level managers, giving them greater responsibility for planning and controlling activities and greater access to information usually unavailable (Waterhouse and Tiessen, 1978). It can be seen as empowering these managers (Conger and Kanungo, 1988).

The literature shows how decentralizing decision-making relates to various aspects of management accounting (Chenhall, 2003). It may increase management accounting sophistication (Abdel-Kader and Luther, 2008; Al-Dhubaibi and Kamal, 2014), but it can also influence innovative management accounting practices (Souza and Gasparetto, 2020). These findings suggest that business organizations with more decentralized structures may need more relevant information to support their decision-making processes.

For a long time, decentralization had a decisive influence on the information characteristics of the MAS, especially in integration and aggregation dimensions (Chenhall and Morris, 1986). The decentralization of decisions by the company's various departments leads to the need to use information with specific characteristics. Thus, it needs integrated information that includes the precise objectives for the multiple sub-units and their interpellations and systematization by functional areas. There is also a need for aggregated information at the department level to provide information to managers about the results of other departments.

With increasing competitiveness in the global market, SMEs need more diversified information, including financial and non-financial, and internal and external indicators to support their decisions. They also need a greater frequency and speed of reporting. Therefore, it seems decentralization also positively influences the MAS's timeliness and scope dimensions (Ngo, 2020; Soobaroyen

and Poorundersing, 2008).

Research on decentralization initially resulted from studying internal organizational factors in large companies. However, SMEs that wanted to survive in the global market had to evolve organizationally. Thus, due to organizational characteristics and the dynamic competitive environments SMEs face, decentralization has recently become particularly relevant, requiring broad-scope information (Alves and Lourenço, 2022).

Decentralization in SMEs influences the need to increase budget information (Sandgaard and Nielsen, 2018). Therefore, a high degree of decentralization requires a high capacity for information processing, as more managers demand more sophisticated information in decision-making (Ghorbel, 2019).

More recently, SMEs have benefited from the cost reduction of technologies that can help them compete with large companies. The digitalization of processes can increase their decentralization of decision-making (Kretschmer and Khashabi, 2020).

Based on the literature review, we did not find research studies that analyzed the mediating effect of the decentralization of decisions on the relationship between top management support and MAS. However, we assume the need for top management support in decentralization processes, which in turn positively influences MAS utilization.

As a result of the above discussion, the following hypothesis is formulated:

Hypothesis 2b: The decentralization of decisions mediates the relationship between top management support and MAS utilization.

2.4. MAS user issues and concerns

People working in business organizations are influenced daily by their level of satisfaction and the level of training they get to use the organizational resources. These variables influence operational and strategic decisions, which are the main drivers of organizational effectiveness, and business competitiveness.

Satisfaction is the sum of the feelings and attitudes relative to factors that affect a specific situation (Bailey and Pearson, 1983). Users' satisfaction with the information a system provides can be defined by the extent to which users believe it offers them all the information they need (Ives et al., 1983). As such, the satisfaction of information users is related to their affective attitude towards this system (Doll and Torkzadeh, 1988). If users are unsatisfied with the information provided by MAS, they will not use it (Mia and Patiar, 2001).

The quality of information is crucial to increasing the satisfaction levels of MAS users, which will lead to an increase in its use and consequent improvement in the decision-making process (Fleischman et al., 2010). The greater the satisfaction with the information provided by those systems, the greater the use will be made of that information (Al-Hattami, 2021; Macinati and Anessi-Pessina, 2014). In this context, the quality of MAS and the information they provide are essential to improving organizational performance.

The influence of top management support on users' satisfaction has been studied in different contexts and has presented some contradictory findings. We found significant positive results for this relationship (Ghobakhloo et al., 2015; Sabherwal et al., 2006; Wang and Song, 2017), but we also found literature that does not support it (Rouibah et al., 2009; Vatanasakdakul et al., 2017).

In our study, we intend to assess user satisfaction with multiple characteristics of the information provided by MAS, including reliability, relevance, accuracy, precision, and completeness.

Based on the literature review, we found a lack of empirical studies analyzing the relationship between the above variables and MAS in the SME context. As such, the following hypothesis is formulated:

Hypothesis 2c: User satisfaction with MAS information mediates the relationship between top management support and MAS utilization.

Training is the process by which an organization transfers job-relevant knowledge and skills to employees (Donnelly et al., 2021). The user training could provide courses in the work context and other guidelines to assist in implementing and using systems supporting management accounting (Fong and Quaddus, 2010). They could also be external and on different subjects, namely the ethical implications of using management accounting instruments (van der Kolk, 2019).

The training can help understand how MAS can assist managers and provide knowledge about the information needed to analyze operational activities and their performance measures (Chenhall and Langfield-Smith, 1999). It can be a critical success factor for MAS implementation (Bradley, 2008) and positively influence its utilization (Ruivo et al., 2014).

Training is crucial in improving the decision-making processes by implementing new management accounting techniques and practices (Nassar et al., 2013). It involves understanding the source and structure of data and how it can be analyzed and used to improve the quality of management decisions (Bhimani, 2012). Innovation in management accounting requires continuous training for MAS users (Halbouni and Nour, 2014).

Given that training provides information on MAS utilization and helps users understand what information they need for management, it is also expected that more training would positively affect the utilization and quality of MAS information. However, this relationship is not always verified (Fong and Quaddus, 2012; Krumwiede et al., 2008).

As such, recent literature calls for more research on user training to better understand the implementation of accounting information systems (Kocsis, 2019).

As a result of the above discussion, the following hypothesis is formulated:

Hypothesis 2d: User training mediates the relationship between top management support and MAS utilization.

3. Methodology

3.1. Sample and data collection

For the survey, we asked the Portuguese representative of Dun & Bradstreet Worldwide Network to provide a random sample of 1500 companies representing the Portuguese population of SMEs, following the European criteria ([The Commission of the European Communities, 2003](#))¹, excluding microenterprises due to their small organizational structure².

In Portugal, like in other European countries, small and medium-sized enterprises (SMEs) significantly contribute to world economic growth, representing 99,8% of all businesses ([Gorgels et al., 2022](#)).

To increase the response rate, we contacted all companies by telephone to explain the purpose of the study and request the chief financial officer's (CFO) name and mail address. We chose CFOs as respondents because they are part of the top management team of SMEs ([Munir et al., 2023](#)). As such, they know the organizational context very well and have strong technical knowledge of MAS utilization.

During that process, 93 SMEs declined to participate in the survey. Therefore, we invited CFOs of 1407 Portuguese SMEs to fill out the questionnaire, from which we obtained 255 usable responses. This response rate represents 18.12 percent, which is identical to similar studies ([Hall, 2008](#); [Martins et al., 2019](#)). [Table 1](#) shows the sample characteristics.

Companies whose parameters are outside the SME criteria were kept in the empirical analysis as they are considered borderlines. They may have a few workers contextually above the required dimension but maintain SMEs' characteristics.

3.2. Instrument and variable measurement

The measurement items included in the research instrument ([Appendix A](#)) were selected based on a comprehensive literature review. As these items were originally written in English, they were initially translated into Portuguese and later from Portuguese back into English by two different specialists with knowledge of both languages. Establishing the comparison between the two versions in English, it was verified that they did not present relevant differences.

To validate the questionnaire content, a panel of experts in the management accounting field, including professors, researchers, and professionals, was asked to verify if the questions' terminology was consistent with the respondent's level of understanding ([Forza, 2002](#)). After the validation process, the final questionnaire version was considered adequate for the Portuguese SMEs context.

The management accounting system was conceptualized through four informational dimensions (scope, timeliness, aggregation, and integration). The multidimensional scale created and validated by [Pedroso and Gomes \(2020\)](#) was used to measure MAS utilization. For this purpose, respondents were asked to indicate each construct item's utilization level in daily decision-making activities through a seven-point Likert scale (1 – Never to 7 – Every time).

For measuring top management support, an instrument developed by [Shields \(1995\)](#) and used in other studies (e.g., [Krumwiede, 1998](#); [Schäfer et al., 2022](#); [Tung et al., 2011](#)) was adapted. Respondents were asked about their level of agreement relating to each construct item, using a seven-point Likert scale (1 – Strongly disagree to 7 – Strongly agree), assuming that the scope of top management is the board of directors or, informally, a top management team.

The decentralization of decisions was measured through a construct developed by [Gordon and Narayanan \(1984\)](#) and used by other authors (e.g., [Abdel-Kader and Luther, 2008](#); [Sandalgaard and Nielsen, 2018](#); [Soobaroyen and Poorundersing, 2008](#)). Respondents were asked to tick the option that best describes the extent of decentralization of their organization for each construct item through a seven-point Likert scale (1 – Very low to 7 – Very high).

For assessing the accountant's participation in strategic decisions, an instrument developed by [Wooldridge and Floyd \(1990\)](#) and adapted for other research studies ([Cadez and Guilding, 2012](#); [2008](#)) was used. Respondents were asked to tick the option that best describes the extent of the accountant's participation for each item related to the strategic management aspects through a seven-point Likert scale (1 – Very low to 7 – Very high).

User satisfaction with MAS information was measured through a construct developed by [Doll and Torkzadeh \(1988\)](#) and used by other authors (e.g., [Macinati and Anessi-Pessina, 2014](#); [Pillai et al., 2021](#); [Rai et al., 2002](#)). Respondents were asked about their level of satisfaction relating to each construct item through a seven-point Likert scale (1 – Completely dissatisfied to 7 – Completely satisfied).

A construct developed by [Shields \(1995\)](#) and adapted for other studies ([Krumwiede, 1998](#); [Krumwiede et al., 2008](#)) was used to assess MAS users' training. Respondents were asked about their level of agreement relating to each construct item through a seven-point Likert scale (1 – Strongly disagree to 7 – Strongly agree).

[Appendix A](#) presents all the items used in the research model and the corresponding descriptive statistics

¹ "The category of micro, small and medium-sized enterprises (SMEs) is made up of enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million." in article 2, number 1 of the *Recommendation concerning the definition of micro, small and medium-sized enterprises* ([The Commission of the European Communities, 2003](#)), <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:en:PDF>.

² "Within the SME category, a microenterprise is defined as an enterprise which employs fewer than 10 persons and whose annual turnover and/or annual balance sheet total does not exceed EUR 2 million." in article 2, number 3 of the *Recommendation concerning the definition of micro, small and medium-sized enterprises* ([The Commission of the European Communities, 2003](#)), <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:124:0036:0041:en:PDF>.

Table 1
Sample profile.

Item	Frequency	Percentage
Number of employees		
Less than 10	1	0.39 %
From 10 to 49	57	22.35 %
From 50 to 99	67	26.27 %
From 100 to 149	49	19.22 %
From 150 to 199	35	13.73 %
From 200 to 249	21	8.24 %
More than 250	20	7.84 %
No response	5	1.96 %
Total:	255	100.00 %
Industry section classification*		
C - Manufacturing	105	41.2 %
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	73	28.6 %
F - Construction	19	7.5 %
H - Transportation and storage	13	5.1 %
J - Information and communication	11	4.3 %
M - Professional, scientific and technical activities	8	3.1 %
K - Financial and insurance activities	4	1.6 %
N - Administrative and support service activities	4	1.6 %
I - Accommodation and food service activities	3	1.2 %
- Miscellaneous (with less than three occurrences in each section)	10	5.1 %
- No response	5	0.8 %
Total:	255	100.0 %

*NACE Rev. 2 - Statistical classification of economic activities in the European Community.

3.3. Data analysis

Consistent with the study's objectives, partial least squares structural equation modeling (PLS-SEM) was applied to test the research hypotheses. For this purpose, the software SmartPLS 3.2.6 was used (Ringle et al., 2015). This statistical method was used due to the complexity and exploratory nature of the research model (Hair et al., 2017; Usakli and Kucukergin, 2018). Also, it responds to Nitzl's (2016) call to increase the use of PLS in management accounting research.

Data analysis comprised three phases. The measurement model was assessed for reliability and validity in the first phase. For this purpose, we analyzed the construct indicator reliability, internal consistency reliability, and convergent and discriminant validity.

In the second phase, the structural model's results were analyzed. We used the Bootstrapping procedure to test the statistical significance of various PLS-SEM results, such as path coefficients, Cronbach's alpha, HTMT, and R^2 values, creating subsamples with observations randomly drawn (with replacement) from the original data set. To ensure the stability of the results, we used 5.000 resamples (Hair et al., 2013). To assess the quality of the results, we used the R^2 values, the significant paths, their f^2 effect sizes, and the predictive relevance (Q^2). In addition, we used the SRMR indicator to assess the model fit (Henseler et al., 2016).

The mediation roles of information users' issues and decision-making variables between TMS and MAS were tested in the third phase. For this purpose, we used a step-by-step process to analyze the mediation effects of all four variables of the research model (Fig. 1). In step 1, only the relationship between TMS and MAS was analyzed (Hypothesis 1). In step 2, each mediator was separately introduced in the model (Hypotheses 2a to 2d). In step 3, all the combinations of two and three mediators were tested. This PLS-SEM mediator analysis process followed the best practices recommended by the literature (Baron and Kenny, 1986; Nitzl et al., 2016; Preacher and Hayes, 2008).

4. Results and discussion

4.1. Measurement model

The measurement model was initially evaluated for construct reliability. All measurement items presented outer loadings above 0.70 (Table 2), the recommended threshold (Hair et al., 2011). Moreover, the values for Cronbach's alpha and Composite Reliability (CR) obtained for each construct exceed 0.7, indicating sufficient construct reliability (Table 2). All average variance extracted (AVE) values were higher than the recommended threshold of 0.5, suggesting that each construct's measurement items share a significant amount of variance.

Concerning discriminant validity, the heterotrait-monotrait (HTMT) ratio of correlations was used (Hair et al., 2017). All HTMT values are below 0.90 (Table 3), establishing the discriminant validity of the constructs (Henseler et al., 2015).

Regarding the management accounting system construct, the loadings of first-order constructs on the second-order construct (Table 4) confirm the results of Pedroso and Gomes (2020). These results mean that utilizing a management accounting system can be measured as a second-order construct, reflecting the four MAS dimensions offered by Chenhall and Morris (1986).

Table 2
Validity and reliability of constructs.

Construct items	Loading	CR	AVE	Alpha
Scope		0.898	0.748	0.825
SCO01	0.930			
SCO02	0.912			
SCO03	0.740			
Timeliness		0.896	0.742	0.825
TIM01	0.799			
TIM02	0.880			
TIM03	0.902			
Aggregation		0.896	0.632	0.854
AGG01	0.820			
AGG02	0.803			
AGG03	0.795			
AGG04	0.830			
AGG05	0.723			
Integration		0.936	0.829	0.897
INT01	0.890			
INT02	0.929			
INT03	0.912			
User Satisfaction		0.947	0.782	0.930
USA01	0.889			
USA02	0.897			
USA03	0.863			
USA04	0.886			
USA05	0.886			
User training		0.967	0.908	0.949
UTR01	0.956			
UTR02	0.961			
UTR03	0.941			
Top management support		0.928	0.810	0.883
TMS01	0.920			
TMS02	0.894			
TMS03	0.886			
Decentralization of decisions		0.913	0.677	0.880
DEC01	0.770			
DEC02	0.799			
DEC03	0.865			
DEC04	0.870			
DEC05	0.805			
Accountant participation in strategic decisions		0.971	0.869	0.926
APD01	0.940			
APD02	0.950			
APD03	0.948			
APD04	0.947			
APD05	0.875			

No significant concerns about common method bias were found based on the results of Harman's single-factor test and common latent factor approach (Podsakoff et al., 2003).

4.2. Structural model

Using a bootstrapping procedure with 5.000 resamples, the results of the structural model are presented in Table 5.

Three of the relations studied were found not significant: the accountants' influence on MAS, the top managers' influence on MAS, and the control variable SMES' Dimension, measured by the number of employees. The result of the control variable means that the dimension of the companies does not influence the utilization of the information provided by MAS. It means that being a small or

Table 3
Discriminant validity.

	Apa	Agg	Dec	Int	Sco	Tim	Tms	Use	Utr
Accountant participation (Apa)	—								
Aggregation (Agg)	0.256								
Decentralization of decisions (Dec)	0.381	0.396							
Integration (Int)	0.280	0.858	0.444						
Scope (Sco)	0.246	0.715	0.397	0.596					
Timeliness (Tim)	0.144	0.806	0.253	0.708	0.653				
Top Management Support (Tms)	0.374	0.350	0.372	0.276	0.245	0.263			
User satisfaction (Use)	0.274	0.373	0.270	0.288	0.305	0.390	0.541		
User training (Utr)	0.328	0.357	0.336	0.320	0.375	0.367	0.532	0.597	—

Note: None of the correspondent bootstrap confidence intervals includes the value 1.

Table 4
Loadings of the first-order constructs on the second-order MAS construct.

Second-order construct	First-order construct	Coefficient
Management accounting system (MAS)	Aggregation	0.936***
	Integration	0.850***
	Scope	0.821***
	Timeliness	0.801***

***p < 0,001, **p < 0,01, *p < 0,05.

Table 5
Structural model results.

Path relationship	Path coefficient	f ²
Accountant participation -> MAS	0.055	0.003
Decentralization of decisions -> MAS	0.285***	0.089
Top Management Support -> Accountant participation	0.347***	0.137
Top Management Support -> Decentralization of decisions	0.335***	0.127
Top Management Support -> MAS	0.029	0.001
Top Management Support -> User satisfaction	0.496***	0.327
Top Management Support -> User training	0.487***	0.312
User satisfaction -> MAS	0.155*	0.020
User training -> MAS	0.173*	0.024
SMEs Dimension -> MAS	0.057	0.004

Construct	Q ²	R ²
Accountant participation	0.100	0.120
Decentralization of decisions	0.071	0.113
Management accounting system (MAS)	0.127	0.251
User satisfaction	0.189	0.247

***p < 0,001, **p < 0,01, *p < 0,05.

medium-sized company does not imply using less or more MAS information.

The most robust relations are between top managers and information user satisfaction and training. The research model has predictive relevance according to Q² values, which are all positive. The values of f² are all positive and follow a similar rank order of path coefficients, which means that large significant path values correspond to large effect sizes. The values of R² are considered moderate to explain MAS utilization (Hair et al., 2013). Finally, we mention that SRMR = 0.077, implying that the model has a good fit



Fig. 2. Results of the structural model without mediating variables

(Henseler et al., 2016).

4.3. Mediation analysis

In the first step of the mediation analysis, we tested the relationship between top management support and the effective use of management accounting systems without the mediating variables (Fig. 2). We found that this relationship is significant, meaning that TMS directly affects MAS utilization without any mediating variable. As such, the lack of significance for this effect in the structural model results (Table 5) is justified by the full mediation exerted by one or more mediating variables.

We then tested each variable's independent mediation in the second step. Based on the results, hypothesis 2a was rejected because the positive relationship between the accountant's participation in strategic decisions and MAS use was not significant at the 5 percent level. The indirect effect between TMS and MAS through decentralization of decisions was found to be significant (1 percent level), supporting hypothesis 2b. The indirect effect between TMS and MAS through user satisfaction was found to be significant (5 percent level), which supports hypothesis 2c. The indirect effect between TMS and MAS through user training was found to be significant (1 percent level), which supports hypothesis 2d. Since the direct effect of TMS on MAS maintained the significance in each of these three models, none of these variables is individually sufficient for the full mediation found in the structural model results (Nitzl et al., 2016).

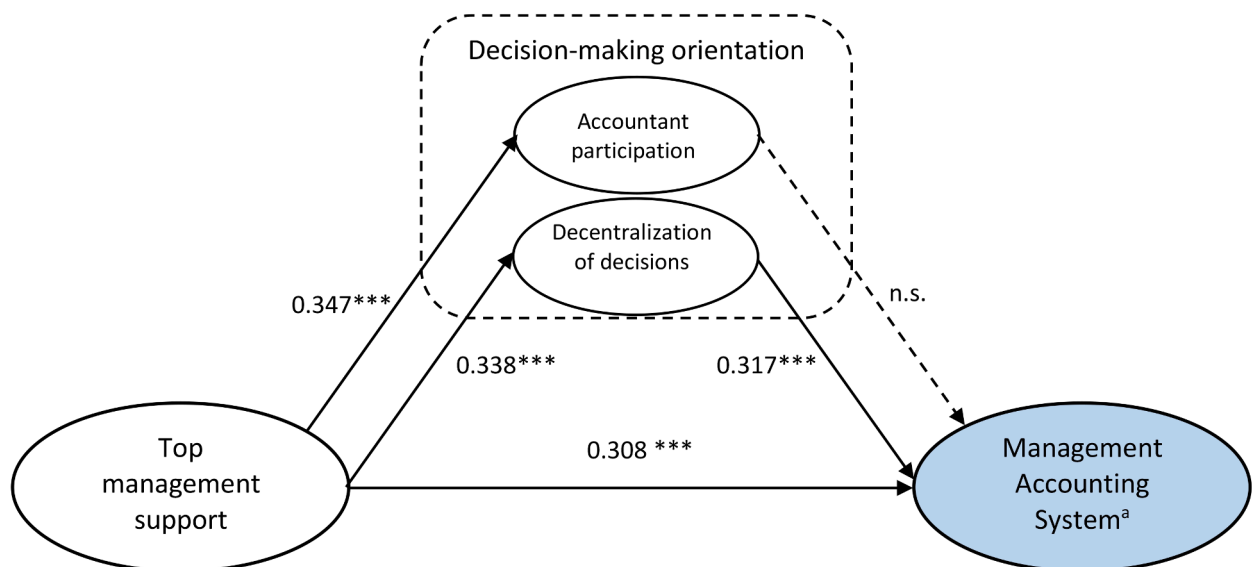
In the third step, following the methodology presented in section three, we tested all possible combinations of two or more mediating variables. After analyzing all the results, we found that the joint mediation effect of users' training and satisfaction exerts a full mediation in the relationship between TMS and MAS. The remaining two combinations of two variables only exert partial mediation. As such, it seems that two groups of variables behave differently as mediating variables of the relationship between TMS and MAS. For these reasons, we divided our initial model into two models and discussed their findings in the next section.

4.4. Discussion

This study disentangles the relationship between top management support and management accounting systems. As such, we explore the role of two groups of variables that could help top managers increase the effective utilization of MAS and consequently improve the quality of the decision-making processes in SMEs.

The first group of mediating variables tested, representing the organizational decision-making orientation, includes the accountants' participation in strategic decisions and the decentralization of decisions (Fig. 3). Although the mediating effect of these variables on the relationship between TMS and MAS has not been tested before in management accounting literature, we expected a significant result based on the findings of individual effect components presented by the literature in several organizational contexts, including SMEs.

The positive results on the impact of TMS on accountant participants in the SME organizational context can be justified by the increasing involvement of accountants in participating in SME's business decisions (Enslin et al., 2023). The top management team in SMEs sees accountants as important business consultants and realizes their importance in promoting the implementation and use of the



***Significance level<0.001 **Significance level<0.01 *Significance level<0.05
 n.s. Non significant

^a Second-order reflective construct

Fig. 3. Results of the structural model for organizational decision-making orientation

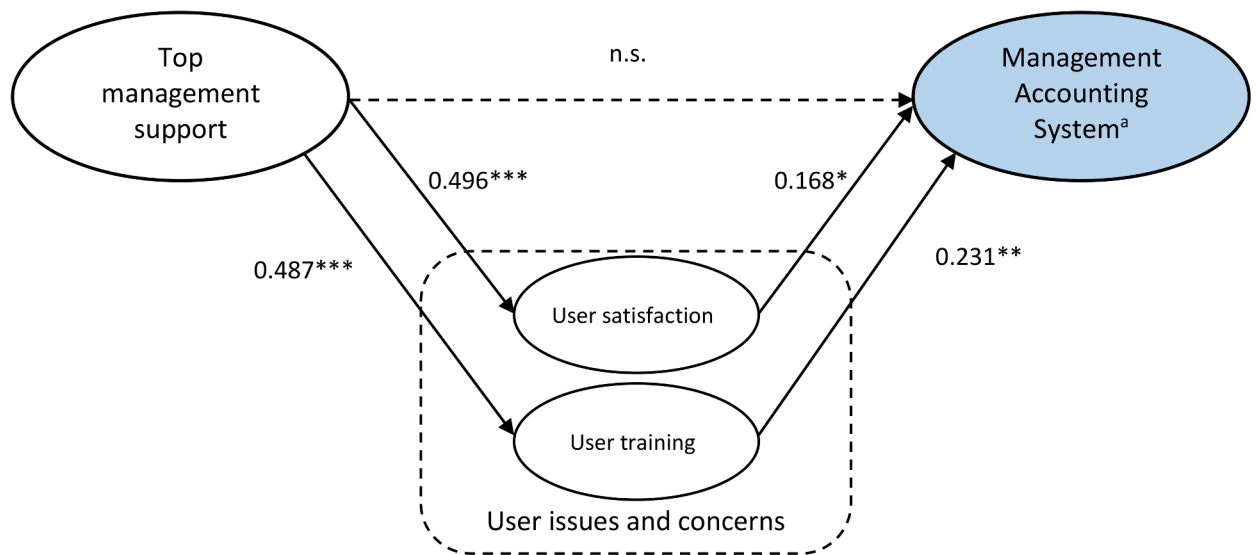
MAS. Concerning the impact of accountant participation in strategic decisions on MAS, we only found positive effects in large organizations (Cadez and Guilding, 2008; Nguyen, 2018). However, since SMEs are now fighting with large companies for market share in the global context (Malesev and Cherry, 2021), it was expected that greater accountant involvement in the strategy formulation and implementation would improve the use of a management accounting system, which was not confirmed by our results. As such, it seems that although accountants in SMEs are finding support from top managers to participate in the corporate strategic processes, they may not know how to get the necessary information to enable MAS to monitor these processes. This result can be justified by the lack of a formal strategic management process that prevents accountants from identifying what information is needed or by the difficulty in analyzing non-financial information and integrating it with financial information. It can also be because SMEs do not want to pay for updated external information needed to respond to market changes and align their resources with their corporate strategy (Latifah et al., 2021). In this context, big data and the new analysis instruments can present a unique opportunity for management accountants to play a more active role in decision support (Rikhardsson and Yigitbasoglu, 2018).

In the same group of variables, representing the organizational decision-making orientation, the results of our study show that the utilization of MAS in SMEs could be improved by top management support through decentralizing the decision-making processes. As such, we found that they are consistent with the positive effect of TMS on decentralization in SME organizational contexts. Our results are also consistent with the positive impact of decentralization on MAS for several organizational dimensions in healthcare environments (Fuadah et al., 2020; Ngo, 2020) and other industries (Lee and Han, 2000; Souza and Gasparetto, 2020). However, no specific evidence was found for SMEs in management accounting literature.

Decentralization usually increases the number of decision-makers, meaning departmental decision-makers have more specialized knowledge about their department but less from the other departments. When they make autonomous decisions, they need information from different fields besides theirs, available in MAS. As such, our results point to a paradigm shift in the decentralization of decisions in SMEs, becoming an instrument to respond to market volatility, which was almost exclusive to large companies (Ghorbel, 2019). Despite appearing to have been influenced by large companies, decentralized decision-making processes in SMEs may also occur because of their flexible and agile structures (Meier, 2023). Another reason for the decentralization could be the influence of the availability of lower-cost information technologies, which means less formal and procedural decentralization and more agile information management due to the digitization of processes (Dutta et al., 2021).

The second group of mediating variables analyzed includes user satisfaction and training variables (Fig. 4). Like in the first group (Fig. 3), although the mediating effect of these variables has not been tested before in management accounting literature, we expected a significant result based on the findings of individual effect components presented by the literature in several organizational contexts, including SMEs.

The results show that the utilization of MAS could be improved by top management support through user satisfaction, which is consistent with other authors' findings relating to the influence of top managers on user satisfaction in several organizational contexts, including SMEs (Azizah, 2018; Ghobakhloo et al., 2015; Wang and Song, 2017). They are also consistent with management accounting literature that confirms the positive influence of user satisfaction on the use of MAS in healthcare environments (Fong and Quaddus, 2012; 2010) and banking organizational environments (Al-Hattami, 2021).



***Significance level<0.001

**Significance level<0.01

*Significance level<0.05

^a Second-order

n.s. Non significant

reflective construct

Fig. 4. Results of the structural model for MAS user issues and concerns

In the same group of variables, representing the user issues and concerns, the results of our study show that the utilization of MAS could be improved by top management support through user training. They are consistent with literature confirming top management support's positive influence on user training (Ha and Ahn, 2014; Krumwiede et al., 2008). They are also consistent with literature that found a significant influence of user training on MAS in SME organizational contexts (Ruivo et al., 2014) and with recent digitalization trends in SMEs. The digitalization of processes will increase the predictive possibilities of data analysis available in SMEs, also increasing the need for training of MAS users (Al-Htaybat and von Alberti-Alhtaybat, 2017), which will have to be continuously supported by top managers.

Overall, our study found three significant mediating effects on the relationship between TMS and MAS, not previously analyzed by the management accounting literature, contributing this way to literature through the evidence of new theoretical paths (Whetten, 1989).

5. Conclusions and implications

Small and medium-sized enterprises (SMEs) increasingly need to compete globally with their counterparts, including large companies. For this purpose, they need management accounting systems that analyze, integrate, and make internal, external, financial, and non-financial information available throughout their organizational structure. These systems will enable all departmental managers to make higher-quality decisions and respond faster to customers and changes in the competitive market forces.

Based on an extensive literature review on management accounting, we found that top management support does not always show a significant positive influence on MAS utilization. To fill this gap, we analyzed top management support's effect on MAS utilization in SMEs, exploring the mediation role of organizational decision-making orientation and user issues and concerns research variables.

5.1. Theoretical contributions

This study offers several theoretical contributions to management accounting research and accounting information systems (AIS) literature. First, our findings suggest that although TMS has a positive direct effect on MAS, utilizing some organizational resources exerts a full mediation. This means they thoroughly explain the relationship between top management support and effective MAS utilization. They reveal that three variables significantly mediate the relationship between TMS and MAS: decentralization, training of MAS users, and satisfaction with the information provided by the MAS. As far as we know, based on the literature reviewed, these relationships have not yet been studied. Although several studies have called for further research on the relationship between TMS and various tangible and intangible resources in several organizations, including SMEs (e.g., Kheybari et al., 2020; Rouibah et al., 2020; Skafi et al., 2020), empirical evidence regarding MAS is limited, not even exist when measured in a systemic approach. Therefore, studying these new relationships significantly alters our understanding of MAS effectiveness in SMEs organizational contexts, reorganizing the causal maps underlying the contingency theory.

Second, our findings contribute to understanding these causal maps by disentangling the relationships between TMS and MAS, examining the individual and group mediating effects, and enabling us to assess the degree of mediation relative to these new relationships. In the analysis process, we found that the combined effect of user satisfaction and training can fully mediate the relationship between TMS and MAS. This finding illustrates the relevance of these organizational instruments that the top management team can use to increase the effectiveness of the MAS. We also found the significant mediation effect of the decentralization of decisions, which can represent a paradigm shift for SMEs' organizational decision processes.

These findings support the fit-as-mediation proposition of the contingency theory (Venkatraman, 1989). In light of this theory, our study shows that SMEs with a higher TMS can achieve significantly higher MAS effectiveness if they place more value on decentralizing decisions, MAS user training, and user satisfaction. As such, it extends previous research that only identified the individual relationships of these variables with MAS without testing the mediating effect (e.g., Al-Hattami, 2021; Ngo, 2020; Ruivo et al., 2014).

Third, our study confirms that MAS should be viewed in a systemic approach, of which its dimensions are part, avoiding segmented MAS research models and allowing future comparability of research findings. Previous research has used these segmented MAS approaches, causing a lack of comparability in results (Pedroso and Gomes, 2020).

5.2. Managerial contributions

SMEs increasingly need internal and external information in all their departments. For many years, they were characterized by a lack of organization and resources and by centralized power decisions. The resilience they showed in surviving the most recent crises leads us to look at these organizations as winners and their characteristics as factors of competitiveness.

Our empirical research offers insights into the interaction processes between MAS, their users, and decision orientation. In particular, our results have several implications for top managers who influence and support change processes and management accountants.

First, from a decision-making perspective, top managers should abandon traditional centralization approaches and implement decentralization processes. According to our results, regardless of SMEs' size, decentralization will lead to an increase in the use of MAS information. This way, departmental managers will access up-to-date market information and react effectively to customer requests or anticipate competitors through innovations aligned with customers' needs.

Second, from the MAS users' perspective, our study reinforces the need for training and alerts top managers to the need for users to be satisfied with the information provided by the MAS. These results have implications for top managers as they should promote

adequate training of users not only in the use of the MAS but also in its design and implementation. Through this training, users can be more involved in updating MAS information and thus increase their satisfaction with its characteristics.

Finally, we found that although top managers support management accountants to participate in strategic decisions, this support is not reflected in the greater use of the MAS. This result has implications for accountants, who should consider changing their role in SMEs from just organizers of information to active participants in corporate and operations strategy by improving the quality of the information used in the decision processes.

5.3. Limitations and future research

Like any other study, this one has some limitations. Although comparable to similar studies, the sample size prevented further analysis, for instance, testing some control variables, including the industry effect on MAS utilization. It is worth noting that the sample used in this study is specific to Portuguese SMEs. Any generalization of the results should be made with caution.

The survey method approach used in this study also prevents analyzing specific organization characteristics of each SME and how they influence the utilization of MAS. Future research should use other methods, like case studies and qualitative research approaches, to analyze important variables influencing MAS use, such as the type of MAS, accountant profiles and tasks, CFO profiles and tasks, and organizational structure.

Future survey research should focus on analyzing how MAS can influence organizational performance, including the mediation effects of managerial performance and moderating effects of internal variables, such as the level of SMEs' digitalization, and external variables, such as perceived environmental uncertainty.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix

Table A1. Descriptive statistics of the survey answers.

Code	Construct Items	Mean	SD.	Skew.	Kurt.
Management accounting system					
Scope					
SCO01	Information which relates to possible future events	4.38	1.45	0.193	-0.680
SCO02	Quantification of the likelihood of futures events occurring	4.39	1.46	0.104	-0.814
SCO03	Non-economic information	3.72	1.46	0.347	-0.394
Timeliness					
TIM01	Requested information to arrive immediately upon request	4.67	1.36	0.069	-0.487
TIM02	Reports are provided frequently on a systematic, regular basis	5.11	1.43	-0.162	-1.037
TIM03	There is no delay between an event occurring and relevant information being reported to you	4.54	1.37	0.055	-0.806
Aggregation					
AGG01	Information provided on the different sections or functional areas in your organization	4.82	1.42	-0.152	-0.636
AGG02	Information on the effect of events on particular time periods	4.73	1.31	-0.015	-0.662
AGG03	Information which has been processed to show the influence of events on different functions	4.11	1.37	0.142	-0.437
AGG04	Information on the effect of different sections' activities on summary reports for your particular sections and for the overall organization	4.48	1.37	0.101	-0.671
AGG05	Information in formats suitable for input into decision models	4.49	1.57	0.023	-0.886
Integration					
INT01	Information on the impact that your decision will have throughout your department, and the influence of other individuals' decisions on your area of responsibility	4.50	1.53	-0.024	-0.814
INT02	Precise targets for the activities of all sections within your department	4.96	1.48	-0.435	-0.400
INT03	Information that relates to the impact that your decisions have on the performance of your department	5.00	1.41	-0.341	-0.603
User satisfaction					
USA01	Reliability of output information	5.50	1.00	-1.370	2.000
USA02	Relevancy of output information to intended function	5.53	0.97	-1.253	1.899
USA03	Accuracy of output information	5.14	1.12	-0.667	-0.182
USA04	Precision of output information	5.24	1.06	-0.772	0.325
USA05	Completeness of the output information	5.20	0.99	-0.975	0.870

(continued on next page)

(continued)

Code	Construct Items	Mean	SD.	Skew.	Kurt.
User training					
UTR01	Users received adequate training in designing of our management accounting system	4.91	1.37	-0.799	-0.224
UTR02	Adequate training was (is) provided for implementing the management accounting system	4.92	1.34	-0.913	0.210
UTR03	Users have had adequate training in how to use the information provided management accounting system	5.00	1.33	-0.970	0.357
Decentralizations of decisions					
DEC01	Development of new products or services	4.11	1.66	-0.244	-0.790
DEC02	The hiring and firing of managerial personnel	3.63	1.69	-0.055	-0.988
DEC03	Major investments decisions	3.63	1.83	0.069	-1.004
DEC04	Budget allocation	4.25	1.60	-0.276	-0.534
DEC05	Pricing decisions	4.13	1.67	-0.249	-0.736
Accountant participation in strategic decisions					
APD01	Identifying problems and proposing objectives	4.29	1.52	-0.379	-0.474
APD02	Generating strategic options	4.20	1.58	-0.412	-0.501
APD03	Evaluating strategic options	4.21	1.64	-0.440	-0.576
APD04	Developing details about strategic options	4.30	1.59	-0.428	-0.491
APD05	Taking the necessary actions to put changes into place	4.51	1.48	-0.463	-0.312
Top management support					
TMS01	The management accounting system receives strong active support from top management	5.64	1.16	-1.136	1.211
TMS02	Upper management has provided adequate resources to implement/maintain the management accounting system	5.38	1.14	-1.012	1.093
TMS03	The management accounting system is closely tied to the competitive strategies of our business	5.60	1.16	-1.164	1.538

Notes: SD – Standard deviation; Skew. – Skewness; Kurt. – Kurtosis.

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