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Article

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Impacts of contingency factors on the application of strategic management accounting in Vietnamese manufacturing enterprises

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Abstract: Based on contingency theory in the study of strategic management accounting, this study examines the internal and external contingencies of the organization that affect the application of strategic management accounting (SMA) in Vietnamese manufacturing enterprises. Using qualitative and quantitative methodology, qualitative methods are used to make questionnaires, and quantitative methods are used to measure the scale and analyze the impact of each factor. The data used in the study was collected using a survey questionnaire from a sample of 395 managers (directors, deputy directors, chief accountants) and accounting staff with knowledge of management accounting/strategic management accounting in Vietnamese manufacturing enterprises. Based on the collected survey data, we performed a multivariable linear regression analysis with SPSS 20 to



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PUBLIC INTEREST STATEMENT

The aim of this article is to identify contingency factors impacting the application of strategic management accounting in Vietnamese manufacturing enterprises. Using qualitative and quantitative methods, using multivariate linear regression with SPSS 20, the results of the regression analysis show that the contingency factors such as organization size, competitive intensity, organizational structure (decentralization of management), organizational technology, business strategy, and perception of market instability have a positive influence on the application of strategic management accounting in Vietnamese manufacturing enterprises. Therefore, this study provides insight that contributes to a better understanding of the impact of contingency factors on the application of strategic management accounting in the context of manufacturing enterprises in emerging economies such as Vietnam. This finding is useful for policymakers and business managers in developing and promulgating mechanisms to influence these random variables to motivate enterprises to use more strategic management accounting techniques.

test the relationship between the contingency factors and the application of SMA. Regression analysis results show that contingencies such as organization size, competitive intensity, organizational structure (decentralized management), organization's technology, business strategy, and perception of market instability positively influence the application of SMA in Vietnamese manufacturing enterprises. Therefore, the study provides insight that contributes to a better understanding of the impact of contingency factors on the application of SMA in the context of manufacturing enterprises in emerging economies like Vietnam. This finding is useful for policymakers and business managers in developing and promulgating mechanisms to influence these random variables to motivate enterprises to use more SMA techniques.

Subjects: Manufacturing Industries; Accounting; Strategic Management; Corporate Governance

Keywords: manufacturing enterprises; management accounting (MA); strategic management accounting (SMA); strategy; enterprise

JEL classification: M40; M41; M14

1. Introduction

In the global economy, geographical distances and national borders are becoming increasingly blurred; services, currencies, people, skills, information, and ideas move across borders the country is becoming more and more liberal. Enterprises are increasingly present in foreign markets, using more and more resources in those markets. With the increasing displacement of factors of production, more and more enterprises are looking to enhance their competitive advantage by focusing on activities that create value for themselves. Globalization affects the production, distribution, and supply of products and services of enterprises. The standards for evaluating enterprises' quality, cost, productivity, and performance are becoming more stringent. Therefore, for enterprises that want to improve operational efficiency and gain advantages in today's globalized environment, managers must be sensitively aware and correctly forecast changes in the environment business.

In the context of a developing country like Vietnam today, global economic integration and participation in free trade agreements have opened up many opportunities for the Vietnamese enterprise community to develop. Vietnam is emerging as a key manufacturing hub in the East and South East Asia region, supported by government-led economic liberalization efforts and integration into global supply chains (Tue, 2022). However, Vietnamese enterprises face increasingly fierce competition not only from domestic enterprises but also from foreign ones (N. P. Tran et al., 2020). For example, in the manufacturing sector, enterprises are currently facing fierce competitive pressures in terms of the variety of goods, product quality and price, sales and distribution channels, supply sources, raw material supply, etc., the life cycle of products is increasingly shortened, customers' demands for product categories are increasingly diverse, and product quality is more stringent. Therefore, to improve operational efficiency and create a competitive advantage over competitors, Vietnamese manufacturing enterprises need to find new management methods and tools to plan their operations strategies to adapt to changes in the business environment.

One of the tools many researchers have confirmed to play an important role in providing a strategic-oriented information system for strategic decision-making and control is the techniques of strategic management accounting (SMA) (e.g., Cadez & Guilding, 2008; CIMA, 2005; Ma & Tayles, 2009). Therefore, more and more research is emphasizing the importance of SMA in

strategic decision-making, improving competitive advantage, and promoting organizational performance (e.g., Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Nik Abdullah et al., 2022; Ojra, 2014; Shaqqour, 2020; Turner et al., 2017).

However, in a developing country like Vietnam, the concept of SMA is still relatively new to many enterprises. This may be because they have not received specific guidelines on how to implement, and not widely available, and they lack training programs on using SMA techniques. Therefore, many business managers do not have a deep understanding or are not fully aware of the role of SMA in supporting them in making management decisions. Besides, most of the accounting staff in the enterprise only have knowledge, specialty, and experience in financial accounting, lack of knowledge or skills, and professional qualifications in MA (T. H. Nguyen, 2022), especially skills on SMA. Therefore, SMA techniques have not been widely used and brought into full play their inherent roles and benefits in the practical activities of Vietnamese manufacturing enterprises. Moreover, to apply SMA successfully, enterprises need to invest a large amount of money to build infrastructure systems, train staff, etc.; therefore, they always consider investment costs and the effectiveness of SMA implementation. The above problems may be certain barriers to the application of SMA in Vietnamese manufacturing enterprises.

Over the years, SMA has been a topic that has attracted the attention of many researchers to improve knowledge and understanding of SMA, and the number of documents has increased significantly. Among them, many researchers have relied on contingency frameworks to try to investigate contingency variables that affect the application of MA or SMA. The most commonly tested contingency variables include organization size (Cinquini & Tenucci, 2010; Guilding, 1999; McManus, 2013; Vu et al., 2022), organizational structure (McManus, 2013; N. Waweru, 2008; T. M. Nguyen & Nguyen, 2021), business strategy (Bui et al., 2020; Cadez & Guilding, 2008; Chenhall, 2003; Cinquini & Tenucci, 2010; Guilding & McManus, 2002; Hwang, 2005; Vu et al., 2022), awareness of environmental uncertainty (Baines & Langfield-Smith, 2003; Cadez & Guilding, 2008; Huyen, 2022; Hwang, 2005; McManus, 2013), competitive intensity (Bui et al., 2020; Chi, 2021; Doan, 2012; McManus, 2013; N. Waweru, 2008), organizational technology (Haldma & Lääts, 2002; N. Waweru, 2008; Ojra, 2014; T. M. Nguyen & Nguyen, 2021; Vu et al., 2022). However, the results of the studies are still different and inconsistent. Furthermore, research in the area of SMA and the properties of contingency has been primarily considered in the context of developed countries, while the number of such studies in developing countries is very low (Nik Abdullah et al., 2022). There are few empirical studies based on the contingency framework to comprehensively explain the contingency variables affecting the adoption of SMA in emerging countries such as Vietnam; therefore, more research is needed to elucidate the issues of SMA and the properties of contingency in the context of this emerging economy. Therefore, our study was undertaken to attempt to bridge this gap in the literature and to provide a focused discussion to explain the extent of the influence of contingency factors on the applying SMA in the context of manufacturing enterprises in developing countries like Vietnam. Based on the research objectives, the following questions are posed:

RQ1: Identify contingency factors that may affect the application of SMA in the context of Vietnamese manufacturing enterprises?

RQ2: Empirical evidence on how much contingency variables impact SMA adoption in developing countries.

RQ3: What are the implications of contingency variables on applying SMA in the context of manufacturing enterprises in emerging countries like Vietnam?

Our study attempts to contribute to the literature on contingency framework-based SMA in several ways. First, our study fills a research gap in developing countries by examining the influence of contingency factors on the adoption of SMA in Vietnamese manufacturing enterprises. Second, this study adds to the literature empirical evidence to explain the degree of impact of contingency variables on applying SMA in the context of manufacturing enterprises. Third, our findings confirm that contingency variables, including organizational size, competitive intensity, organizational structure (decentralization management), organization's technology, business strategy, and perception of market instability, positively affect adopting SMA in manufacturing firms. Fourth, this finding is a reference source for policymakers and business managers in developing countries in building and promulgating policies for direct or indirect impact on these contingency variables, creating a premise to promote the application of SMA in enterprises. Finally, our findings help managers and accounting staff in enterprises and accounting practitioners better identify which contingency variables affect the application of these techniques of SMA and the role of SMA in supporting management decisions, motivating them to put more effort into applying SMA in their firm. Thus, our findings provide insight that contributes to a better understanding of the magnitude of the impact of contingency factors on the adoption of SMA, especially in the context of manufacturing enterprises in countries with economies in transition like Vietnam.

The remainder of this article will be structured as follows: Section 2 presents the background. Next, Section 3 presents a theoretical literature review. Evaluation of the empirical literature review and hypotheses development are presented in Section 4. Section 5 presents the research design. The empirical results and discussion are provided in Section 6. Finally, Section 7 presents the summary and conclusion.

2. Background

In recent years, SMA has been a topic attracting the attention of researchers as well as the enterprise community in Vietnam. This is reflected in the increasing number of studies on SMA, many of which have tried to find ways of implementing and applying SMA in Vietnamese enterprises. These studies have focused on examining the impact of contingency variables on the application of SMA in enterprises, such as organization size (Chi, 2021; Vu et al., 2022), competitive intensity (Bui et al., 2020; Chi, 2021; Doan, 2012), perception of market instability (Do, 2022; Huyen, 2022), organizational structure (Vu et al., 2022), decentralization of management (Doan, 2012; Huyen, 2022; T. M. Nguyen & Nguyen, 2021), organizational technology (T. M. Nguyen & Nguyen, 2021; Vu et al., 2022), and business strategy (Bui et al., 2020; Chi, 2021; T. M. Nguyen & Nguyen, 2021; Vu et al., 2022). These studies have considered the context of enterprises in many different business sectors; for example, Doan (2012) studied the context of medium and large enterprises; Vu et al. (2022) focused on logistics enterprises; T. M. Nguyen and Nguyen (2021) examined enterprises in the consumer sector; Do (2022) focuses on companies listed on the Vietnamese stock market. In the manufacturing sector, research by Bui et al. (2020) focused on inspecting manufacturing enterprises in Binh Duong province—Vietnam; while Chi (2021) focused on research in manufacturing enterprises in Bac Kan province, Vietnam. Although research by Bui et al. (2020) and Chi (2021) has shown the factors affecting SMA's application in manufacturing enterprises, these studies have only focused on looking at manufacturing enterprises within a locality. Therefore, this result is not representative of all Vietnamese manufacturing enterprises.

Moreover, in the era of globalization, Vietnamese enterprises face increasing competition from not only domestic enterprises but also foreign firms (N. P. Tran et al., 2020), including manufacturing enterprises. In response to competition, manufacturing enterprises are trying their best to find solutions to improve operational efficiency (Bui et al., 2020) and new management methods and tools to serve the strategic decision-making process to respond to changes in the business environment. Therefore, it is necessary to research so that manufacturing enterprises can build and apply an effective SMA system to improve operational efficiency for enterprises in today's era (Bui et al., 2020).

Based on previous studies, this study examines the impact of contingency variables on the application of SMA in Vietnamese manufacturing enterprises. The study aims to provide insight to improve the understanding of the contingency factors affecting the application of SMA in the context of manufacturing enterprises in a developing country such as Vietnam and the role of SMA in management decision-making. This finding is useful for policymakers and business managers in developing and promulgating mechanisms to influence these random variables to motivate enterprises to use more SMA techniques. At the same time, our findings help managers and accounting staff in enterprises and accounting practitioners better identify which contingency variables affect the application of these techniques of SMA and the role of SMA in supporting business decisions, thereby motivating them to make more efforts in research, learning experiences and finding ways to apply SMA techniques.

3. Theoretical literature review

3.1. The concept of strategic management accounting

Management accounting (MA) is recognized as concerned with the “generation, communication, and use of financial and non-financial information for managerial decision-making and control activities” (Groot & Selto, 2013, p. 3). Stemming from the view that MA should go beyond internal orientation and pay more attention to the external environment, Simmonds (1981, p. 26) defined SMA as “the provision and analysis of management accounting data about a business and its competitors, for use in developing and monitoring business strategy”. Researchers proposed various definitions of SMA to improve understanding and define the core techniques of SMA following Simmonds’ first attempt. Bromwich (1990, p. 28) defines SMA as: “the provision and analysis of financial information on the firm’s product markets and competitors’ costs and cost structures and the monitoring of the enterprise’s strategies and those of its competitors...”. CIMA (2005) describes SMA as a form of MA that emphasizes the focus on information related to the entity’s external factors and non-financial as well as information obtained by the entity internally generated. Hoque (2004) argues that SMA is a process of identifying, collecting, selecting, and analyzing accounting data to help the leadership team make strategic decisions and evaluate organizational performance. According to Cadez and Guilding (2008), SMA should be considered a set of strategically oriented MA techniques. Ma and Tayles (2009) define SMA as MA that provides a strategically oriented information system for strategic decision-making and control. AlMaryani and Sadik (2012) argue that SMA represents a group of techniques and methods that support the organization’s goals within the strategic scope to provide information for the formulation of organizational strategy and to support implementation performance by encouraging behavior that integrates with strategy and through the application of MA techniques to reduce costs, increase product quality, and measure organizational performance.

3.2. Strategic management accounting techniques

In contrast to the techniques of traditional MA, which only provide internal information about the enterprise, SMA techniques are used in collecting, processing, analyzing, and providing information to decision-makers to make decisions and carry out monitoring. The techniques of SMA provide external and future-oriented information, are multidimensionally structured, and consider both financial and non-financial measures to evaluate the effectiveness (Cadez & Guilding, 2008; Cinquini & Tenucci, 2010). These techniques can sift through strategic information such as customers, competitors, markets, and the external environment, allowing enterprises to create a competitive advantage and improve operational performance dynamics (Chenhall, 2005). These techniques provide external and future-oriented information and are cost-focused (e.g., Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Ojra, 2014); strategic planning, control and performance measurement (e.g., Cinquini & Tenucci, 2010; Ojra, 2014); strategic decision making (e.g., Cadez & Guilding, 2008; Ojra, 2014); customer accounting (e.g., Ojra, 2014; Turner et al., 2017) and competitor accounting (e.g., Cinquini & Tenucci, 2010; Ojra, 2014; Turner et al., 2017). Based on the synthesis of previous literature, Cadez and Guilding (2008) classified under five SMA groups (costing; planning, control, and performance measurement; strategic decision-making; competitor

accounting; customer accounting) corresponding to 16 techniques of SMA, including attribute costs, lifecycle costs, quality costs, target costs, value chain costs, benchmarking, integrated performance measurement, costing strategic cost, pricing strategy, brand valuation, competitor cost assessment, competitive position monitoring, competitor performance assessment, customer profitability analysis, analytics lifetime customer profitability, customer valuation is an asset. Thus, based on previous literature, the authors synthesize sixteen (16) SMA techniques proposed in the study by Cadez and Guilding (2008) and classified according to five SMA topics, including (1) strategic costing; (2) strategic planning, control, and performance measurement; (3) strategic decision-making; (4) competitor accounting; and (5) customer accounting.

3.3. Contingency framework in research on the application of SMA

Contingency theory represents a major theory in MA research (Chenhall, 2003). Contingency theory helps to identify external and internal factors that affect various aspects of accounting system performance (V. T. Tran et al., 2022). Based on contingency theory, researchers have argued that there is no one accounting system that is suitable for all organizations under all circumstances (D. T. Otley, 1980; Islam & Hu, 2012); instead, contingencies such as organization size (Chi, 2021; Cinquini & Tenucci, 2010; Vu et al., 2022), business strategy (e.g., Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Pavlatos, 2015; Turner et al., 2017), organizational structure (McManus, 2013; N. Waweru, 2008; Pavlatos, 2015; Tuan Mat, 2010), organizational technology (Cadez & Guilding, 2008; Haldma & Lääts, 2002; Huang et al., 2010; Vu et al., 2022) or environmental uncertainty including two core perception of market instability and competitive intensity (McManus, 2013; Pavlatos, 2015) can influence the design of MA systems or the adoption of SMA in organizations.

Organizational size is an internal factor often mentioned as a variable affecting the design of MA systems (Cinquini & Tenucci, 2010). Organizational size affects the organization's structure and use of management control tools. Larger organizations often have more complex structures, so control and management tools also become more complex, and the costs and time of information processing also increase (Guilding, 1999); therefore, larger firms are willing to use more sophisticated accounting methods (Guilding & McManus, 2002; Guilding, 1999). In this way, consider SMA as including advanced accounting techniques, we expect organizational size to affect SMA adoption.

Organizational strategy is another internal element of the organization that is also considered important in improving the understanding of MA within a contingency framework (Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Ojra, 2014). In the context of contingency, Chapman (1997) argues that one of the key points in reflections on the contingency-based accounting view is understanding the relationship between strategy and accounting. An organization's choice of strategy will affect the management control system in that organization (D. Otley, 2016), i.e., different types of organizational plans and strategies are likely to create different control system structures (Miles & Snow, 1978). According to Langfield-Smith (1997), the MA system is adjusted to support the strategy to enhance competitive advantage and superior performance. Business strategy is mentioned as one of the main factors determining an organization's SMA activities (Ojra, 2014; Pavlatos, 2015; Turner et al., 2017) or SMA adoption (Bui et al., 2020; Chi, 2021; Vu et al., 2022). SMA plays an important strategic role by contributing to formulating and implementing a company's strategy and enabling managers to improve a firm's competitive advantage (Langfield-Smith et al., 2018); it has significantly supported companies' strategic decision-making and enhanced profitability (D. Otley, 2016). Therefore, we believe that the business strategy choice can affect SMA's application. Therefore, we believe that the business strategy choice can affect SMA's application.

Organizational structure is the pattern and interrelationships between functions (Macy & Arunachalam, 1995). According to Miller and Droge (1986), the organizational structure includes management decentralization, formalization, and centralization. Across various studies,

decentralization has been mentioned as an important contingency factor in explaining the operating dynamics of organizations (Ojra, 2014; Opute & Madichie, 2017). A decentralized organization structure is also recognized as an internal factor that affects an organization's SMA activities (Ojra, 2014; Pavlatos, 2015). The structural change causes the MA system to change (Tuan Mat, 2010), and the highly decentralized structure can change the MA system to suit market fluctuations (N. Waweru, 2008). Furthermore, the need for SMA practices is higher in decentralized organization, as lower-level managers need more information to support decision-making (McManus, 2013; Pavlatos, 2015). Therefore, this study predicts that the decentralized organizational structure influences SMA activities.

Another important factor within the organization that needs to be explored concerning MA practices is the organization's technology (Cadez & Guilding, 2008; Haldma & Lääts, 2002; Huang et al., 2010; N. M. Waweru & Uliana, 2005; N. Waweru, 2008). Technology is believed to be fundamental in an organization's governance system (Cadez & Guilding, 2008; Huang et al., 2010; N. Waweru, 2008), and it has a close relationship with organizational structure (Marsh & Mannari, 1981). New production technology changes managers' information needs when making decisions (Isa & Foong, 2005), so production technology affects companies' accounting practices (D. T. Otley, 1980) and is a major driver of change in MA (Baines & Langfield-Smith, 2003; Maina Waweru et al., 2004). In addition, new technology will make the accounting system will most likely become more complex and complex (Haldma & Lääts, 2002). Therefore, business managers and accountants must develop new accounting techniques to deal with these arising problems (Kalkhouran et al., 2015). Therefore, this study expects that the organization's technology influences the adoption of SMA.

From a cognitive lens, the environment can only be viewed as certain or uncertain to the extent that decision-makers perceive it (Achrol & Stern, 1988). The general business environment shows that the pace of change and increasing competition has caused an increasingly clear level of uncertainty, so organizations or unit faces high uncertainty; they must have flexible and adaptable systems to manage operations when unexpected events occur (D. Otley, 2014). Awareness of environmental uncertainty consists of two core aspects that have been distilled, competitive intensity and market turbulence (Guilding & McManus, 2002; Ojra, 2014). Organizations must pay attention to their operating environment because participating in environmental uncertainties will allow them to identify key drivers of change (Cescon et al., 2019). Managers operating in high-uncertainty environments will require timely, accurate, and frequent information (Chenhall & Morris, 1986). Other scholars have also argued that environmental uncertainty would involve more proactive and externally focused accounting systems (e.g., Haldma & Lääts, 2002; Hwang, 2005); therefore, environmental uncertainty awareness has an influence significantly to the extent to which firms will adopt SMA practices (McManus, 2013; Ojra, 2014; Pavlatos, 2015). Therefore, our study expects that the two core aspects of environmental uncertainty have been the perception of market instability and competitive intensity influencing the application of SMA.

In summary, based on the contingency theoretical framework and the evaluation of previous literature on SMA, our study expects that contingency factors, including organization size, decentralized organizational structure, organization's technology, business strategy, competitive intensity, and perception of market instability, affect the adoption of SMA in the context of manufacturing firms in the country developing like Vietnam.

4. Empirical literature review and hypotheses development

4.1. The relationship between organizational size and the application of SMA

Organizational size is an internal factor often mentioned as a variable affecting the design of MA systems (Cinquini & Tenucci, 2010). Libby and Waterhouse (1996) propose a relationship between the size of an organization and the tendency to change MA and argue that larger firms have more resources to change. This may be because larger companies often have larger total resources and better internal information systems, so designing a MA system or applying SMA is more convenient

than other small companies. In addition, scholars have argued that firm size affects how organizations design and use MA practices for decision-making (e.g., Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Huang et al., 2010; Tuan Mat, 2010). Contingency-based MA literature has revealed that firm size has a significant impact on the use of MA in business organizations (Abdel-Kader & Luther, 2008; Haldma & Lääts, 2002), or the organizational size that affects the use of SMA techniques (Cadez & Guilding, 2008; Cinquini & Tenucci, 2010). In the context of a developing country like Vietnam, Chi (2021), Vu et al. (2022) also show that organizational size positively affects the adoption of SMA in the surveyed organizations. Based on the above arguments, our first hypothesis is proposed:

H1: Organizational size positively affects SMA's application in Vietnam manufacturing enterprises.

4.2. The relationship between competitive intensity and the application of SMA

Competitive intensity refers to the rationality with which organizations compete for various resources, such as raw materials, sales, and distribution channels, as well as product quality, variety, and price (Gordon & Narayanan, 1984). In an environment with fierce competition, the actions and reactions of competitors can be very unpredictable, and speed of market adjustment becomes vital for market participants (Eisenhardt, 1989); therefore, organizations need to have a more complex MA and governance system to provide a basis for improved decision making (Libby & Waterhouse, 1996), and maintain an effective MA system (R. G. Cooper, 1995) to gain competitive advantage. In this way, SMA is considered an advanced/complex MA system. Previous literature has argued that perceptions of environmental uncertainty (including the competitive intensity) have a significant influence on the extent to which firms adopt SMA practices (e.g., McManus, 2013; Pavlatos, 2015). Competitive intensity is positively related to customer accounting practices (McManus, 2013) and positively affects the implementation of SMA in enterprises (Kariuki & Kamau, 2016). Cescon et al. (2019) argued that competitive forces factors positively relate to using SMA (strategic pricing, balanced scorecard, risk analysis, target cost, life cycle cost). Researching in the context of an emerging country like Vietnam, Doan (2012) argued that the higher the competition, the more businesses use SMA tools. In other words, competition intensity significantly affects SMA's application in Vietnamese enterprises (Bui et al., 2020; Chi, 2021). Based on the above arguments, the second hypothesis is proposed as follows:

H2: The intensity of competition positively affects the application of SMA in Vietnam manufacturing enterprises.

4.3. The relationship between organizational structure (management decentralization) and the application of SMA

The entity's organizational structure affects the interaction between the pursuit of strategy and the production and use of MA information (Spanos & Prastacos, 2004). Decentralized decision-making will be associated with an emphasis on formal MA and control systems (Chenhall & Morris, 1986; Gordon & Narayanan, 1984); hence the need for the practice of SMA is higher in decentralized companies, as lower-level managers need more information to support decision making (Pavlatos, 2015). Decentralization is the degree to which autonomy is delegated to managers, providing managers with greater responsibility for planning, operating control, and how information is handled not available in the organization more effectively (Abernethy & Lillis, 1995). Many documents have mentioned the link between organizational structure (decentralized) and the use of SMA and argued that the use of MA or SMA would be higher in organizations adopting a decentralized structure; in other words, the organizational structure according to management decentralization influences SMA implementation (e.g., Chenhall, 2008; N. Waweru, 2008; Pavlatos, 2015; Tuan Mat, 2010). Considering the context of Vietnam, where the management structure in centralized enterprises is still common, Doan (2012) argues that the greater the decentralization of

management, the more enterprises tend to use more SMA tools. In other words, decentralization of management has a positive relationship with the application of SMA in enterprises (Huyen, 2022; T. M. Nguyen & Nguyen, 2021). Based on the above arguments, the third hypothesis is proposed as follows:

H3: Decentralized organizational structure positively influences SMA's application in Vietnam manufacturing enterprises.

4.4. The relationship between an organization's technology and the application of SMA

Technology is believed to be fundamental in an organization's governance system (Cadez & Guilding, 2008; Huang et al., 2010); thus, the company's production technology affects its accounting practice (D. T. Otley, 1980). Furthermore, advanced manufacturing technology will likely make the MA system more complex to accommodate the technology (Haldma & Lääts, 2002). Therefore, technological progress is the main driver of change in MA (Baines & Langfield-Smith, 2003; Maina Waweru et al., 2004). Choe (2004) found a significant positive association between the level of production technology and the amount of information generated through the MA information system; therefore, production technology positively affects the management system and MA information system, respectively. Technology is believed to be a factor that plays an important role in the adoption of SMA techniques (Nik Abdullah et al., 2022), and it has a positive influence on the adoption/implementation of MA or SMA in organizations (Baines & Langfield-Smith, 2003; Cadez & Guilding, 2008; Kariuki & Kamau, 2016; Ojra, 2014). Research in the Vietnamese context by Pham et al. (2020) indicates that advanced production technology significantly influences MA practice in Vietnamese manufacturing enterprises. T. M. Nguyen and Nguyen (2021), and Vu et al. (2022) also find a positive relationship between the degree of technological progress and the level of SMA adoption, i.e., technological progress has a positive effect on applying SMA in enterprises. Based on the above arguments, the fourth hypothesis is proposed as follows:

H4: Organization's technology positively influences SMA's application in Vietnam manufacturing enterprises.

4.5. The relationship between business strategy and the application of SMA

The SMA literature has mentioned and emphasized that organizational strategy is one of the key determinants of a company's SMA activities (e.g., Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Guilding, 1999; Ojra, 2014; Pavlatos, 2015; Turner et al., 2017). Guilding (1999) suggested that there is a positive relationship between the adoption of a lead-generation strategy and competitor-focused accounting. Because prospectors are seen as people constantly looking for product and market opportunities and as creators of innovation in the market (Cadez & Guilding, 2008). In a fiercely competitive environment regarding product variety, product quality, price, sales, distribution channels, etc., a prospector-type company is dynamic in searching for market opportunities and capably meets consumers' needs with new product developments and heavy investments in research and development (Leftesi, 2008). Therefore, we expect organizations adopting a prospector-type strategy to use SMA techniques more. This is consistent with the argument of Cadez and Guilding (2008), and Ojra (2014), the use of SMA in prospector-type firms is greater than in defender-type firms. Recently, several studies have examined this issue in the Vietnamese context (e.g., Bui et al., 2020; Chi, 2021; T. M. Nguyen & Nguyen, 2021; Vu et al., 2022) and concluded that business strategy has a positive impact on the adoption of SMA. Based on the above arguments, the fifth hypothesis is proposed as follows:

H5: Vietnamese manufacturing firms that adopt a prospector-type strategy will use SMA techniques more.

4.6. The relationship between the perception of market instability and the application of SMA

In the management and control accounting literature, the environment is one of the factors that determine and cause changes in the MA and control systems used in an organization (Baines & Langfield-Smith, 2003; Cadez & Guilding, 2008; Cinquini & Tenucci, 2010; Maina Waweru et al., 2004; McManus, 2013; Tuan Mat, 2010). Since the MA system will vary according to the context of the organization (Cadez & Guilding, 2008); therefore, changes in the environment and related information needs have significantly shaped the role of management accountants in organizations (Gordon & Miller, 1976). When awareness of environmental uncertainty is high, using SMA is likely to be enhanced to generate relevant facts to make informed decisions to meet the environment's needs (Ojra, 2014). Previous literature has documented that perceived uncertainty (perception of market instability) significantly affects the extent to which companies will adopt SMA practices (e.g., McManus, 2013; Ojra, 2014; Pavlatos, 2015). Al-Mawali (2015) argues that when organizations operate with high market awareness, the need to perform SMA is higher for those with low market awareness. Pavlatos (2015) found a positive correlation between the degree of environmental uncertainty and using SMA tools. In other words, the higher the perception of market instability, the higher the need to use SMA techniques. Studying the context of Vietnamese enterprises, Do (2022), and Huyen (2022) argued that the perception of market instability positively impacts the application of SMA in enterprises. Based on the above arguments, the sixth hypothesis is proposed as follows:

H6: Perception of market instability positively influences the application of SMA in Vietnam manufacturing enterprises.

5. Research design

5.1. Research models

Theoretical model: based on the literature review of theoretical documents and evaluation of empirical papers, the authors have identified 06 factors that are expected to have a certain influence on the application of SMA in Vietnamese manufacturing enterprises. These factors can be seen in the theoretical model described in Figure 1.

Regression model: based on the proposed hypotheses and theoretical model, the authors build a quantitative research model through an expected regression equation that reflects the "impacts of contingency factors on the application of SMA in Vietnamese manufacturing enterprises" presented in Equation (1). The independent variables are summarized in Table 1, and the dependent variable is summarized in Table 2. The variables in this study are described in Table A1 (see Appendix A). Therefore, the regression equation is expected to take the following structure:

$$SMA_i = \alpha + \beta_1 SIZE_i + \beta_2 COMPI + \beta_3 STRUI + \beta_4 TECH_i + \beta_5 STRAI + \beta_6 INST_i + \epsilon_i \quad (1)$$

In which, α : Constant term; β_i : Coefficients of the explanatory variables; ϵ_i : Residual

5.2. Research methods

5.2.1. Design survey questionnaire

In order to solve the research's objectives, the authors built a survey questionnaire for the current investigation based on the scales of previous studies and adjusted it to suit the actual conditions

Figure 1. Proposed research model.

Note: Source: Suggested by authors

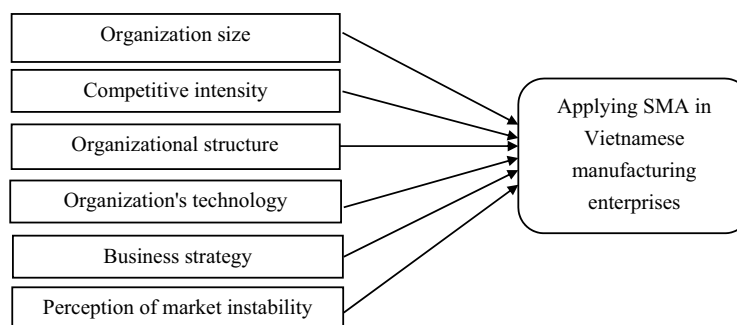


Table 1. Independent variables

Abbr.	Detail	Reference	Expected sign
SIZE	Organization size	Haldma and Lääts (2002), Abdel-Kader and Luther (2008), Cadez and Guilding (2008), Cinquini and Tenucci (2010), Chi (2021), Vu et al. (2022).	+
COMP	Competitive intensity	McManus (2013), Doan (2012), Pavlatos (2015), Kariuki and Kamau (2016), Bui et al. (2020), Chi (2021).	+
STRU	Organizational structure	N. Waweru (2008), Chenhall (2008), Tuan Mat (2010), Pavlatos (2015), T. M. Nguyen and Nguyen (2021), Huyen (2022).	+
TECH	Organization's technology	Cadez and Guilding (2008), Kariuki and Kamau (2016), Pham et al. (2020), T. M. Nguyen and Nguyen (2021), Vu et al. (2022).	+
STRA	Business strategy	Cadez and Guilding (2008), Ojra (2014), Bui et al. (2020), Chi (2021), Vu et al. (2022).	+
INST	Perception of market instability	McManus (2013), Ojra (2014), Pavlatos (2015), Do (2022), Huyen (2022).	+

Source: Compiled by the authors

practice in Vietnam to describe the relationship between contingency factors and the application of SMA is presented in Figure 1. Specifically: preliminary scales are built based on research objectives, research content, and original scales in previous studies. Next, the author group conducts additional screening and correction to select measurement scales suitable to the research objectives and characteristics of manufacturing enterprises in Vietnam through qualitative research with expert consultation techniques. A discussion with experts with in-depth knowledge of MA and SMA was conducted to adjust the scales to suit the characteristics of Vietnamese manufacturing enterprises. Experts in the field of MA or SMA, such as Professors, Associated Professors, Doctor of Philosophy, and Chairman of the Board of Management, Presidents, Directors, Chief Accountants. The consultation results show that the experts have a high consensus on the scale of the group of contingency factors proposed by the authors. Experts believe that

Table 2. Dependent variable

Abbr.	Detail	Reference
SMA	Apply strategic management accounting	Cadez and Guilding (2008), Ojra (2014).

Note: Source: Compiled by the authors

these scales are entirely suitable for the characteristics of Vietnamese manufacturing enterprises today. As for the scales to measure the application of SMA (SMA techniques), based on the original scale in the study of Cadez and Guilding (2008), and Ojra (2014), most experts believe that necessary to choose the techniques of SMA that are commonly used in manufacturing enterprises in Vietnam today, which are: (1) Attribute costing, (2) Life-cycle costing, (3) Target costing, (4) Value-chain costing, (5) Customer profitability analysis, (6) Valuation of customers as assets, (7) Competitor cost assessment, (8) Strategic costing, (9) Strategic pricing, (10) Brand valuation, and (11) Benchmarking. Thus, based on the original scale of previous studies and the results of consultation with experts, the authors decided to use the measurement scale of contingency factors from the original scale of previous studies and adjust the language to suit the culture of Vietnam; for the scale of measuring the application of SMA, the authors use 11 techniques of SMA as suggested by the experts mentioned above. Then, these scales will be included in the survey questionnaire for the current survey (the detailed survey questions are described in Table A1 - see Appendix A). In addition, in this study, the authors selected all structures measured by the 5-point Likert scale (from 1: strongly disagree to 5: strongly agree) because the 5-point Likert scale will ensure surveyed subjects were easier to understand and express their views (Marton-Williams, 1986), less confusing, and increased response rates (Babakus & Mangold, 1992; Devlin et al., 1993).

5.2.2. Data collection methods

The data of this study were collected through survey questionnaires in the form of face-to-face interviews or sent by email or post to 450 manufacturing enterprises in Vietnam. Survey subjects are business managers (directors, deputy directors, chief accountants) and accountants with knowledge of MA/SMA in manufacturing enterprises in their provinces and cities of Vietnam. This audience is people who know very well about the corporate governance system, business orientation as well as strategy, or the enterprise's current situation, so they have a crucial and decisive role in the decision-making process applying SMA in the enterprise. The survey collected 440 survey questionnaires (97.78% response rate), with which 395 valid survey questionnaires (89.77% rate) and 45 invalid survey questionnaires (10.23% rate), which should be discarded because respondents left the answer blank or answered failed to answer the questions on the reversed scale correctly; therefore, a sample size of 395 was used for inclusion in this study. The survey period was from August to December 2022. Table 3 shows the characteristics of respondents in this study.

5.2.3. Sampling method

In experimental research, sample size depends on many factors, such as regression model processing method, necessary reliability, etc. In practical research applications, the sample size is usually 150 or large (Anderson & Gerbing, 1988) or a minimum sample size of 5 samples for one estimate (Bollen, 1989). In exploratory factor analysis (EFA), the sample size should be 4 or 5 times the number of variables in the factor analysis (Hoang & Chu, 2008). Therefore, in this study, the authors selected a sample according to the above criteria with the ratio of observations to an analyte of 5 samples for one estimate. Hence, the sample size of 395 observations is the perfect fit. The selection of samples at manufacturing enterprises is entirely suitable with the current practical conditions in Vietnam because these enterprises have been and are facing increasingly fierce competition in terms of product diversity, quality and selling prices of products, raw materials, human resources, technology level, meeting customer needs, etc. On the other hand, these enterprises are also trying to find directions and apply standards, technical regulations, and

Table 3. Describe the characteristics of the respondents

Characteristics	Classification	Valid		Invalid	
		Frequency	Percentage (%)	Frequency	Percentage (%)
Enterprise size	Small (less than 100 staffs)	111	28.1	22	48.9
	Medium (from 100 to less than 200 staffs)	134	33.9	15	33.3
	Large (over 200 staffs)	150	38.0	8	17.8
	<i>Total</i>	395	100	45	100
Workplace	Director	65	16.5	9	20.0
	Deputy director	85	21.5	8	17.8
	Chief accountant	110	27.8	12	26.7
	Accountant	135	34.2	16	35.6
Working time	<i>Total</i>	395	100	45	100
	Less than 5 years	72	18.2	17	37.8
	From 5 to less than 10 years	138	34.9	13	28.9
	From 10 to less than 20 years	125	31.6	10	22.2
	Over 20 years	60	15.2	5	11.1
	<i>Total</i>	395	100	45	100
Qualifications	Postgraduate level	85	21.5	12	26.7
	University degree	216	54.7	21	46.7
	College degree	94	23.8	12	26.7
	<i>Total</i>	395	100	45	100

Source: Survey results

technology to production and management, orientation for strategy formulation, customer selection, market selection, etc.

5.2.4. Data analysis methods

The study uses SPSS 20 software to analyze multivariable linear regression to determine the relationship between the investigated structures by performing the following steps: Cronbach's Alpha test to examine the reliability of the scale; exploratory factor analysis (EFA) aims to reshape the structure of the groups of scales, consider the convergence and distinction of the groups of variables, help to remove the observed variables that have no practical significance, that is, the analysis EFA is used to reduce a set of observed variables to a more significant set of factors (D. T. Nguyen, 2011); multivariate linear regression analysis was used to test model fit and to test research hypotheses, i.e., to determine the relationship between contingency factors and the application of SMA.

6. Empirical results and discussion

6.1. Cronbach's Alpha test and EFA analysis

Before conducting multivariable linear regression analysis to examine the model's fit and test the research hypothesis, the authors performed several procedures to examine the reliability of Cronbach's Alpha scale and EFA analysis to ensure the suitability of the data for regression analysis. The results of testing the reliability of Cronbach's Alpha scale of variables (independent and dependent variables) are presented in Table 4, showing that all observed variables (component variables) have corrected item-total correlation greater than 0.3 and Cronbach's Alpha coefficient of the variables are all greater than 0.6, so the scales are well-used and reliable (Hoang & Chu, 2008) used for EFA analysis.

The results of the EFA analysis of independent and dependent variables are presented in Tables 5, 6 shows that the Kaiser-Meyer-Olkin (KMO) coefficient satisfies the requirements of $0.5 \leq \text{KMO} \leq 1$, so it is satisfactory; Bartlett's test has a Sig value of less than 1% (Sig. = 0.000), which proves that the observed variables in the variables have a close relationship with each other and is suitable for EFA analysis. The total variance extracted is greater than 50%, at Eigenvalues has a value greater than 1, so it is satisfactory (Anderson & Gerbing, 1988). The characteristic variables all have factor loading coefficients greater than 0.5, which are considered practical significance when analyzing EFA (Hair et al., 1998). Thus, the results of the EFA analysis of independent variables and dependent variables are entirely consistent, and the extracted factors are reliable and valid.

In short, after performing the reliability test of Cronbach's Alpha scale and analyzing the EFA of the variables (independent and dependent variables), it can be confirmed that: the scale of the variables in the study is well-used and reliable; the extracted factors are reliable and valid, and the observed variables belonging to the factor groups are kept unchanged, without disturbance. Thus, the data set used for the study is perfectly suitable for multivariable linear regression analysis.

6.2. Regression analysis

6.2.1. Correlation

This study uses the Pearson correlation test to test the linear relationship between the independent and dependent variables. The results in Table 7 show that the relationship between the independent variables SIZE, COMP, STRU, TECH, STRA, and INST with the dependent variable SMA has statistical significance at 1% (Sig. = 0.000 < 0.001); therefore, these independent variables are correlated with the dependent variable and continue to be included in the research model to explain the dependent variable.

6.2.2. Linear regression

This study uses multivariable linear regression to test the research hypotheses and the relationship between the independent and dependent variables. The test results show that adjusted R Square = 54.7%, that is, the independent variables explain 54.7% of the variation of the dependent variable; Durbin—Watson value = 1.746, is in the range of 1.5 to 2.5, so the result does not violate the assumption of first-order series autocorrelation (Table 8). Besides, the F-test has Sig. = 0.000 < 0.001 (Table 9), so the regression model is suitable (statistical significance level 1%), i.e., there is at least one independent variable affecting the dependent variable.

The regression analysis results in Table 10 show that the variables SIZE, COMP, INST, TECH, STRA, and STRU all have Sig. = 0.000 < 0.001, so the regression model is statistically significant at 1%, fits the data set, and is usable, i.e., the independent variables (including SIZE, COMP, INST, TECH, STRA, STRU) affects the dependent variable (SMA). Moreover, the independent variables' variance inflation factors (VIF) are less than 2, so it does not violate multicollinearity (D. T. Nguyen, 2011).

Thus, after performing multivariable linear regression analysis, the regression coefficients (B, Beta) were statistically significant ($p < 0.001$); the independent variables positively affect the dependent variable, and the level of impact from high to low is as follows: COMP, TECH, INST, SIZE, STRU, STRA. Therefore, based on the regression analysis results, this study confirms that hypotheses H1, H2, H3, H4, H5, and H6 are accepted at the 1% statistical significance level, consistent with the expectation. Therefore, the authors' baseline, i.e., the contingency factors mentioned in this study, positively influences the application of SMA in the surveyed manufacturing enterprises.

6.3. Common method bias test results

In this study, we selected a manager (director, deputy director, chief accountant) or accounting staff to represent their enterprise responses to our survey questionnaire. Respondents will answer all questions (observed variables) in the questionnaire, which may lead to common methodological bias (Podsakoff et al., 2003). Therefore, we applied Harman's single-factor test statistical procedure to evaluate the common method bias. This is the most commonly used study method (Ren & Chadee, 2017). Furthermore, several recent studies have also used this method to test the common method bias (e.g., Le et al., 2020; Y. T. Tran et al., 2020). According to B. Cooper et al. (2020), a single factor emerged that accounted for most of the variance (>50%), indicating the presence of the common method variance. Therefore, if the extracted variance is greater than 50%, the data is not good; if it is less than 50%, it is good. The results of Harman's single-factor test (Table 11) show that the first factor to explain the variance is 24.735% < 50%. Thus, there is no presence of common method variance (B. Cooper et al., 2020), and single-source bias is not a significant concern (Podsakoff et al., 2003).

6.4. Discussion

6.4.1. Competitive intensity

The research results show that competitive intensity has a positive impact and is the strongest on the application of SMA in Vietnamese manufacturing enterprises ($\beta_2 = 0.427$; $p < 0.001$). This means the higher the intensity of competition (promotions, product promotion activities, high competition for market share, fierce competition on price, quality, or novelty of products), the greater the demand for using SMA techniques by Vietnamese manufacturing enterprises. This result is fully consistent with the research's expectation of the link between competitive intensity and SMA adoption and is consistent with the findings of some studies (e.g., Bui et al., 2020; Chi, 2021; Doan, 2012; Kariuki & Kamau, 2016; McManus, 2013; Pavlatos, 2015). In a country with a transitional economy like Vietnam, integration into the global economy means an increasingly fierce competitive environment. Promotion activities, product promotion, competition for market share, competition on price, quality, and novelty of products are taking place more frequently and fiercely. This forces businesses to act and react quickly to changes in the business environment.

Table 4. The results of testing the reliability of the Cronbach's Alpha scale

Variables	Observable variables	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha coefficient
SIZE	SIZE1	0.704	0.843	0.861
	SIZE2	0.777	0.784	
	SIZE3	0.768	0.779	
COMP	COMP1	0.653	0.804	0.838
	COMP2	0.557	0.823	
	COMP3	0.532	0.828	
	COMP4	0.575	0.820	
	COMP5	0.685	0.798	
	COMP6	0.691	0.796	
INST	INST1	0.547	0.772	0.795
	INST2	0.564	0.765	
	INST3	0.621	0.737	
	INST4	0.694	0.698	
TECH	TECH1	0.728	0.731	0.820
	TECH2	0.666	0.763	
	TECH3	0.594	0.797	
	TECH4	0.587	0.798	
STRA	STRA1	0.637	0.594	0.748
	STRA2	0.521	0.723	
	STRA3	0.572	0.669	
STRU	STRU1	0.630	0.743	0.800
	STRU2	0.660	0.712	
	STRU3	0.647	0.727	
SMA	SMA1	0.524	0.920	0.921
	SMA2	0.696	0.913	
	SMA3	0.564	0.919	
	SMA4	0.628	0.918	
	SMA5	0.678	0.914	
	SMA6	0.828	0.906	
	SMA7	0.677	0.915	
	SMA8	0.791	0.908	
	SMA9	0.635	0.916	
	SMA10	0.755	0.910	
	SMA11	0.811	0.908	

Source: Research results

More than ever, enterprises need to optimize input factors and constantly create, explore, improve, and establish new techniques and management methods in the production and business process to improve their competitive position against competitors; otherwise they will face great damage due to weak competitiveness, such as causing unemployment, even leading to business closure, dissolution or bankruptcy. Therefore, enterprises need to understand that, in addition to creating profits in the short term, they need to maintain and improve their competitive position for a long time. To do that, enterprises need to design a more complex MA and management system to provide the basis for improved decision-making, and SMA is seen as the advanced MA that helps organizations position themselves for a competitive advantage over competitors. Business

Table 5. The results of exploratory factor analysis of independent variables

	Component					
	1	2	3	4	5	6
COMP5	0.800					
COMP6	0.795					
COMP1	0.778					
COMP4	0.711					
COMP2	0.699					
COMP3	0.663					
TECH1		0.868				
TECH2		0.824				
TECH4		0.760				
TECH3		0.752				
INST4			0.843			
INST3			0.792			
INST2			0.756			
INST1			0.746			
SIZE2				0.902		
SIZE3				0.890		
SIZE1				0.865		
STRU2					0.834	
STRU3					0.828	
STRU1					0.827	
STRA1						0.851
STRA3						0.812
STRA2						0.776
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.				KMO		0.747
Bartlett's Test of Sphericity				Sig.		0.000
Extraction Sums of Squared Loadings				Eigenvalues		1.667
				Cumulative %		65.422

Note: Source: Research results

managers need to change their management methods and use new technology tools to adapt to the fluctuations of the business environment. Therefore, applying SMA will be an effective solution to provide information for managers in planning, implementing, and controlling business strategies. In other words, in an environment with increasingly fierce competition, enterprises need to make more efforts to use SMA techniques to improve management decisions and increase their competitive advantage.

6.4.2. Organization's technology

The research results show that the organization's technology is also an important factor that has a positive impact on the application of SMA in Vietnamese manufacturing enterprises ($\beta_4 = 0.362$; $p < 0.001$). This implies that when an enterprise has advanced production technology and uses more information systems and software to support its operations, the need to use MA techniques in the process of management will increase the greater the management and operation. This finding is consistent with the research's expectations about the role of technology in promoting SMA implementation and similar to the previous results of Cadez and Guilding (2008), Ojra (2014), Kariuki and Kamau (2016), Pham et al. (2020), T. M. Nguyen and Nguyen (2021), Vu et al. (2022). The use of advanced technology by organizations/enterprises means that the information needed

Table 6. The results of the exploratory factor analysis of the dependent variable

		Component
		1
SMA6		0.870
SMA11		0.859
SMA8		0.843
SMA10		0.809
SMA2		0.759
SMA5		0.743
SMA7		0.741
SMA9		0.699
SMA4		0.693
SMA3		0.629
SMA1		0.590
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	KMO	0.926
Bartlett's Test of Sphericity	Sig.	0.000
Extraction Sums of Squared Loadings	Eigenvalues	6.250
	Cumulative %	56.819

Note: Source: Research results

Table 7. Correlations

Variables	SIZE	COMP	INST	TECH	STRA	STRU	SMA
SIZE	1						
COMP	−0.005	1					
INST	0.060	−0.027	1				
TECH	0.009	0.050	−0.076	1			
STRA	−0.082	−0.008	−0.006	0.032	1		
STRU	0.089	0.231**	−0.130**	0.167**	−0.013	1	
SMA	0.259**	0.475**	0.235**	0.398**	0.150**	0.314**	1

Note: ** and * indicates significant at 1%, 5%.

Source: Research results

Table 8. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.744	0.554	0.547	0.39275	1.746

Note: Source: Research results

to serve managers' decision-making and monitoring activities will change. Therefore, business managers must change the management method and design a more complex MA system (SMA is considered an advanced MA system) to match the organization's technological innovation. For a developing country like Vietnam today, the issue of changing production technology towards modernity is one of the goals that many manufacturing enterprises pay special attention to and receive great support from the Government. Grasping the Government's support for digital transformation, manufacturing enterprises are currently focusing on investing in innovating production technology, gradually transitioning to providing products and services on digital platforms,

Table 9. Anova

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	74.399	6	12.400	80.386	0.000
	Residual	59.851	388	0.154		
	Total	134.250	394			

Note: Source: Research results

intelligent production, and improving their internal capacity. This is reflected in the proportion of Vietnamese enterprises with high technology, and medium technology is increasing; the rate of technological innovation has improved significantly, with more than 80% of large enterprises and over 50% of SMEs engaged in product or process innovation (Ministry of Industry and Trade, 2022). This is one of the favorable conditions for promoting the implementation of SMA in Vietnamese manufacturing enterprises.

6.4.3. Perception of market instability

The research results confirm that the greater the perception of market instability, the higher the application of SMA in manufacturing enterprises ($\beta_6 = 0.284$; $p < 0.001$). This means when enterprises are the perception of market instability (customer price sensitivity, product demand), they are more interested in new technical tools to cope with market changes in price, product demand, customer tastes, etc., performance assessment of strategies compared to the competitors, this may change their views on the application of SMA techniques in businesses in a positive direction. This finding is consistent with the study's expectation of the association between the perception of market instability and SMA performance and is compatible with the study of McManus (2013), Ojra (2014), Pavlatos (2015), Do (2022), Huyen (2022). This finding explains that, in the context of global economic integration, Vietnamese manufacturing enterprises are facing fierce competition in terms of product diversity, quality, price, supply sources, raw materials, etc., and the increasing requirements of the market in terms of the level of consumer satisfaction, accompanying services, convenient distribution channels, promotions, and customer care, etc. In that context, enterprises need to operate flexibly, and decisions should be made quickly to react to market changes. Therefore, business managers need to change management methods to adapt to fluctuations in the market, especially the change in customer behavior. Furthermore, as the perception of market instability increases, business managers will need more customer information. Therefore, using SMA techniques will help them fully grasp information about customers' needs and markets to build appropriate strategies to meet and satisfy customer needs. Recognizing this problem, Vietnamese manufacturing enterprises have begun to pay more attention to customer research activities, gradually shifting from thinking about providing products to providing the values that customers expect; this is the premise for promoting the application of SMA in these enterprises.

6.4.4. Organization size

The research results show that organization size positively impacts the application of SMA in Vietnamese manufacturing enterprises ($\beta_1 = 0.238$; $p < 0.001$). This implies that the larger the organization size (in terms of total revenue, total assets, and the total number of employees), the easier it is to use SMA techniques; in other words, the larger the size of Vietnamese manufacturing enterprises, the higher the application of SMA. This result is consistent with the expectations of this study and is consistent with the findings of previous studies (e.g., Abdel-Kader & Luther, 2008; Cadez & Guilding, 2008; Chi, 2021; Cinquini & Tenucci, 2010; Haldma & Lääts, 2002; Vu et al., 2022). This confirms that Vietnamese manufacturing enterprises with large organizational sizes will have many advantages in applying SMA successfully. These enterprises have strong financial resources, complicated management, or easily accessible resources and conditions to deploy the SMA system. However, in a developing country like Vietnam, small and medium

Table 10. Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	−1.970	0.303		−6.492	0.000		
	SIZE	0.234	0.034	0.238	6.962	0.000	0.980	1.021
	COMP	0.292	0.024	0.427	12.245	0.000	0.946	1.057
	INST	0.338	0.041	0.284	8.258	0.000	0.975	1.026
	TECH	0.399	0.038	0.362	10.497	0.000	0.968	1.033
	STRA	0.156	0.032	0.166	4.867	0.000	0.992	1.008
	STRU	0.178	0.037	0.173	4.837	0.000	0.900	1.111

Table 11. The results of Harman's single-factor test

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.410	24.735	24.735	8.410	24.735	24.735
2	3.057	8.990	33.725	3.057	8.990	33.725
3	2.821	8.297	42.022	2.821	8.297	42.022
4	2.509	7.378	49.400	2.509	7.378	49.400
5	1.985	5.837	55.237	1.985	5.837	55.237
6	1.700	4.999	60.236	1.700	4.999	60.236
7	1.214	3.572	63.808	1.214	3.572	63.808

Note: Source: Research results

enterprises still account for a large proportion. Therefore, new management techniques and methods in corporate governance and management decision-making are still limited, especially since enterprises do not seem interested in investing and using SMA techniques. Furthermore, to apply SMA successfully, enterprises must invest a lot of money to build infrastructure systems, train staff, etc. This explains why the application of SMA techniques in Vietnamese enterprises is still quite modest and has not received the support of many managers. This is one of the major barriers when applying SMA in Vietnamese manufacturing enterprises. Therefore, to promote the application of SMA, enterprises need to focus on researching solutions and building cooperation strategies to expand markets and increase firm size.

6.4.5. Organizational structure

The research results show that the organizational structure according to management decentralization positively impacts the application of SMA in Vietnamese manufacturing enterprises ($\beta_3 = 0.173$; $p < 0.001$); i.e., the decentralized enterprises are, the more motivated they are to use SMA. This finding is consistent with the research's expectation about the role of organizational structure in adopting SMA and with the results of many studies (e.g., Chenhall, 2008; Doan, 2012; Huyen, 2022; N. Waweru, 2008; Pavlatos, 2015; T. M. Nguyen & Nguyen, 2021). The study's findings imply that organizations with a decentralized system with clearly defined responsibilities and authorities for each department and branch will be more likely to succeed in setting up an SMA system. Because departments and branches are empowered to make all decisions, they can be more proactive in planning, controlling operations, and dealing with information that is not available in the organization more effectively, thereby making effective management decisions. However, in a country with an economy transitioning from a centralized economy to a market economy like Vietnam today, the centralized organizational structure in enterprises is still common. In addition, many business managers are trained and grow up in a centralized economy, so a stereotyped, administrative-heavy culture influences them. Therefore, most lower-level leaders in all parts of the business cannot make decisions on their own without the approval of senior management, which partly leads to the company's reaction to the changes in the business environment is limited, affecting the competitiveness of enterprises. These limitations are said to be barriers that significantly affect the application of SMA in Vietnamese manufacturing enterprises. Therefore, to promote the application of SMA, business managers need to change the way management in the direction of clearly assigning more responsibility and authority to each department so that they can proactively make effective management decisions.

6.4.6. Business strategy

The research results show that the prospector-type strategy has a positive but weakest effect on the application of SMA in Vietnamese manufacturing enterprises ($\beta_5 = 0.166$; $p < 0.001$). This

means Vietnamese manufacturing firms adopting the prospector-type strategy will use more SMA techniques. This result is consistent with the study's expectations about the role of business strategy in SMA adoption and is consistent with the results of many previous studies (e.g., Bui et al., 2020; Cadez & Guilding, 2008; Chi, 2021; Cinquini & Tenucci, 2010; Ojra, 2014; Vu et al., 2022). An organization's choice of strategy will affect the management control system in that organization, i.e., different types of organizational plans and strategies are likely to create different control system structures. Vietnam is currently one of the ten economies with the largest market openness in the world (T. M. Nguyen & Nguyen, 2021), so the business environment of Vietnamese manufacturing enterprises is facing increasingly fierce competition in terms of product diversity, product quality, price, raw material supply, etc. Besides, these enterprises still mainly focus on providing low-cost value to meet and satisfy customers about the product's selling price without paying attention to the value that customers expect. Therefore, these enterprises need to shift from thinking about providing products to providing the values that customers expect, paying more attention to customer and competitor research by using more than SMA techniques to analyze and collect information about customers and competitors in the strategic decision-making process. This helps them find product and market opportunities, meet consumer needs, develop new products, etc., maintain market share, penetrate and expand new markets, and improve high competitiveness. Implementing this content will help firms increase their competitive advantage and improve operational results.

7. Summary and conclusion

Globalization and technological progress are drastically changing the nature of competition in many industries. Enterprises must compete with new competitors in their home market and competitors in foreign markets. Therefore, enterprises must change their strategies proactively, often creating challenges for competitors to improve their operations and competitive position. To that end, SMA activities will provide a roadmap for enterprises to improve operational efficiency and enhance their competitive position. Therefore, with efforts and expectations to improve the understanding and promote the application of SMA in the context of enterprises in a developing country like Vietnam. The study aims to identify contingency factors affecting the application of SMA in Vietnamese manufacturing enterprises. Using the qualitative method using questionnaires, while the quantitative approach is used to measure the analysis, and using the linear regression model with SPSS, the research results show that the contingency factors, including organizational size, competitive intensity, organizational structure (decentralization of management), organization's technology, business strategy, and perception of market instability actively to the application of SMA in manufacturing enterprises in Vietnam. In which, the competitive intensity factor has the strongest impact, while the business strategy factor has the weakest effect on the application of SMA in these enterprises. The findings of this study imply that, in a volatile business environment, enterprises need to ensure a good combination of contingency factors to operate their businesses optimally and promote the application of SMA in its operational context. In this way, enterprises need to pay more attention to contingencies and the external environment (competitive intensity and perception of market instability), design organizational structure according to decentralization of management in the decision-making process, focus on investment and innovation in production technology, develop clear business strategies by the operating characteristics and business environment of enterprises, develop cooperation strategies to expand the market and increase the scale of the enterprise.

Although this study provides insight into the extent of the impact of contingency factors on the application of SMA in the context of manufacturing enterprises in emerging economies such as Vietnam, however, the study still has some limitations that further studies need to review and expand more completely on this subject, as follows:

First, the data used in this study was collected from the responses listed in the questionnaire from an individual in each enterprise. Therefore, there is a threat of bias; that is, these assessments may contain errors of personal bias and judgment. Thus, further studies should expand the source of data collection by collecting both primary data (survey) and secondary data for analysis (e.g.,

from internal records of the enterprise or sent to two different respondents). In addition, the study surveyed manufacturing enterprises in many fields, so it was impossible to analyze the specific factors affecting each production field. Therefore, further studies can study this issue in each field, such as textiles, footwear, chemicals, processing, manufacturing, electronics, etc.

Secondly, this study has yet to fully consider the factors that can affect the application of SMA in enterprises (the factors in the study only explain 54.7% of the variation in the application of SMA). Therefore, further studies are called to continue examining other factors' influence (e.g., the cost of implementing SMA, the capacity of accountants and accountants involved in decision-making, market orientation, etc.) to have a broader view. Besides, this study does not include control variables that may affect the application of SMA in enterprises. Therefore, further studies are called to examine the influence of control variables such as firm age, type of enterprise (e.g., small, medium, and large sized), ownership structure, etc., on the application of SMA.

Thirdly, the sample size is relatively small ($n = 395$) and may not be highly representative of the population; therefore, further studies should consider increasing the sample size to be highly representative and have more significance.

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Correction

This article has been corrected with minor changes. These changes do not impact the academic content of the article.

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Appendix A

Table A1. Describe the variables

Variables	Observed variables	Description	Source
SIZE	SIZE1	The total turnover of your enterprises in the last financial year was relatively high.	Libby and Waterhouse (1996), Cadez and Guilding (2008), Cinquini and Tenucci (2010), Ojra (2014), Chi (2021), Vu et al. (2022).
	SIZE2	Your enterprise's total number of employees per year is considerable.	
	SIZE3	The total value of assets on your enterprise's balance sheet in the last financial year was significant.	
COMP	COMP1	Many promotions occur in our industry.	Doan (2012), Pavlatos (2015), Kariuki and Kamau (2016), Bui et al. (2020), Chi (2021).
	COMP2	Many enterprises in our manufacturing sector invest heavily in product promotion.	
	COMP3	Enterprises in the manufacturing sector have high competition for market share.	
	COMP4	The current business environment is threatening the survival of our enterprise.	
	COMP5	Fierce price competition is threatening our enterprise.	
	COMP6	The quality or novelty of our competitors' products is threatening our enterprise.	
INST	INST1	Sometimes our customers are very price sensitive.	Cadez and Guilding (2008), Cinquini and Tenucci (2010), Ojra (2014), Pavlatos (2015), Do (2022), Huyen (2022).
	INST2	We see a demand for our products from customers who have never purchased our products before.	
	INST3	New customers tend to have a different product interest from existing customers.	
	INST4	Our customers are always looking for new products.	
TECH	TECH1	Technology is a critical element of an enterprise's operating system.	Ojra (2014), Kariuki and Kamau (2016), Pham et al. (2020), T. M. Nguyen and Nguyen (2021), Vu et al. (2022).
	TECH2	Technology-based enterprise production techniques.	
	TECH3	Computer-based accounting information system.	
	TECH4	Our enterprises invest in software packages to support their accounting systems and other operations.	

(Continued)

Table A1. (Continued)

Variables	Observed variables	Description	Source
STRA	STRA1	The degree of change of the enterprise's list of products/ services delivers to the market over time.	Guilding (1999), Cadez and Guilding (2008), Cinquini and Tenucci (2010), Bui et al. (2020), Chi (2021), Vu et al. (2022).
	STRA2	The pioneering role of enterprises in developing new products/ services or new markets in enterprises in the same industry/ field in the same field.	
	STRA3	Enterprise reaction capabilities for the first signals about the needs or opportunities of the market.	
STRU	STRU1	Small issues in the enterprise must be brought to the upper management for the final decision.	N. Waweru (2008), Chenhall (2008), Tuan Mat (2010), Pavlatos (2015), T. M. Nguyen and Nguyen (2021), Huyen (2022).
	STRU2	Any important decisions made by employees must be approved by senior management	
	STRU3	Employees cannot make their own decisions without authorization.	
SMA	SMA1	Attribute costing	Cadez and Guilding (2008); Ojra (2014).
	SMA2	Life-cycle costing	
	SMA3	Target costing	
	SMA4	Value-chain costing	
	SMA5	Customer profitability analysis	
	SMA6	Valuation of customers as assets	
	SMA7	Competitor cost assessment	
	SMA8	Strategic costing	
	SMA9	Strategic pricing	
	SMA10	Brand valuation	
	SMA11	Benchmarking	

Note: Source: Compiled by the authors