

COST ACCOUNTING PRACTICES IN SMEs: LIABILITY OF AGE AND OTHER FACTORS THAT HINDER OR BURST ITS IMPLEMENTATION IN TURBULENT YEARS

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Abstract

This study aimed to investigate the level of cost accounting (CA) implementation in small- and medium-sized enterprises (SMEs). CA is a management accounting tool whose application in small companies has always been difficult. Nevertheless, academicians and practitioners recommend CA implementation in SMEs, especially because of the deep market instability, competitive pressure, and margin erosion that have occurred following the COVID-19 pandemic and 2022 European war scenario. Company size influences CA implementation; however, it is not the only influencing factor and perhaps not even the most important. To investigate the barriers to the adoption of CA and which conditions or actions can remove these barriers, leveraging from the contingency theory, a questionnaire was sent out in July 2022 to limited liability SMEs operating in the manufacturing, construction, and distribution macro-sectors in Verona and Vicenza provinces (Italy). Respondents answered a set of questions regarding CA implementation in their SMEs as of July 2022. Using a multivariate regression model to analyze data from the 120 questionnaires received, we found that lack of resources, limited training and skills, firm age, and the presence of the founder in the firm had a negative influence on CA implementation in SMEs. The low level of CA implementation was also associated with its supposed inefficiency, uselessness, and unsuitability for business. The effect of company size on CA implementation was not statistically significant. Despite this study's limitations regarding the sample and period considered, we believe that it contributes to both academic debates and practice by illustrating the limiting factors and ways in which CA implementation can be fostered in SMEs in turbulent years.

Keywords Cost accounting · SMEs · Management accounting · Contingency theory

Introduction

Cost accounting (CA) is a management tool that has always had just a moderate diffusion in small- and medium-sized enterprises (SMEs) compared to large firms (López & Hiebl, 2015). Notwithstanding, scholars, practitioners, and firms agree on the benefits of its adoption; in many companies, this tool remains an unknown or “one of the next things” to do or improve upon (Brierley, 2011). Indeed, the gap between the theory (that is, the textbooks that recommend a decision-relevant approach to cost analysis for pricing decisions (Perren & Grant, 2000) and practice (that is, empirical research that has consistently suggested that such an approach is not widely used in practice) is called “the reality gap” (Lucas & Rafferty, 2008). It follows, therefore, that for many SMEs, the knowledge of production cost to support business decisions (Nayak & Greenfield, 1994), which should be periodically updated according to changes in economic and market conditions, remains uncovered or only partially addressed, as a larger proportion of SMEs do not allocate overhead costs to product costs or do it using a lower number of overhead rates

(Brierley, 2011). Indeed, some research suggests that small businesses acquire effective information and control through informal means and that very small firms lack what are conventionally referred to as formal systems (Perren & Grant, 2000; Dyt & Halabi, 2007).

The origin of this situation is perhaps deeply rooted in the positive trends recorded for many decades by firms, the competition not being too aggressive, the number of resources required for CA implementation, and the stability of the economic scenario (Lohr, 2012). Indeed, many SMEs complain about limited budgets (in absolute value) that do not meet the requirements for CA implementation, low familiarity with the tool, inadequate knowledge and skills, and a scarce culture of control (Mitchell & Reid, 2000; Umeji & Obi, 2014). Resource poverty is typical in SMEs because small businesses are not little big businesses, as Welsh and White have observed (1982).

Moreover, the characteristics of CA implementation—cost objects, cost pools, values used (standard versus actual), cost method (variable or full costing), allocations to cost objects, double bookkeeping method, and extra-accounting—vary considerably among SMEs (Reid & Smith, 2000). It has been observed that contingent variables, such as decision-making style, organizational structure, environment, IT, international competition, and external events (including economic shocks and financial crises), shape management accounting systems and CA accordingly (Gordon & Miller, 1976; Jones, 1985; Xiao et al., 1996; Brignall, 1997; Reid & Smith, 2000; Messner, 2016; Otley, 2016).

The recent COVID-19 pandemic and European war have had a profound impact on the economic and social context of individuals (Meyer et al., 2022) as well as on the operation of companies (Linnenluecke, 2017; Kraus et al., 2020; Sharma et al., 2022), putting their resilience to the test (Roffia & Dabic, 2023). Difficulties in outlooks on market trends and customer behaviors have merged with the switch-off of in-person activities, business discontinuities (Breier et al., 2020), and shortages of components to raise prices and make timely product delivery difficult, producing a very turbulent situation. In addition, the high level of competition, which has not reduced despite the events, has also made it difficult to increase prices in response to lower margins. How then do we calculate the “real” margins if CA is weak, obsolete, or even absent? How do we analyze and react in turbulent years?

Over the past few years, SMEs, which are universally recognized as having remarkable speed, have realized how important a well-structured CA system is, especially in determining reliable and up-to-date product costs, redefining sales prices, setting up business negotiations with customers, and planning for future agility (López & Hiebl, 2015).

Considering the events outlined above and the complex foreseeable future scenarios, this study aimed to determine the actual level of CA implementation in SMEs and analyze the factors that may be responsible for the current level or its positive evolution in the future. In summary, the study aimed to answer the following questions: What are the reasons for the non-adoption or limited adoption of CA by SMEs? What conditions could help SMEs to adopt CA tools? What could possibly increase CA use in SMEs in the near future?

To answer these research questions, a questionnaire was sent to Veneto SMEs in the provinces of Verona and Vicenza in the late summer of 2022. For relevance and homogeneity, only manufacturing, construction, and distribution companies were selected. The questionnaires

were addressed to the chief financial officers (CFO), members of boards of directors (BoDs), business controllers, and majority shareholders, enquiring about CA implementation in their company, reasons for absent or limited implementation, and some demographic variables such as company size and involvement of the founder in the company's activities. Analyzing the 120 valid questionnaires received, we identified a few factors that influence the level of CA implementation and others that can foster CA adoption in the future.

Despite its limitations, we believe that this study contributes to both the academic and professional debate on CA implementation in SMEs in three ways. First, it underscores how resources and knowledge are important for the set-up and development of cost-control tools in SMEs. Second, it highlights the "liability of age," as older companies and those that had the founder still active in the management had less advanced CA tools. Third, it recognizes the importance of CA packages, competitive pressure, and lower margins as potential future drivers of CA implementation in SMEs.

The paper is structured as follows: the "Literature Review" section explores the literature and reports our research hypotheses. The "Research Methodology" section describes the participants, instrument, procedure adopted, and models involved. The "Findings" section reveals our results, whereas the "Discussion" section analyzes this study's implications and checks the validity of the research hypothesis. Lastly, the "Conclusion, Limitations, and Future Developments" section concludes, addresses the study's limitations, and outlines some of its implications.

Literature review

Management and cost accounting in SMEs

CA is a conscious and rational procedure performed by accountants to accumulate costs and relate such costs to specific products, customers, or departments for effective management (Layne & Rickwood, 1984). Accounting studies have distinguished between two broad categories of accounting: financial accounting (FA) and management accounting (MA). Unlike FA, MA is not mandatory for firms and is intended to provide the management with suitable information for business decision making, improving business performance (Shields & Shellenman, 2016). Within the MA field of study, one of the most discussed tools among scholars is CA; however, interest in it is declining (Hopper & Bui, 2016).

CA studies started to develop significantly and spread in the scientific community over a century ago. However, from an empirical point of view, companies have used CA for much longer; indeed, examples of production cost calculations can be found during the Renaissance in the United Kingdom, Italy, and other European countries (Garner, 1947). However, with the construction of major industries, railway networks, and mass production, this tool has found widespread and systematic use in large companies. Its adoption occurred later in Italy than in Anglo-Saxon countries because Italy's industrial development began later (during the second half of the nineteenth century) and progressed slowly thereafter (Cinquini et al., 2015; Ovunda, 2015). CA practices do not discourage the use of extra accounting tools; therefore, CA is devoid of the double entry balancing that characterizes financial accounting, even though the development of the technique has taken over, especially in larger organizations. Initial studies

were rooted in the neoclassical theory; in contrast, the latter ones were mostly underpinned by the institutional (Tool, 1991; Ahmed & Scapens, 2000) and contingency (Scapens, 1994; Brignall, 1997) theories. Nonetheless, a substantial gap exists between the models and tools proposed by scholars for cost and management accounting and what companies use, and this has been addressed in the literature (Scapens, 1994; Gao, 2021). Even more evident is the gap that still exists in the literature specifically regarding SMEs, since management and cost studies have long ignored the specificities of this category of firms and perhaps also because this topic was not considered “fashionable” (López & Hiebl, 2015).

The main theories underpinning management and cost accounting

The contingency theory is probably the most recognized theory underpinning MA and CA studies (Gerdin & Greve, 2004). Initial studies on MA were grounded in the neoclassic theory of the firm, which was not originally intended to be an explanation of the behavior of managers within firms (Scapens, 1994). Other relevant theories that have underpinned studies on MA are the agency theory (Baiman, 1990; Tiessen & Waterhouse, 1983), the transaction cost economics theory (Spicer & Ballew, 1983), and the institutional theory (Powell & DiMaggio, 1991). The agency theory supports the implementation of CA and MA to monitor and control agents’ behavior, which requires a flow of information from the relevant entity to the principal (Reid et al., 1999). The institutional theory views accounting practices as institutionalized routines that enable organizations to reproduce and legitimize behavior and achieve organizational cohesion, enabling decision making in a complex and uncertain world (Scapens, 1994; Hopper & Bui, 2016). According to this theory, accounting is used by organizations to project an appearance of rational practice toward their social environment and thus maintain the support necessary for their survival (Perren & Grant, 2000). MA and CA are tools that support conscious business decision making (Tool, 1991; Scapens, 1994; Ahmed & Scapens, 2000). The contingency theory of MA has its roots in the 1970s when it was used to explain the varieties of MA practice (Otley, 2016); this was also confirmed more recently in two studies by Reid and Smith (1999) and Reid et al. (1999) using data obtained from Scotland. In fact, in the same period, different companies used very different MA systems, the last system being influenced by both traditional contingent factors, such as firm size, economic environment, business sector, industry, culture, strategy, organizational issues, etc., and external influences, leading the organization to change and adapt its management control system (MCS) (Messner, 2006). In addition, SMEs, as observed by Perren and Grant (2000), are considerably influenced by their owner/manager’s business “micro-world,” especially regarding decisions related to their MA routines, making it even more complex to completely understand the factors influencing these choices.

Cost accounting tools, enterprise resource planning systems, and the research gap

CA is one of the components of the MCS of a company (Malmi & Brown, 2008; Ferreira & Otley, 2009). Usually, it is possible for companies to change or adapt just one component of their MCS without replacing the whole system. More recently, CA practices have benefited from their implementation in companies that have integrated enterprise resource planning (ERP) systems and can manage business information in a coordinated and consistent way (Jenson & Johnson, 1999; Keong et al., 2012). Since the 1990s, ERPs have given impetus, particularly in large companies that were their initial target, to wider information sharing as well as widespread

implementation of best practices on internal controls inside the company (Katuu, 2020), including CA, which was one of the package components (Malmi & Brown, 2008). In the following years, solution providers focused on developing ERP solutions for medium- and small-sized companies, with growing success (Buonanno et al., 2005).

Although SMEs constitute an important segment of all economies, research on CA implementation in SMEs remains substantially limited (Lohr, 2012; Armitage et al., 2016), and only in recent years have a few articles addressed this topic, reducing the research gap (Ulrich & Kratt, 2021; Marius et al., 2012; Lòpez & Hiebl, 2015). Micro-, small-, and medium-sized enterprises constitute the back bone of the Italian as well as the global economy, numerically representing (in both cases) over 90% of companies and employing more than 50% of the work-force (World Bank, 2021; EU Commission, 2020). To address CA implementation in SMEs, it is not sufficient to downsize studies on large firms because they have different behaviors and business models (Miller et al., 2021), as the European Commission (2020) has recognized. Unlike large firms, wherein MA and CA are mostly used to reduce agency costs between managers (agents) and owners, SMEs use MA and CA primarily to facilitate business decisions and organizational development, which, if it is to be done properly, requires adequate information (Shields & Shelleman, 2016; Marius et al., 2012). Scholars and practitioners have recognized that the informative usefulness of the effective implementation of CA remains a paradox with little interpretation (Jansen, 2018). Since the level of CA implementation is still low in SMEs (Biadacz, 2022; Cinquini et al., 1999; Hopper et al., 1999; Imo & Chukwu, 2022; Jansen, 2018), we would like to contribute to the analysis of this paradox. However, it is not the only dystonia in the field of CA, as the ABC paradox also remains valid, at least in Italy (Cinquini et al., 2015), because of the ambiguity between the perceived benefits of ABC and its low adoption rate by firms.

Unfortunately, research on MA and CA has been dominated by the study of current practices in leading large-scale Western and Japanese companies (e.g., Anderson, 1995; Cooper, 1989; Kaplan, 1994); this is probably because such firms have the resources to develop new or advanced techniques (Mitchell and Reid, 2000), including activity-based costing and target costing (Reid et al., 1999; Lòpez & Hiebl, 2015; Gosselin, 2007). This study aimed to fill this gap by analyzing the level of adoption of CA by SMEs and identifying which factors hinder or foster its adoption in light of the changes that have originated from the COVID-19 pandemic and the Russian war. We also analyzed the influence of company age and the presence of the founder in the organization on CA implementation in SMEs; to our knowledge, this has not yet been investigated by the literature.

Influence of the turbulent years following COVID-19 and the Russian war on CA implementation

Given that events such as the COVID-19 pandemic and the 2022 European war constitute a potential element of change (Sharma et al., 2022) and given the development of new business practices and implementation of new accounting tools, as the contingency theory suggests (Reid & Smith, 2000), a survey on CA is now particularly interesting (Lutfi et al., 2022). In fact, because modern ERP systems have considerably lowered the threshold of investment required for their implementation (Muscatello et al., 2003; Kanchana & Sriranjini, 2018) and these systems often incorporate a specific module for CA, it has become particularly interesting to understand how

many impulses of their implementation have arrived in recent years. What emerges is a potential double effect produced by the environmental turbulence and instability of markets that have arisen in these turbulent years. Indeed, due to their direct effect on CA adoption, which we expect has grown compared to previous years, we suspect that there is also an indirect one, originating from ERP system implementation. The importance of management information systems and the integration of information through ERP systems in support of business decisions in the context of SMEs is widely recognized (Raymond & Magnenat-Thalman, 1982). The recent COVID-19 pandemic has driven many SMEs to reconsider their traditional reluctance to adopt ERP systems because they now need to strengthen their digitalization and organizational resilience (Lutfi et al., 2022; Roffia & Mola, 2022; Skouloudis et al., 2020). Because ERP systems and CA are undoubtedly part of the organizational structure that influences strategic, capital, and learning resilience, an improvement in CA will have a huge impact on SMEs' survival (Ates & Bititci, 2011; Bhamra et al., 2011). However, concerning the growing importance of ERP systems, it should be noted that many SMEs still use or plan to use CA systems that are not based on double bookkeeping methods but rather on spreadsheets and stand-alone software tools. Despite the absence of a square, this second method of CA is probably the most widely used in SMEs and thus represents the status quo from which to evolve. The evolution of CA requires the presence of specific management control skills, which are often limited or even absent, in the company. Knowledge and skill are important if we consider the usefulness and opportunities for the CA resulting from the developments of information systems that include tools for data analytics and process mining (Wang, 2022). So, considering both methods of CA (the one based on double-entry bookkeeping and the other based on the use of extra-accounting simple spreadsheets), what is their degree of implementation in SMEs?

Research questions and hypotheses

This study empirically evaluated the validity of certain factors in influencing CA implementation in SMEs to ascertain whether, eventually, some other internal or external factors could foster its implementation. This analysis was performed in light of the turbulence of the new competitive market scenarios that arose after the COVID-19 pandemic and the Russian War. First, what can these factors be?

The first group of factors influencing CA implementation include the company size and macro-sector of activity. With a few exceptions, the size of a company—which is a synthesis of many other aspects, such as the availability of qualified managers, the culture of control, and the trust that the company has built on the territory—could be a limiting factor in the implementation of CA tools (Cinquini et al., 2015). Most scholars agree that larger SMEs should have higher levels of CA implementation and sophistication (Brierley, 2011), but some scholars hold a different opinion on this issue, e.g., Becker et al. (2011) found company size to have no influence on MA adoption in German SMEs. This is also reflected in the adoption of sophisticated CA systems (Biadacz, 2020; Lavia López & Hiebl, 2015) and more advanced cost calculation techniques, such as ABC, Kaizen costing, and Target costing, by large firms. In contrast, the increased use of CA in most capital-intensive businesses, such as railways, ship and aircraft manufacturers, mining, and other large manufacturing companies, over the last two centuries (Cinquini et al., 2015) suggests a potential influence of the macro-sector of activity (i.e., manufacturing) on CA implementation. In summary, based on the abovementioned considerations, we formulated the first hypothesis.

Hp1 Company size and macro-sector of activity influence CA implementation.

Two other factors that could influence CA implementation in SMEs are the “seniority” of the company (firm age) and the presence of the founder in the company. Regarding firm age, on the one hand, more years of activity should stabilize the control process within an organization, thus favoring the adoption of tools such as CA, key performance indicators (KPIs), and economic budgets; on the other hand, more years of activity makes past habits chronic and reduces the desire for change and the likelihood of adopting innovative managerial practices like the implementation of the CA packages available in ERP systems (Lutfi et al., 2022). While, according to certain studies, the presence of the founder in an organization clearly contributes positively to company performance (Adams et al., 2009), product development, and customer relationships, it is almost unclear whether it contributes to CA practices and requires further study. The contribution of the founder, regardless of their experience and skill, is “naturally” more oriented on product and business development than on control, this is a typical managerial prerogative that is limited by the nature and characteristics of the SME. In light of these considerations, we posited the second hypothesis.

Hp2 Firm age and the presence of the founder in the company exert a negative influence on CA implementation.

CA, in SMEs, plays a key role in the planning and control processes by supporting analyses aimed at assessing the profitability of the products and services offered as well as right decision making (Drury, 2018). An increase in competitive pressure usually leads to a reduction in profitability, resulting in the need to implement more aggressive trade policies. In these contexts, the use of CA allows for the measurement of the commercial efforts safeguarding the survival of the company. Avoiding the sale of products at a loss and in any case, making this decision while being conscious of the consequences is a fundamental managerial objective that we can entrust to CA. Therefore, it is expected that companies with more competitive pressure are also the ones most eager or forced to implement CA (Hopper et al., 1999; Lohr, 2012). Regarding company performance, scholars have pointed out the higher profitability of SMEs which are adequately supported by CA and MA (Uchegbu et al., 2021; Imo & Chukwu, 2022). This influence of MA tools, particularly CA systems and strategic MA tools, has been proven in both manufacturing and service companies (Alvarez et al., 2021; Hariyati et al., 2023). The opposite is also likely the case, that is, companies with high performance are also the ones that invest more in CA, which we remember being a very useful practice but still entailing a burden. Financial performance can therefore be a functional element to overcome expenditure fears and build a solid control model. In light of the above consideration, we formulated the third hypothesis.

Hp3 Competitive pressure and financial performance are associated with high levels of CA implementation.

As previously reported, most of the studies on CA are based on large firms, probably because it was implicitly believed that it is unlikely for SMEs to have the expertise or resources to develop significant breakthroughs or innovations and therefore realize significant advancements. Over the years, the limited resources available for this form of control and the often-lacking knowledge of the tool by SME staff limited CA adoption (Mitchell & Reid, 2000; Umeji & Obi, 2014) and encouraged the development of simple customized CA models instead. This is at least

what has happened in most European and North American countries, with only a few exceptions such as was reported by Hopper et al. (1999) regarding some Japanese SMEs. Effective cost management is a competitive advantage for any company that has become even more relevant in today's economy which is characterized by great instability and turbulence in main markets. To rationally and effectively manage resources and costs, reliable production costs are fundamental as they are the basis for business decision making, planning and control processes, and performance management (Biadacz, 2022). Additionally, even with the availability of the necessary know-how and skilled personnel, the use of CA could be made difficult by the absence of material and financial resources to support it. CA still requires people and tools (in addition to managerial expertise), often in overabundance depending on the company's size, despite the benefits of the CA tools (or packages) available inside ERP systems. Over time, ERP systems have proportionally required lower investments and fewer people, thus lowering the threshold of entry for SMEs (Muscatello et al., 2003). Based on the abovementioned considerations, we posited the fourth hypothesis.

Hp4 Resources, know-how, skills, and training are limiting factors for CA implementation.

To correctly address the decision to implement CA, we decided to consider another factor that we believe is strongly tied to the decision maker's (entrepreneur, director, controller, etc.) subjective perception of CA implementation in SMEs—the perceived utility of the tool (or on the contrary, its usefulness). The less important its utility is perceived to be, the more CA will be discouraged or not implemented. This has already been proven in the case of ERP and IT technologies, using the TAM and UTAUT models (Venkatesh et al., 2003; Amoako Gyampah & Salam, 2004; Roffia & Mola, 2022), which stressed the importance of the perception of a tool's utility and efficiency as key drivers of its adoption. In light of the above consideration, we formulated the fifth hypothesis.

Hp5 CA can be considered an inefficient and/or ineffective tool by SMEs.

While it is important to analyze the factors that have led to the current state of CA implementation, it is equally important, given the theoretical and practical implications, to identify potential factors (either new opportunities or barrier removal) that will increase CA implementation. Candidates for this analysis included some of the limiting factors previously considered, such as the availability of skills, knowledge, and training. Analyzing previous studies on ERP systems (Buonanno et al., 2005; Muscatello et al., 2003), we found that the availability of CA packages could remove an important economic barrier as well as competitive pressure and that attention to cost control could motivate efforts toward CA implementation and development. Based on these considerations, we formulated the sixth and final hypothesis.

Hp6 Availability of knowledge, skills, and training; high competitive pressure; accessibility of CA packages; and attention to cost control could remove barriers to CA implementation and even boost it.

Research methodology: instruments, participants, and procedure

To answer our research questions, a quantitative study was carried out based on a questionnaire addressed to manufacturing, construction, and distribution companies operating in the Veneto

region, in the provinces of Verona and Vicenza. According to the Italian Institute of Statistics (ISTAT), in 2019, these two provinces in the Veneto region were at the top in terms of per-capita number of firms, value of exports, and employment rates in Italy. They were active in the manufacturing, construction, and distribution macro-sector, with 5,421 limited liability SMEs employing around 167,000 workers. These SMEs accounted for more than 90% of the limited liability companies active in this area, employing more than 50% of the workforce, not unlike the rest of the world. These firms represent a homogeneous subset of Italian SMEs that is “suitable” for research purposes (De Massis et al., 2013).

We are aware that our results would have had greater validity and extensibility if we had gotten a more representative sample of the universe of SMEs and reached more respondents including companies from other geographic areas (and other countries) and sectors. We plan to overcome these limitations in the future by removing time constraints on data collection and acquiring new business contacts.

Based on the definition of SME adopted by the European Union and for simplicity and homogeneity with international comparison, we identified SMEs using only the requirement regarding employees and leaving out the simultaneous use of sales revenues and total balance sheet assets. Data collection started in July 2022 and ended in October 2022. We asked SMEs about their CA implementation, the reasons for non-adoption, and some demographic data.

We conducted a preliminary phase of data collection by interviewing two BoD members to gather information regarding our topic and assess our online questionnaire (Woodside & Wilson, 2003). We identified a set of statements to which respondents had to answer using a 5-point Likert scale (1: totally disagree, 5: completely agree). Each statement was associated with a variable in order to limit the overall number of statements and raise the response rate. The variables considered are listed in the Appendix. We contacted about 5,000 SMEs, fulfilling our requirements in terms of legal form, status (in business), geographical area, and size. The invitation was addressed to CFOs, members of BoD, and majority shareholders (depending on our contacts) or the company controller because these were the individuals most qualified to discuss CA.

The questionnaire indicated the purpose of the research and gave instructions on how to respond. A total of 156 responses were received, but after removing duplicates to ensure homogeneity with respect to the study purpose and our target companies, 120 questionnaires remained. Manufacturing companies (European NACE code = C macro-sector) accounted for 106 responses, building and construction companies for 3 responses (NACE code = F macro-sector), and distribution companies for 11 responses (G macro-sector). Small firms (those with 10 to 29 employees) accounted for 42% of our sample, companies with 30 to 49 employees were 24 in number, and companies with 50 to 249 employees were 45. We addressed potential non-response bias in our sample companies compared to SMEs active in our reference area by comparing the responses of the first and last respondents; we found non-significant statistical differences.

Considering our literature review and supported by our preliminary interviews, we identified five potential factors as negatively influencing CA implementation in SMEs: (1) lack of resources; (2) lack of knowledge, skills, and training; (3) inefficiency of the tool; (4) skepticism regarding the

usefulness of the tool; and (5) inadequacy of the tool in business activity. All of them were evaluated using a 1 to 5 Likert scale.

Lack of resources, above all, was a serious limiting factor for the implementation of CA in the SME context, as the CA tool requires both material and personnel investments, which are often proportionally reduced because of the limited size of the company.

The second factor—lack of knowledge, skills, and training—is linked to the “managerial side” of the company. SMEs are often limited in terms of finance and control functions for various reasons, including scarcity of professional management and just being more focused on the product and sales network.

Further, the CA tool could be considered an inefficient tool by SMEs, usually because of the high level of resources required and the availability of other sources of cost information (machinery resellers, suppliers, competitors, consultants, etc.).

Similarly, as the fourth factor, SMEs could believe that CA is not useful because of their size and the complexity associated with the tools or, more simply, because the instruments and information provided by CA are not well known. Traditionally, SMEs distrust CA, and this has, for many years, delayed its implementation.

Lastly, SMEs could delay or limit their investments in CA tools due to their business activity, believing that in their case, the cons outweigh the pros.

Following our literature review and considering the potential influence of both competitive pressure and financial performance on CA implementation, we additionally considered, for our analysis, two specific variables to measure these effects. We evaluated competitive pressure by asking respondents to report their perceived level of pressure using a 5-point Likert scale. Regarding the financial performance of SMEs, we used self-reported measures of performance, particularly the return on asset (ROA) ratio (measured by dividing EBIT—earnings before interests and taxes—by total assets, 7-point scale), ROA ratio compared to competitors (5-point scale), and liquidity (5-point scale), which we inserted into our analysis as a single variable (PERFFIN). The Cronbach Alpha of these three variables was greater than 0.8, supporting this choice. Finally, we included some context variables, such as company age, involvement of the founder in management, and the size of the company in terms of sales turnover because of their potential influence in our SME context (Roffia et al., 2021). Company age referred to the years from foundation to 2022, whereas the presence of the founder in management was measured using a dummy variable (0: no, 1: yes). Regarding company size, we decided to use the natural logarithm of the sales turnover as in other studies. Lastly, we invited respondents to indicate, through notes, any further helpful information regarding company size, activity, or changes that occurred recently.

To broaden the scope of our analysis, we also decided to ask respondents which drivers, in their opinion, could foster CA implementation in SMEs. We identified five potential factors as follows: (1) margin reduction; (2) high competitive pressure; (3) availability of software packages for CA; (4) availability of knowledge, skills, and training; and (5) cost control requirements. Margin reductions and high competitive pressure are two trends that, over the last 30 years, have

interested many economic sectors, regardless of the size of the companies. We expect that over the next few years, more SMEs will face these difficulties and therefore decide not to improve their CA. The availability of software packages for CA could reduce the efforts required for its adoption, lowering the investment and realization times. The lack of resources, skills, and training, as observed in terms of the actual level of CA implementation, constitutes a serious limiting factor for the implementation of CA, and the reduction of this lack can boost new investments in companies. Similarly, the same effect can arise from new top management requirements in terms of higher cost information quality provided by finance and controlling functions.

The analysis used to answer the research questions was based on multivariate ordinary least squares regressions, where the dependent variable was the level of CA implementation (CAOIMPL), and the explanatory variables were those previously mentioned. In our model, potential endogeneity for reverse causality issues could be substantially excluded because the explanatory variables considered exert their effect on CA implementation only after a certain period and because CA implementation (or its improvements) is a long and complex process that requires time to be realized, usually many months. This way, we ensured a lag between the independent and dependent variables. Financials were considered in relation to competitors and with reference to previous years because of the delay in the availability of data. Other considerations regarding this issue are included in Sect. 5.1 which deals with the robustness of results.

Figure 1 shows the Ordinary Least Square (OLS) regression model of this project. We also used summary statistics to analyze single variables, accounting for frequencies from respondents in various sub-sets of data. The variables used are listed in Table 1.

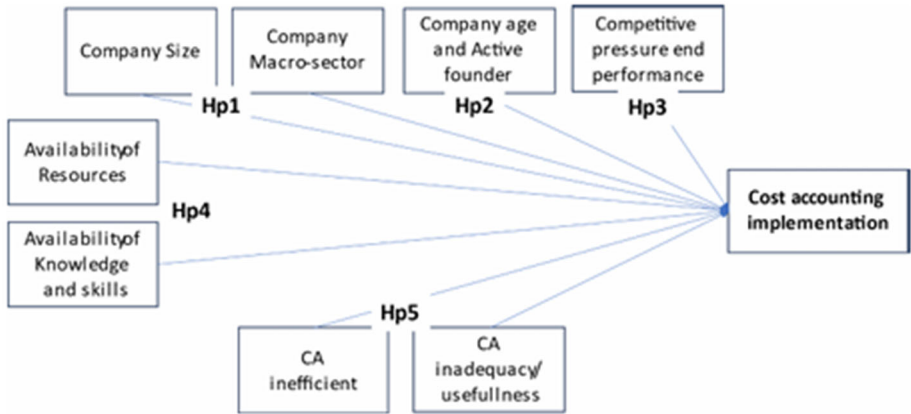


Fig. 1 OLS Regression model

Table 1 Definition of variables

Variable	Definition
CA0IMPL	Cost accounting implementation level (1: scarce, 2: limited, 3: sufficient, 4: moderate; 5: high)
LNSALES	Natural logarithm of Sales turnover in 2021
YOLD	Number of years from foundation
FOUND	A variable that takes 1 in case of founder still active inside the company, 0 otherwise
COMPPRES	Competitive pressure (1: scarce, 2: limited, 3: sufficient, 4: moderate; 5: high)
PERFFIN	Financial performance measured by mean of: (a) ROA ratio (1: low profitability – 7: highly profitable scale), (b) ROA ratio comparison to competitors (1: very lower ROA, 5: very higher ROA), (c) liquidity (1: scarce, 2: limited, 3: sufficient, 4: moderate; 5: high)
CA0NORES	A dummy variable that takes 1 if low level cost accounting implementation is due to lack of resources, 0 otherwise
CA0NOKNOW	A dummy variable that takes 1 if low level cost accounting implementation is due to lack of know-how, skills, and training, 0 otherwise
CA0INEFF	A dummy variable that takes 1 if low level cost accounting implementation is due to inefficiency of the tool, 0 otherwise
CA0NOUTIL	A dummy variable that takes 1 if low level cost accounting implementation is due to scepticisms/usefulness of the tool, 0 otherwise
CA0NOFORACT	A dummy variable that takes 1 if low level cost accounting implementation is due to inadequacy of the tool in the specific context, 0 otherwise
CA1MARGIN	A dummy variable that takes 1 if high future pressure on margins could improve cost accounting implementation, 0 otherwise
CA1COMP	A dummy variable that takes 1 if high future competition could improve cost accounting implementation, 0 otherwise
CA1SW	A dummy variable that takes 1 if the availability of cost accounting packages could improve cost accounting implementation, 0 otherwise
CA1EDUC	A dummy variable that takes 1 if the availability of knowledge, skills and training could improve cost accounting implementation, 0 otherwise
CA1COSTS	A dummy variable that takes 1 if a required high cost control could improve cost accounting implementation, 0 otherwise

Findings

Table 2 shows the descriptive statistics of the variables considered in this study, including minimum, maximum, mean, and standard deviation.

The data obtained in July 2022 in Italy, more than two years after the outbreak of the COVID-19 pandemic and after half a year of economic shocks arising from the 2022 European war, showed a discrete implementation of CA by our sample companies (CA0IMPL mean = 3.7), with a significant standard deviation (1.0).

The sample SMEs, 41% of which had between 10 and 19 employees (S1SIZE), had an average sales turnover of 18.8 million euro (LNSALES mean 15.8, std. dev. = 1.5). They were active on average from 1981 (YOLD has a mean age of 41.2 years in 2022), and 60% of them had their founder active in management (FOUNDER). Competitive pressure (COMPPRES) had a mean value of 3.8 over 5, with a standard deviation of 0.9. Financial performance had a mean value of 3.9 over 5.666 (the PERFFIN value was the mean of 3 variables; one was answered using a 7-point Likert scale, and the other two were answered using a 5-point Likert scale; the range of this variable was between 1.333 and 5.666). Approximately 27.5% of our sample SMEs indicated lack

of resources to be their reason for not implementing CA (CA0NORES); 29% indicated a lack of know how, skill, and training (CA0NOKNOW); 10% indicated that they considered CA to be an inefficient tool (CA0INEFF); 9% indicated that they considered CA to be non-useful in general; and 3% considered CA to be useless for their specific SME (CA0NOFORACT).

We also analyzed CA implementation (CA0IMPL) using two different categorical sets of respondents: (1) manufacturing versus non-manufacturing companies and (2) small versus medium companies. Despite the differences in means between the groups, the t-test ($p < 0.01$) did not show statistically significant differences between the datasets.

Table 2 Descriptive statistics (120 observations)

Variable	Obs	Mean	Std. Dev.	Min	Max
CA0IMPL	120	3.667	1.015	1	5
LNSALES	120	15.840	1.525	9.541	19.137
YOLD	120	41.267	18.207	7	99
FOUND	120	0.600	0.492	0	1
COMPPRES	120	3.817	0.898	2	5
PERFFIN	120	3.861	0.803	1.333	5.667
CA0NORES	120	0.275	0.448	0	1
CA0NOKNOW	120	0.292	0.456	0	1
CA0INEFF	120	0.100	0.301	0	1
CA0NOUTILITY	120	0.092	0.290	0	1
CA0NOFORACT	120	0.033	0.180	0	1
CA1MARGIN	119	0.454	0.500	0	1
CA1COMP	119	0.328	0.471	0	1
CA1SW	119	0.403	0.493	0	1
CA1EDUC	119	0.395	0.491	0	1
CA1COSTS	119	0.387	0.489	0	1

Table 3 shows the correlation matrix between the variables used in the linear regressions referred to in Table 4. The significant correlations ($p < 0.05$) observed indicate some associations between CA implementation (CA0IMPL) and the variables previously illustrated; however, they did not exceed 0.4. There is only one case in which the value exceeded 0.5, and that is the correlation between company age and the involvement of the founder in the management of the organization (0.57, $p < 0.01$). T

Table 3 Pairwise correlation matrix (only significant correlations)

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) CA0IMPL	1.000										
(2) LNSALES		1.000									
	(0.249)										
(3) YOLD			1.000								
	(0.670)	(0.149)									
(4) FOUND		-0.193	-0.569*	1.000							
	(0.855)	(0.035)	(0.000)								
(5) COMPPRES					1.000						
	(0.242)	(0.422)	(0.219)	(0.805)							
(6) PERFFIN	0.400*		0.211		-0.183	1.000					
	(0.000)	(0.159)	(0.021)	(0.356)	(0.045)						
(7) CA0NORES	-0.406*					-0.297*	1.000				
	(0.000)	(0.280)	(0.945)	(0.620)	(0.169)	(0.001)					
(8) CA0NOKNOW	-0.459*					-0.286*	0.262*	1.000			
	(0.000)	(0.923)	(0.073)	(0.417)	(0.926)	(0.002)	(0.004)				
(9) CA0INEFF									1.000		
	(0.072)	(0.796)	(0.547)	(0.267)	(0.788)	(0.900)	(0.840)	(0.319)			
(10) CA0NOUTILITY	-0.352*				-0.226					1.000	
	(0.000)	(0.422)	(0.905)	(0.095)	(0.013)	(0.332)	(0.472)	(0.216)	(0.917)		
(11) CA0NOFORACT											1.000
	(0.406)	(0.755)	(0.540)	(0.149)	(0.064)	(0.889)	(0.910)	(0.195)	(0.502)	(0.522)	

Note. 120 observations. Only correlations significant at least at 5% are reported. *shows significance at $p < 0.01$.

Table 4 reports the results of the regression analysis performed regarding CA implementation (CA0IMPL) as an output variable. The analysis proceeded in successive steps, with additional explanatory variables inserted into the model to increase its goodness of fit which is expressed by the R² value and the associated F-test. Therefore, in Column 1, only the control variable LNSALES has been inserted; Column 2 includes the independent variables firm age (YOLD) and the involvement of the founder in the management of the organization (FOUND). Column 3 includes the level of competitive pressure (COMPPRES) and financial performance (PERFFIN); finally, in Column 4, variables related to possible reasons for not having implemented CA are inserted into the regression. From the first column to the last, a progressive increase in R² (from 0.01 to 0.55) as well as F-tests (in the third column, the value is close to 16, $p < 0.001$) can be

observed. The adjusted R2 value is substantially in line with the above while modifying the number of regressors considered. The post-regression checks verified the existence of the conditions for the validity of the model and, in particular, the absence of heteroskedasticity, collinearity (variance inflation factor), and the correct formulation of the model. From the results in Column 4, the variables that were found to be significant and, therefore, affect CA implementation were (the sign of the influence is indicated in the brackets): firm age YOLD (-), presence of the founder FOUNDED (-), competitive pressure COMPPRES (+), and financial performance PERFFIN (+). All five potential motivators of non-implementation of CA considered as potential explanatory variables were significant ($p < 0.05$) and had negative effects as expected: lack of resources CA0NORES (-) and knowledge CA0NOKNOW (-), inefficient tool CA0INEFF (-), and the usefulness of the tool, both in general CA0NOUTILITY (-) and in the specific context CA0NOFORACT (-). It is noteworthy that the size of the company (LNSIZE) did not have a statistically significant effect on CA implementation and that manufacturing SMEs (C macro-sector) had a CA implementation level statistically similar to the others.

Table 4. Results (robust standard errors)

Variables considered	(1) CA0IMPL	(2) CA0IMPL	(3)
Model	Only Control var.	Control and Indep. var.	All var.
LNSALES	0.071 (0.053)	0.049 (0.045)	0.061 (0.039)
YOLD		-0.013* (0.007)	-0.016*** (0.004)
FOUNDED		-0.204 (0.197)	-0.337** (0.147)
COMPPRES		0.257** (0.107)	0.145 (0.094)
PERFFIN		0.596*** (0.097)	0.330*** (0.089)
CA0NORES			-0.610*** (0.182)
CA0NOKNOW			-0.706*** (0.156)
CA0INEFF			-0.524** (0.238)
CA0NOUTILITY			-1.149*** (0.253)
CA0NOFORACT			-0.947*** (0.218)
_cons	2.548*** (0.832)	0.26 (1.02)	2.295** (0.943)
Observations	120	120	120
R-squared	0.011	0.231	0.551
RMSE	1.014	0.909	0.711
Adj R ²	0.003	0.198	0.510
F-stat	1.800	8.739	15.998

Robust standard errors are in parentheses *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Discussion of results

Based on the aforementioned results, research hypothesis 1 (Hp1) is not confirmed: company size does not influence CA implementation in SMEs. This is similar to reports by Becker et al. (2011) and López & Hiebl (2015), who only found behavioral variations in large firms. This may also be due to progress in ERP systems adopted by SMEs, which have made CA modules available to smaller companies. Similarly, the macro-sector of activity did not influence the level of CA implementation; this is in contrast with findings by Brierley (2011) and Armitage et al. (2016). Lower barriers to the acquisition of CA tools as well as to the development of CA models for construction and distribution companies could be responsible for these results.

Conversely, Hp2, Hp3, Hp4, and Hp5, all of which concern the potential influence of a wide set of explanatory variables on CA implementation, are confirmed. In particular, firm age (Hp2a), contrary to what was reported by Armitage et al. (2016), was not beneficial to CA implementation; this highlights a sort of “liability of age” for older SMEs, which tend to invest less in CA tools than younger SMEs. Start-up companies and young SMEs can be born ready for these forms of control. Similarly, the presence of the founder in the company (Hp2b) did not influence CA implementation positively; this is probably because most founders are more engaged in product improvement and market development than in controlling activities. Conversely, competitive pressure (Hp3a) did positively influence CA implementation in SMEs, similar to what was reported by Hopper et al. (1999) and Lohr (2012) concerning German SMEs, which had limited CA adoption when costs were higher than benefits and strong market positions were reached without MA. High financial performance also had a positive influence on CA implementation (Hp3b), similar to reports by Hopper et al. (1999) and Shields and Shelleman (2016) in their studies on micro-SMEs. Unsurprisingly, a lack of resources, knowledge, skills, and training had a negative influence on CA implementation, similar to what was outlined by Brierley (2011) and Armitage et al. (2016) (Hp4). Lastly, as highlighted in the TAM and UTAUT theory (Venkatesh, 2003) regarding IT and ERP implementation, a perceived lack of usefulness of CA and inadequacy of CA reduced the willingness of SMEs to implement it; this finding aligns with that of Lohr (2012) concerning cost-to-benefit trade off, confirming Hp5.

Regarding Hp6, we analyzed the frequency and distributions (across company size and activity macro-sectors) of five variables we had posed to SMEs in the questionnaire regarding factors that, in their opinion, could improve CA implementation in the coming years. These variables were CA1MARGIN, CA1COMP, CA1SW, CA1EDUC, and CA1COSTS. All five were answered by at least one third of the respondents (multiple answers accepted) as follows: CA1MARGIN (45%), CA1COMP (33%), CA1SW (40%), CA1EDUC (39%), and CA1COSTS (39%). Therefore, Hp6, which concerns the supporting role of these variables— availability of knowledge, skills, and training; availability of CA packages; increased competition; higher attention to cost control; and high future pressure on margins—is confirmed.

Robustness tests on the results

The results of the model expressed in Column 4 of Table 4 were subjected to some robustness tests. More particularly, to consolidate the explanatory value of the results, in line with other

studies, we tested our model in homogeneous sub sets of data. Details of these integrative regressions are available upon request. The first test involved a group of small (< 50 employees) and medium-sized (between 50 and 250 employees) enterprises which were analyzed separately, as well as manufacturing SMEs (ISTAT - NACE C macro-sector) against non manufacturing ones (ISTAT NACE F and G macro-sectors). The results were in line with what has already been noted above and presented in Table 4.

We also addressed a potential endogeneity issue for simultaneity between CA implementation and financial performance. In Sect. 3, we introduced the design of our model which included a lag between the explanatory and dependent variables. Considering the absence of a valid instrumental variable for financial performance with which to perform a two-stage Least Squares regression analysis, we ran an OLS regression model (results available upon request), excluding the PERFFIN variable from the ones considered in Column 4, and performed post estimation validity tests. The results were positive and aligned with those in Column 4 of Table 4. It is noteworthy that regarding this potential endogeneity issue, performance measures could have many other influencing factors even more powerful than CA. Moreover, financial performance in relation to CA implementation could be a contingent independent variable with ex-ante unpredictable (positive or negative) effects (Otley, 2016). It could be said that companies with high profitability have more resources to invest in sophisticated CA tools, but it could also be said that improvements in CA tools are only realized when there is poor profitability. The direction of the potential influence of financial performance on CA is unclear, even for scholars.

Conclusions, limitations, and future developments

The COVID-19 pandemic and the European war have exerted negative effects on the economic environment and created strong instability in markets. Companies had to navigate these turbulent years by exploiting their organizational resilience. CA, along with MA, is one of the elements that promote organizational resilience. SMEs, which are extremely flexible but vulnerable to shocks and crises, have been traditionally reluctant to implement CA. Only a few empirical studies have addressed CA implementation in SMEs, particularly in recent years following the complex foreseeable scenarios that constitute a potential break with past balances.

This analysis, leveraging the contingency theory of organizations, investigated this research topic using empirical data from 120 SMEs in the provinces of Verona and Vicenza (Italy), collected in 2022. These answers were obtained with considerable effort by the research team due to difficulties in communication and delays in returning the completed questionnaires by these companies. In addition, using respondents' replies, multivariate OLS regressions were performed to identify which factors could affect CA implementation in SMEs. The results highlighted a negative influence exerted by a lack of material resources, knowledge, skill, and training on CA implementation, underscoring how resources and knowledge are important for the setup and development of cost control tools in SMEs. A perceived inefficiency or inadequacy of the tool also exerted negative effects on CA implementation. Indeed, CA is a costly tool whose implementation is influenced by its perceived benefit. In addition, our results suggest a "liability of age," as older SMEs and companies whose founder was still involved in management had worse CA implementation. In contrast, positive effects were observed with both high competitive pressure and higher financial performance. In our sample, sales turnover had no statistically

significant influence on CA implementation, outlining that company size does not significantly matter for CA implementation.

Regarding CA implementation in the future, as expected, we found positive influences exerted by availability of knowledge, skills, and training; availability of CA packages; increased competition; higher attention to cost control; and pressure on margins.

We plan to perform a longitudinal analysis of different years and include other SMEs in our sample, possibly from other countries. This could enhance the reliability and extendibility of our results to other contexts. Other areas of future research could include, considering the gaps outlined in the literature review section, an extension of our work to the wider fields of MA and MCS in SMEs.

This study has some limitations including the statistical methodology used, the OLS regression model adopted, the sample used (limited to 120 SMEs operating in the Veneto Region active in the C, F, and G macro-sectors of the European NACE code), and the period considered (this could be extended for a longitudinal analysis). Nevertheless, despite its limitations, this study contributes to the literature on CA because it analyzed the influence of contextual factors on CA implementation in SMEs, with interesting empirical implications. First, SMEs should fill the gap with larger firms in terms of resources, know-how, and training dedicated to this tool. If we agree that CA is becoming increasingly important in these recently turbulent years, these two factors should be easily acquired. Second, if on the one hand, the younger SMEs have shown a greater capacity for integration of CA within their organizations, then the theme poses for older enterprises in which the founder is often still present. Therefore, this study serves to promote the culture of cost control and the importance of pushing in this direction in light of reasonable expectations of enduring environmental and market turmoil as well as fluctuations in demand and rapid implementation of price and planning decisions. Third, this study recognizes the pro-future effect that competitive pressure and the reduction of margins can have in the adoption of CA by SMEs, in combination with the availability of cheaper and functional CA packages that can reduce the barrier of access to these tools.

Appendix Questionnaire submitted to companies ? List of questions

(Responses with: *Likert scale: 1–5, **Likert scale: 1–7: *** Dummy: 0 = No, 1 = Yes)

Q1. (CA0IMPL) Level of cost accounting implementation*.

Q2. (CA0NORES) In my company low levels of cost accounting implementation are due to lack of resources***.

Q3. (CA0NOKNOW) In my company low levels of cost accounting implementation are due to lack of Knowledge, skills, and training***.

Q4. (CA0INEFF) In my company low levels of cost accounting implementation are due to inefficiency of the tool***.

Q5. (CA0NOUTILITY) In my company low levels of cost accounting implementation are due to scepticism/usefulness of the tool ***.

Q6. (CA0NOFORACT) In my company low levels of cost accounting implementation are due to inadequacy of the tool in relation to the specific context of the company***.

Q7. (CA1MARGIN) In my company lower margins could increase cost accounting implementation***.

Q8. (CA1COMP) In my company higher competitive pressure could increase cost accounting implementation***.

Q9. (CA1SW) In my company availability of cost accounting packages could increase cost accounting implementation***.

Q10. (CA1EDUC) In my company availability of knowledge, skills and training could increase cost accounting implementation***.

Q11. (CA1COSTS) In my company a higher cost control requirement could increase cost accounting implementation***

Q12. (ROA) The company has ROA ratio** (1-estremely not profitable, 7-estremely profitable).

Q13. (ROACOMP) The company has ROA ratio compared to competitors* (1-estremely worst, 5-estremely better).

Q14. (LIQ) Availability of Liquidity* (1-scarce, 5-high).

Q15. (COMPPRES) Level of competition* (1-scarce, 5-high).

Q16. (FOUND) The founder is still present in the management of the company***.

Q17. (YOLD) Years of activity from when the company was born.

Q18. (S1SIZE) Employees between 10 and 19***.

Q19. (LNSALES) Sales revenues in 2021 (in logarithm).

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