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Research on factors affecting the application of management accounting in Vietnamese construction enterprises

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ABSTRACT

In Vietnam's growing economy, construction enterprises (CEs) play a crucial role in establishing infrastructure and fostering the development of other industrial sectors. However, CEs also face significant challenges, particularly in managing costs, schedules, and quality within projects. The adoption of management accounting (MA) has become an indispensable tool for CEs to optimize financial operations, enhance managerial efficiency, and support strategic decision-making. Investigating the factors influencing MA adoption in Vietnamese CEs is a critical issue. The influencing factors considered include: firm size, technological level, accountants' qualifications, top management perception, the cost of organizing the MA system, and the level of market competition. This paper aims to identify and analyze the factors affecting MA adoption in CEs, employing a mixed-methods approach (qualitative and quantitative) through surveys targeting individuals from the board of directors, chief accountants, or accounting managers within the enterprises. SPSS and AMOS quantitative results have identified factors affecting the application of MA and the level of influence of each factor. The research findings will clarify the direction and extent of each factor's impact, thereby proposing practical implications and solutions to enhance MA adoption in Vietnamese CEs.

Contribution/ Originality: This study combines qualitative and quantitative methods to examine six key factors affecting the adoption of management accounting in Vietnamese construction enterprises. It provides empirical evidence with practical implications for a developing economy. The research uniquely integrates theoretical perspectives with contextual insights tailored specifically to the construction sector.

1. INTRODUCTION

In the context of integration, Vietnam's CEs are facing new challenges and opportunities. Accession to Free Trade Agreements (FTAs) has opened up vast markets, enabling Vietnamese CEs to access international projects and collaborate with foreign partners.

However, this also means that domestic CEs must compete directly with international contractors possessing superior management capabilities, modern technology, and operational efficiency. The CEs, as one of Vietnam's key economic sectors, have been strongly influenced by the wave of globalization. Vietnamese CEs now compete not only in the domestic market but also with international contractors. International integration demands that CEs enhance their management capacity, optimize costs, and ensure efficiency in project execution. This presents a significant

challenge, particularly for small and medium-sized enterprises (SMEs), which are often constrained by limited financial, human, and technological resources.

Applying MA is an urgent requirement. MA is not merely a tool for internal management but also plays a vital role in enhancing the enterprise's competitiveness. Through MA, enterprises can tightly control costs, optimize resource utilization, and improve operational performance. Furthermore, the MA system provides valuable financial and non-financial information, aiding managers in making strategic decisions, ranging from project selection and resource allocation to risk management.

However, the adoption of MA in Vietnamese CEs still faces numerous challenges. Some significant challenges include a lack of awareness and capacity among management teams. Many managers in Vietnamese CEs do not fully recognize the importance of MA, leading to underinvestment in the system. Additionally, the limited professional expertise of accounting staff, coupled with the lack of specialized management software, also presents major obstacles to effective MA implementation.

In the era of globalization, Vietnamese CEs need to understand that adopting MA is not just an internal necessity but also a decisive factor for survival and development in the international market. Researching the factors influencing MA adoption will help clarify the elements affecting the implementation process of this system. Therefore, the research is justified for the following reasons: (1) the trend of globalization and international integration; (2) the benefits of MA for Vietnamese CEs; (3) specific research on MA adoption in enterprises generally, and Vietnamese CEs specifically.

The research topic, Research on Factors Affecting the Application of MA in Vietnamese CEs, is deemed a necessary and urgent issue. This topic not only holds theoretical significance in developing the MA system in Vietnam but also offers practical value, supporting enterprises in the industry to improve long-term operational efficiency.

2. LITERATURE REVIEW

2.1. Concept of Management Accounting in Enterprises

According to Schuster, Heinemann, and Cleary (2021), MA is one of the three information systems within an enterprise, alongside Investment & Financial Accounting and Financial Accounting. Internal accounting, or MA, encompasses all information systems designed for internal users, primarily managers, fulfilling their decision-making roles within the enterprise.

MA performs functions including identifying, measuring, aggregating, analyzing, preparing, interpreting, and communicating information, with the objective of supporting managers in pursuing the organization's objectives (Bhimani et al., 2012).

Similarly, Bhimani et al. (2012) state that MA provides information to managers within the organization. MA information helps managers to plan and control the enterprise's operations. Planning involves establishing organizational goals and outlining the methods to achieve them. Control involves implementing the plan and using feedback information to evaluate the degree to which objectives have been met. In the planning and control cycle, feedback plays a crucial role. Timely and systematic internal reports generated from the main MA system serve as the primary source of useful feedback.

2.1.1. Approaches to the Content of Management Accounting

2.1.1.1. Approach Based on Management Functions

The approach to MA based on management functions is a primary research direction in accounting, helping to define the role and scope of MA application in the operational management of enterprises. This perspective asserts that the content of MA is primarily determined by its support for the basic management functions of the enterprise, including planning, organizing, controlling, evaluating, and decision support.

This not only provides a comprehensive view of the internal information system but also enables the enterprise to respond quickly to environmental changes, optimize resource utilization efficiency, and enhance competitiveness.

In the initial phase, planning is the decisive first step for all management activities. Management accounting (MA) plays a role in providing data, forecast information, and statistical figures to formulate financial, business, and production plans. Next, the organizing function requires the enterprise to rationally rearrange resources to implement the set plan. At this stage, MA supports this by providing detailed information about departments, divisions, and production units.

The control function is one of the core tasks of enterprise management, ensuring that activities are executed according to plan and that objectives are met. From an MA perspective, control extends beyond monitoring financial data to include the analysis and comparison of key performance indicators between actual results and plans. Furthermore, the performance evaluation function plays a crucial role in guiding the enterprise's development direction. MA provides tools and methods for performance evaluation, such as break-even analysis, profit margin ratios, return on investment, and other financial indicators. By measuring the efficiency of each department, project, or specific product, managers can identify strengths and weaknesses, thereby proposing improvement and development strategies.

Finally, the advising and decision support functions are extensions of MA, providing managers with deep and multi-faceted insights into the enterprise's operations. When facing strategic decisions such as expanding production, investing in new technology, or adjusting business strategy, managers rely on reports, analyses, and forecasts provided by the MA system.

Thus, approaching the content of MA through management functions helps enterprises better understand the link between management activities and the internal information system, thereby building a scientific, flexible, and effective MA system. This perspective affirms MA's role not only in providing data but also as a strategic tool to help enterprises optimize resources, enhance performance, and guide sustainable development.

2.1.1.2. Approach Based on the Object of Accounting

The approach to the content of MA based on its objects is a key research focus, defining the scope and content of MA by focusing on the objects that the management information system must reflect and process. According to this view, MA content is built upon the fundamental elements that the enterprise needs to monitor, evaluate, and control to optimize business operations, thereby supporting accurate and timely management decision-making.

Primarily, the objects of MA include elements such as costs, revenues, profits, assets, and capital. Each of these objects is not merely a number or simple financial information but serves as a basis for analysis, forecasting, and comparison to evaluate the efficiency of resource utilization within the enterprise. In the area of costs, MA not only records incurred expenses but also analyzes them in detail by categories such as production costs, selling costs, and administrative expenses, thereby helping to identify significant cost drivers, detect inefficiencies, and implement measures for cost control and reduction effectively.

Regarding revenue, the perspective based on accounting objects requires clear identification of revenue sources from various channels such as sales revenue, service revenue, financial income, etc. Revenue analysis methods, such as analysis by product, market region, or time period, help the enterprise understand consumption trends and evaluate the impact of pricing policies and marketing strategies on business performance.

Consequently, managers can formulate business development plans based on realistic revenue forecasts and long-term strategic orientation.

Profit is another core object of MA, serving as the ultimate measure of business performance. From this perspective, MA focuses on analyzing profit according to criteria such as gross profit, net profit, return on sales, and return on investment. These indicators not only help evaluate current performance but also serve as a basis for forecasting profit trends, determining the break-even point, and formulating strategies to optimize resource

allocation. Additionally, the objects of MA include the management of assets and capital. These are important factors that help the enterprise monitor, manage, and evaluate the effective use of financial resources. Analyzing assets, from inventory and fixed assets to cash flow and working capital, helps the enterprise gain a comprehensive view of its liquidity, asset utilization efficiency, and investment effectiveness. Indicators such as inventory turnover ratio, debt-to-equity ratio, and other analytical tools are used to optimize capital utilization, minimize financial risks, and ensure continuous and stable business operations.

The approach based on accounting objects also requires the integration of the aforementioned elements to build a synchronous and coherent management information system. The interaction between costs, revenues, profits, and assets creates a holistic picture of the enterprise's business performance.

Through this, managers can not only evaluate the performance of individual units but also identify the relationships between these elements, thereby enabling strategic decisions aimed at optimizing the entire enterprise management system.

In summary, the approach to MA content based on its accounting objects is a comprehensive method, allowing enterprises to clearly identify the core elements needing monitoring and control during the management process. Through this, the MA system is built scientifically, synchronously, and flexibly, contributing to decision support, optimizing resource utilization, and ensuring long-term business operational efficiency.

2.1.1.3. Approach Based on Decision-Making Level

This approach is a crucial aspect of applied research in MA, allowing for the classification and processing of management information based on the scope and impact of decisions made within the enterprise. This perspective divides the decision-making process in an enterprise into three main levels: operational decisions, tactical decisions, and strategic decisions.

Each level requires management information and indicators to be constructed and presented specifically, aiming to meet the decision-making needs appropriate to each facet of the enterprise's operations.

At the operational level, the enterprise focuses on short-term decisions, often daily, weekly, or monthly, to ensure stable and efficient production and business operations. In this context, MA plays a role in providing detailed information on production costs, labor efficiency, raw material consumption levels, and other daily operational indicators.

Moving to the tactical level, decisions are made with a medium-term impact, often relating to adjusting operational plans, changing organizational structures, and optimizing operating procedures of various departments. At this level, MA not only provides cost and revenue data but also integrates information on the operational efficiency of each department and production line, thereby supporting budgeting, financial forecasting, and the development of specific adjustment plans for each unit.

At the strategic level, decisions emerge with long-term impacts, guiding the entire enterprise's operations amidst the constantly changing market and global business environment. These decisions relate to determining growth targets, investment directions, developing new product strategies, market expansion, and corporate restructuring to achieve sustainable competitive advantage.

Within this framework, MA takes on the role of providing long-term forecast information, analyzing market trends, assessing the enterprise's competitive ability, as well as financial and non-financial indicators related to innovation capacity and sustainable development.

The approach to MA content based on the decision-making level not only helps classify management decisions by scope of impact and time horizon but also facilitates the construction of a comprehensive management information system, supporting resource optimization, effective operational control, and strategic development directions for the enterprise. Applying this perspective in practice not only brings tangible economic value but also contributes to broadening the scope of scientific research and shaping advanced MA models.

2.2. Overview of Research on Management Accounting in Enterprises

Haldma and Lääts (2002) clarified the impact of factors on the application and development of the MA system in Estonian manufacturing enterprises. The results indicated that, although enterprises maintained some traditional accounting practices, changes in the business environment and technological advancements played a key role in driving improvements in the MA system.

Abdel-Kader and Luther (2008) investigated the contextual factors affecting the sophistication level of MA practices in UK enterprises. The study surveyed 10 factors divided into three main groups: external characteristics (environmental uncertainty and customer power), organizational characteristics (competitive strategy, hierarchical structure, and firm size), and production characteristics (system complexity, application of advanced manufacturing technology, application of total quality management, application of just-in-time production methods, and product perishability).

Tuan Mat (2010) surveyed how manufacturing companies in Malaysia changed their application of MA during the period 2003-2007. The study indicated that external factors (competitive pressure, changes in the business environment), along with internal factors (firm size, organizational structure, innovation strategy), all contributed to determining the level and form of application of MA practices, thereby directly affecting the business performance of the enterprise.

Albu and Albu (2012) clarified the factors influencing the existence and application of MA techniques in Romania. The study focused on surveying factors such as capital sources, especially the presence of foreign capital, firm size, as well as environmental and competitive factors. Through a survey of 109 enterprises, the results showed that the type of capital and firm size were key factors driving the adoption of MA techniques, with foreign capital playing a decisive role, while the impact of the environment and competition showed limited statistical evidence.

Mayr (2012) studied the factors affecting the application of management accounting in Eastern European enterprises and assessed the impact of these factors on business performance.

The results indicated that firm size had the strongest influence on the adoption of management accounting practices, while accounting capacity showed a weaker impact; simultaneously, integrating management techniques such as budgeting, performance evaluation, and decision support contributed to improving the competitiveness and business performance of the enterprise.

Ahmad and Mohamed Zabri (2015) surveyed the factors affecting the application of MA practices in SMEs in Malaysia. Using binary logistic regression analysis, the study showed that firm size, intensity of competition, and the level of advanced technology adoption all had a positive and statistically significant impact on the use of MA systems.

Leite, Fernandes, and Leite (2016) studied the impact of contextual factors on the application of manufacturing accounting practices in the textile and apparel industry in Portugal.

Specifically, the study surveyed five key factors: level of competition, product diversity, organizational size, importance of cost information for decision-making, and the level of application of advanced manufacturing technology. Through a survey of 512 companies and regression analysis, the results showed that although traditional accounting practices were still preferred, the mentioned factors all had a positive impact on the transition towards modern systems, with advanced manufacturing technology having the most direct and strongest impact, contributing to enhanced enterprise management efficiency.

Shahzadi, Khan, Toor, and Haq (2018) studied the relationship between external and internal factors regarding the application of MA practices in Pakistani enterprises. Through empirical surveys across enterprises in various industries, the results indicated that both uncertainty from the external environment and the application of modern techniques internally played crucial roles, driving the transformation process of the MA system from simple to complex forms, thereby enhancing management efficiency and better meeting the competitive demands of the enterprise.

Hung and Oanh (2020) studied the factors influencing the intention to adopt management accounting systems in Vietnamese enterprises, based on the Unified Theory of Acceptance and Use of Technology combined with the Diffusion of Innovation theory.

Surveying 542 respondents, including accountants and managers, the study focused on four main factors: performance expectancy, effort expectancy, perceived trust, and subjective norms. The results indicated that these factors explained 60.618% of the variance in the intention to adopt the management accounting system, with subjective norms having the strongest impact, achieving a regression coefficient of 0.238.

Huỳnh and Huỳnh (2021) studied the role of the management accounting (MA) system in supporting the decision-making process of enterprises, as well as identifying the factors affecting the level of MA application in small and medium-sized enterprises (SMEs) in Binh Duong Province. The study analyzed the influence of seven key factors: the role of professional accounting organizations, corporate culture, management policies, enterprise characteristics, the level of market competition, qualifications of accounting staff, and staff training.

Tuan, Hung, Hai, and Vu (2020) clarified the factors influencing the application of MA systems in SMEs CEs in Central Vietnam. Specifically, firm size offered the greatest potential for information consumption and management resources, followed by the perspectives and awareness of managers regarding the importance and implementation of the MA system. Additionally, the application of information technology supported the provision of timely and accurate information, while competitive pressure also motivated enterprises to transition from traditional accounting methods to modern techniques.

Oanh and Hong (2023) studied the factors affecting the application of management accounting systems in construction companies in Vietnam. The results showed that the factor with the strongest influence was the perception of managers, followed by the qualifications of accounting staff, company size, intensity of competition, and business strategy.

In total, these five groups of factors explained 62.5% of the impact level on the application of the management accounting system in construction companies in Vietnam, thereby providing a basis for proposing solutions to improve the quality of management information and enhance the operational efficiency of enterprises.

Hoanh, Tuan, and Yang (2024) studied the factors impacting the adoption of MA practices in CEs in Vietnam, aiming to enhance management efficiency and support the decision-making process. The results showed that all factors had a positive influence on the implementation of the MA system, with organizational culture having the strongest impact, followed by firm size and the level of competition.

2.3. Overview of Relevant Theories

2.3.1. Contingency Theory

Contingency Theory is one of the important theoretical foundations in the fields of MA, particularly in explaining why management models and practices cannot be applied uniformly across all organizations. This theory originated from research on organizational structure and management behavior in the 1960s, notably with works by Burns and Stalker (1961), Lawrence and Lorsch (1967), and later Donaldson (2001), who emphasized that there is no single optimal management model for all circumstances. Instead, management effectiveness depends on the degree of fit between the organization's internal factors and the external conditions it faces.

Contingency theory suggests that the design and application of the MA system need to be adjusted flexibly depending on the specific characteristics of the enterprise. Factors such as firm size, level of market competition, technological capability, financial capacity, qualifications of accounting personnel, and the perception of top management are all contingent variables that can affect the MA system.

2.3.2. Diffusion of Innovation Theory

The Diffusion of Innovation Theory is one of the foundational theories in studying organizational behavior and the process of adopting new technology or management methods. This theory was developed by Rogers (1962) in his work "Diffusion of Innovations," and was subsequently expanded by many other scholars in fields such as business, public health, education, and management. Rogers argued that innovation whether a product, process, or idea will be adopted and spread according to a specific sociological process, influenced by factors related to the characteristics of the innovation, the organization, and the environment.

In the field of MA, the diffusion of innovation theory is applied to explain why the same MA tool such as ABC or customer profitability analysis has different levels of adoption among enterprises. According to Rogers' approach, the implementation of new MA tools is not merely a technical issue but a social change process, dependent on perception, accessibility, and organizational cultural characteristics.

Specifically, within enterprises, the success of MA adoption significantly depends on readiness for change, the role of leadership in encouraging innovation, and the capability of internal communication to create consensus. Enterprises with a flexible organizational culture, management teams open to innovation, and mechanisms for piloting new management tools tend to adopt MA earlier and more comprehensively. Conversely, conservative organizations, lacking resources or without a suitable internal support system face difficulties in applying modern MA methods.

2.3.3 Cost-Benefit Theory

The Cost-Benefit Theory is an economic theory that plays a fundamental role in supporting management decisions, investments, and policy planning. The origins of the theory were established in the mid-19th century with the work of Dupuit (1844), who first proposed the quantification of benefits and costs in analyzing public works projects. Subsequently, Marshall (1890) and Pigou (1920) developed the basic concepts of cost-benefit theory in welfare economics. In the 20th century, the theory was further systematized and expanded by Mishan (1971) and Boardman, Greenberg, Vining, and Weimer (2011), becoming one of the main tools in positive economic analysis.

The assumption that individuals and organizations are rational decision-makers, always seeking to optimize effectiveness by comparing expected total benefits and total incurred costs. An action, project, or decision is considered rational if the benefits generated are greater than or at least equal to the costs incurred. Benefits in the theory include not only measurable financial elements but also encompass non-financial factors such as information quality, responsiveness to changes, decision-making capacity, or strategic alignment—provided these factors can be relatively quantified.

Digital transformation and the integration of information technology are becoming mainstream trends; the cost-benefit theory is increasingly important. Implementing MA is no longer a question of whether to do it but how to implement it most effectively, aligned with internal capabilities and strategic objectives. Costs in this context are not just investment figures but also relate to organizational flexibility, learning ability, and the adaptability of the enterprise.

2.3.4. Organizational Behavior Theory

Organizational Behavior Theory was developed from the mid-20th century, based on the integration of psychology, sociology, and management science. Key figures who contributed to shaping and expanding this theory include Barnard (1938), Simon (1947) and (Robbins & Judge, 2019). This theory emerged with the aim of analyzing and explaining individual and group behavior within the organizational environment, thereby optimizing the operational efficiency of the enterprise. The core content of the theory includes aspects such as individual perception, work motivation, attitudes, values, communication skills, organizational culture, and the influence of leadership on the operational effectiveness of the organization. According to organizational behavior theory, humans are not just

agents executing technical processes but also subjects directly impacting the success or failure of any management system within the enterprise. In the context of applying MA, the human element specifically the team of accounting staff and management plays a central role in the implementation, maintenance, and effective utilization of the MA system. The application of MA cannot be separated from professional competence, work motivation, attitude towards change, and collaborative capacity among members within the organization.

3. METHODOLOGY

3.1. Research Design

3.1.1. Qualitative Research

Objective: To interview independent experts to refine the model and survey questionnaire regarding the factors affecting the application of MA in Vietnamese CEs.

Subjects: Expert interviews were conducted with 2 groups:

(1) Group 1: Academics engaged in research and teaching at reputable universities, with experience and practical knowledge in the field of accounting and auditing, holding doctoral degrees, and having 10 years or more of experience.

(2) Group 2: Individuals currently working in manufacturing enterprises, with professional qualifications from university level, with at least 10 years of experience in accounting and management, holding high managerial positions such as general director, director, chief accountant, or finance manager.

3.1.2. Research Process

+ Design discussion outline: The expert interview outline was designed in a semi-structured format to explore additional content related to the research.

+ Contact and interview experts: The discussion outline was sent to respondents via Gmail for experts to review and prepare. After scheduling appointments, the author met with experts to discuss, deliberate, and seek opinions. The interviews were carefully recorded to assist the author in analyzing the issues in depth.

+Synthesize, refine model, and survey questionnaire: Based on the opinions of these experts, the author synthesized the feedback from the interview sessions to build a suitable and easy-to-understand survey questionnaire.

The results obtained from the expert interviews are the preliminary model and survey questionnaire.

3.1.3. Quantitative Research

Preliminary quantitative research: Preliminary quantitative research was conducted with a sample size of 58. The purpose of the preliminary quantitative research is to identify problematic points in the survey questions and to assess the reliability of the measurement scale before conducting the official research.

Official Quantitative Research: The official quantitative research was conducted to collect data for quantitative analysis. After revision, the survey questionnaire was distributed to respondents from enterprises in the selected sample. The collected data were then cleaned for analysis using SPSS 26 and AMOS 24. The results of the official quantitative research were used to test the research model, examining the influencing factors, their directions, and the extent of their impact on the adoption of MA in Vietnamese CEs.

3.2. Research Hypotheses

(1) Firm size: According to the study by Ahmad and Mohamed Zabri (2015), firm size is an important factor affecting the organizational structure and internal control activities of the enterprise. Firm size not only impacts the way work is organized and assigned within the enterprise but also has a significant influence on the adoption of financial management methods and tools, especially MA. Several studies have shown that firm size has a positive and direct impact on the adoption of MA within enterprises. Specifically, studies by Haldma and Lääts (2002), Alkizza and

Akbar (2007), and El-Ebaishi, Karbhari, and Naser (2003) all indicate that larger enterprises tend to adopt more in-depth and modern MA methods compared to smaller enterprises.

H1+: Firm size has a positive impact on the implementation of MA in Vietnamese CEs.

(2) Technology: According to the Diffusion of Innovation Theory, accessing and applying technology (manufacturing technology, information technology) is a major driving force promoting the adoption of MA. Numerous studies Nguyen and Thai (2022), Isa and Foong (2005), and Kalkhouran, Abdul Rasid, Sofian, and Nedaei (2015) lead to that the application of modern manufacturing technology increases the demand for MA adoption. Regarding information technology, the study by Ojra (2014) shows that investing in project management software, accounting software, and information technology personnel will provide a clear competitive advantage, while also enhancing the level of application of MA techniques. Pavlatos (2015), Bui, Pham, Huỳnh, and Pham (2020), and Le (2020) all agree that the quality of the internal information system has a positive impact on the application of MA.

H2+: Technology has a positive impact on the implementation of MA in Vietnamese CEs.

(3) Accountant Qualification: According to the diffusion of innovation theory, the acceptance and application of new methods in MA largely depend on the competence and qualifications of the accounting staff. Accounting staff with high qualifications, formal training, and practical experience are often able to apply management accounting tools more effectively than staff with lower qualifications. This is because they are capable of understanding management accounting methods thoroughly, thereby applying them correctly in financial management, cost control, financial planning, and evaluating the operational efficiency of the enterprise. Studies by Tayles and Drury (1994), Collis and Jarvis (2002), and McChlery and Rolfe (2004) all indicate that when accounting staff have high qualifications, they can apply modern MA tools and methods, thereby supporting the enterprise in enhancing management efficiency and making strategic decisions.

H3+: An Accountant qualification has a positive impact on the implementation of MA in Vietnamese CEs.

(4) Top Management Perception of MA*:* According to organizational behavior theory, the perception and attitude of top leadership have a crucial impact on the adoption of MA within the enterprise. Studies by Gaidienė and Skyrius (2006); Malmi (1997); Moisello (2012) and Amir, Kama, and Levi (2015) along with studies in Vietnam such as Hieu and Dung (2018) and Nguyen, Ta, and Nguyen (2021) show that when leadership recognizes the value of MA, they will support financing, personnel training, and create a favorable environment for MA implementation. This helps enhance financial control, optimize operations, and promote sustainable development.

H4+: Top management perception of MA has a positive impact on the implementation of MA in Vietnamese CEs.

(5) Cost of the MA *System:* According to the cost-benefit theory, the decision to invest in MA depends on the comparison between the costs incurred and the expected benefits. Studies Al-Omiri and Drury (2007), Mahfar and Omar (2004), Lucas, Rafferty, and Hadrian (2013), and Tri (2015) show that the high cost of organizing the MA system is a major barrier, especially for small and SMEs. When the organizational cost exceeds the financial capacity or the perceived benefits are unclear, enterprises will hesitate or refuse to adopt MA, even though MA helps optimize financial management and cost control.

H5-: The cost of organizing the MA *system has a negative impact on the implementation of MA in Vietnamese CEs.*

(6) Level of Market Competition: The level of market competition creates pressure forcing enterprises to continuously optimize costs, improve quality, and innovate to survive. Studies Lucas et al. (2013), Drury, Braund, and Osborne (1993), and Khandwalla (1972) show that the higher the competition, the greater the need to adopt MA to provide timely information, support strategic decision-making, and effectively control costs. Therefore, the level of market competition is a driving force for enterprises to implement MA systems to maintain advantages and develop sustainably.

H6+: The level of market competition has a positive impact on the implementation of MA in Vietnamese CEs.

3.3. Research Model

The official research model is presented in Figure 1.

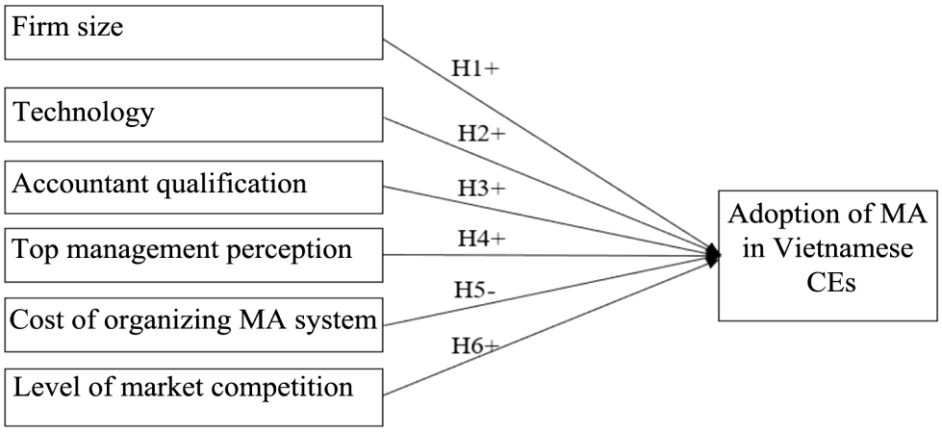

Figure 1. Official research model.

3.4. Official Measurement Scale

The official measurement scale is presented in Table 1.

Table 1. Official measurement scale.

Scale	Measurement item	Code	Source
Firm size	The larger the revenue, the higher the need for MA adoption in CEs.	QM1	Flacke and Segbers (2005) and Hutaibat (2005)
	The larger the total assets, the higher the need for MA adoption in CEs.	QM2	
	The more employees, the higher the need for MA adoption in CEs.	QM3	
	The larger the organizational structure, the higher the feasibility of adopting MA.	QM4	
Technology	The use of technology is a core element of the company's operating system.	CN1	Ojra (2014)
	The company's production/service techniques are based on technology.	CN2	
	The company's accounting information system is computer-based.	CN3	
	The company invests in software packages to support accounting and other activities.	CN4	
Accountant qualification	The company's accounting staff are trained according to reputable, quality processes.	TD1	Ismail and King (2007) and McChlery and Rolfe (2004)
	The company's accounting staff have knowledge about MA.	TD2	
	The company's accounting staff receive organized training to enhance their skills and knowledge.	TD3	
	The company's accounting staff are capable of using MA tools.	TD4	
Top management perception	The CEs' management has knowledge about MA.	NT1	Hung (2016)
	The CEs' management highly values the usefulness of MA tools.	NT2	
	The CEs' management has a high demand for applying MA within the enterprise.	NT3	
	The CEs' management accepts higher costs when adopting MA.	NT4	
	Applying MA depends on initial equipment investment costs	CP1	Hung (2016)
	MA adoption depends on consulting fees from experts and MA organizations.	CP2	

Scale	Measurement item	Code	Source
Cost of organizing MA system	MA adoption depends on the cost of recruiting and training personnel for the MA department.	CP3	
	MA adoption depends on the cost of salaries and benefits for MA staff.	CP4	
Level of market competition	Level of competition regarding market share/revenue.	CT1	Tuan Mat (2010) Author's proposal
	Level of competition regarding input factors.	CT2	
	Level of competition regarding construction bidding prices.	CT3	
	The enterprise always reacts quickly to competitive actions that could threaten it.	CT4	
Adoption of MA in Vietnamese CEs	CEs apply MA cost techniques.	AD1	Hung (2016), Author's proposal
	CEs apply MA budgeting techniques.	AD2	
	CEs apply MA performance evaluation techniques.	AD3	
	CEs apply MA techniques to support the decision-making process.	AD4	
	CEs apply MA strategic techniques.	AD5	

3.5. Research Sample

To use EFA, the sample size, according to the observation/variable ratio, should be 5:1, preferably 10:1 or higher (Hair, Black, Babin, Anderson, & Tatham, 2006). The author proposes a model with seven factors (six independent variables and one dependent variable) with twenty-nine observed variables. Based on the 5:1 ratio, the minimum required sample size is 145; with a 10:1 ratio, the minimum required sample size is 290.

The number of survey questionnaires sent out was 300, targeting enterprise managers, chief accountants, or accounting managers. The results returned 197 questionnaires, with 195 valid responses. With six independent variables, one dependent variable, and 29 observed variables, the study's sample size of 195 is appropriate based on the minimum sample size calculation.

3.6. Data Collection Method

Questionnaires were used to collect data from survey methods, including face-to-face surveys, telephone surveys, mail surveys, and online Google Form surveys. The survey questionnaire included questions aimed at assessing the influence of factors such as firm size, technology, accountant qualification, top management perception of MA, cost of organizing the MA system, and level of market competition. The survey used a 5-point Likert scale, ranging from "1-Strongly disagree" to "5-Strongly agree".

3.7. Analysis Method

SPSS 26 and AMOS 24 software are used to process the data after receiving survey feedback.

(1) Descriptive statistics: Descriptive statistics present or describe the basic characteristics of a dataset.

(2) Reliability analysis of the scale using Cronbach's Alpha coefficient: To measure the internal consistency among statements within the same factor, the author group uses the reliability coefficient, Cronbach's Alpha. A good measurement scale should have a reliability coefficient of 0.7 or higher (Nunnally, 1978). However, if it is too high (0.95 or higher), it may indicate that the scale contains observed variables that are not significantly different in meaning and are considered nearly redundant within the scale (Nguyen, 2013). Additionally, the study also needs to pay attention to another important index, which is the Corrected Item-Total Correlation.

(3) Exploratory Factor Analysis (EFA): In this research project, the author group uses the EFA method as a tool to test the preliminary measurement scale. EFA is a quantitative method used to assess the discriminant validity and

convergent validity of the scale, helping to condense a set of many observed variables into a smaller set of factors that are more meaningful but still contain sufficient information (Hair et al., 2006). EFA analysis is performed by evaluating the criteria in Table 2.

Table 2. Criteria for Exploratory Factor Analysis (EFA).

Criterion	Accepted Value
KMO coefficient	$(0.5 \leq KMO \leq 1)$
Significance of Bartlett's test	Sig Bartlett's Test < 0.05
Eigenvalue	Eigenvalue > 1
Total variance extracted (TVE)	TVE > 50%
Factor loading	≥ 0.5 or difference between two loadings on the same variable > 0.3

(4) Confirmatory Factor Analysis (CFA): CFA is performed for the following purposes:

Assess the overall fit of the data based on model fit indices such as Chi-square/df, CFI, TLI, GFI, RMSEA, etc.

+ Evaluate the quality of observed variables, confirming the factor structures.

+ Assess convergent validity and discriminant validity of the constructs: According to Hair, Black, Babin, and Anderson (2010) and Hair, Hult, Ringle, and Sarstedt (2016), we use AVE, MSV indices, and the Fornell and Larcker table to assess convergent and discriminant validity of the scale.

(5) Multiple Linear Regression Model Analysis: Structural Equation Modeling (SEM) is a second-generation statistical analysis technique developed to analyze multidimensional relationships among multiple variables in a model (Haenlein & Kaplan, 2004). The purpose of using SEM in this study is to assess the influence of factors on the adoption of MA in Vietnamese CEs.

Similar to the CFA method, the SEM model is used to assess the fit of the theoretical model with market data through criteria: Chi-square (CMIN), Chi-square adjusted by degrees of freedom (CMIN/df), Comparative Fit Index (CFI), and Root Mean Square Error of Approximation (RMSEA). The requirements for these indices are the same as those in the CFA model mentioned above.

After conducting the SEM analysis, in the Output section, the author group selects three result tables for evaluation.

- The first table is the Regression Weights table. In this table, based on the P-value with a conventional significance level of P-value<0.05, we identify the variables that are truly significant.
- The second table is the Standardized Regression Weights table, which shows the direction and magnitude of the influence of each significant variable.
- The third table is the Squared Multiple Correlations (R-squared) table, which shows the model's goodness of fit with the data.

Table 3. Descriptive statistics of the research sample.

Variable analyzed	Component	Indicator	Mean	Standard deviation
Factors affecting MA adoption in CEs	Firm size	QM1	4.08	0.713
		QM2	4.09	0.817
		QM3	4.05	0.866
		QM4	4.12	0.892
	Technology	CN1	4.01	0.809
		CN2	4.06	0.791
		CN3	3.94	0.857
		CN4	3.97	0.873
	Accountant qualification	TD1	3.99	0.773
		TD2	4.10	0.799
		TD3	4.06	0.697
		TD4	4.08	0.629
	Top management perception	NT1	4.10	0.810

Variable analyzed	Component	Indicator	Mean	Standard deviation
		NT2	4.03	0.789
		NT3	4.03	0.843
		NT4	4.32	0.881
	Cost of organizing MA System	CP1	4.06	0.744
		CP2	4.01	0.777
		CP3	3.90	0.708
		CP4	3.94	0.777
	Level of market competition	CT1	3.84	0.732
		CT2	3.93	0.840
		CT3	3.94	0.813
		CT4	4.07	0.825
Capability to adopt	Adoption of MA in Vietnamese CEs	AD1	4.21	0.585
		AD2	4.15	0.663
		AD3	4.26	0.562
		AD4	4.15	0.686
		AD5	4.05	0.716

(6) Testing for multicollinearity in the model: The Variance Inflation Factor (VIF) is an index used to assess multicollinearity in a regression model. The smaller the VIF, the less likely multicollinearity is to occur. The study uses the standard VIF < 2 assessment criterion.

4. RESULTS AND DISCUSSIONS

4.1. Descriptive Statistics

Descriptive Statistics of the Research Sample in Table 3.

From Table 3, the average values of the observed variables are all within the range (3.90, 4.20); additionally, the standard deviation is less than 1. This demonstrates that the sample is representative of the population.

4.2. Reliability Test (Cronbach's Alpha)

Item-Total Statistics and Cronbach's Alpha in Table 4.

Table 4. Item-total statistics and Cronbach's alpha.

Indicator	Item-total correlation	Cronbach's alpha if item deleted	Indicator	Item-total correlation	Cronbach's alpha if item deleted
Cronbach's alpha: 0.880			Cronbach's alpha: 0.915		
QM1	0.654	0.878	CN1	0.781	0.899
QM2	0.741	0.845	CN2	0.804	0.892
QM3	0.783	0.828	CN3	0.853	0.874
QM4	0.794	0.824	CN4	0.792	0.896
Cronbach's alpha: 0.797			Cronbach's alpha: 0.868		
TD1	0.626	0.739	NT1	0.734	0.825
TD2	0.609	0.750	NT2	0.720	0.831
TD3	0.611	0.746	NT3	0.778	0.806
TD4	0.607	0.752	NT4	0.651	0.861
Cronbach's alpha: 0.889			Cronbach's alpha: 0.883		
CP1	0.721	0.870	CT1	0.719	0.861
CP2	0.760	0.856	CT2	0.699	0.869
CP3	0.833	0.830	CT3	0.818	0.821
CP4	0.719	0.872	CT4	0.755	0.846
Cronbach's alpha: 0.830					
AD1	0.606	0.803			
AD2	0.613	0.801			
AD3	0.633	0.797			
AD4	0.640	0.793			
AD5	0.663	0.787			

All measures have Cronbach's Alpha coefficients greater than 0.7. The item-total correlation coefficients are all above 0.3 and are appropriate for these scales. Therefore, it can be concluded that these are reliable measurement scales suitable for conducting Exploratory Factor Analysis (EFA). EFA will be performed on the 29 indicators.

4.3. Exploratory Factor Analysis (EFA)

4.3.1. EFA for Independent Variables

KMO and Bartlett's Test for Independent Variables in Table 5.

Table 5. KMO and Bartlett's test for independent variables.

Kaiser-Meyer-Olkin measure of sampling adequacy		0.823
Bartlett's Test of Sphericity	Chi-square	2,837.901
	df	276
	Significance	0.000

We observe that the KMO coefficient equals 0.823, which is greater than 0.5, satisfying the requirements for exploratory factor analysis (EFA). Therefore, factor analysis is appropriate for the research data.

Bartlett's test result: Sig = 0.000 < 0.05 indicates that the variables are correlated within the population, so EFA can be performed. Table 6.

Table 6. Total variance explained.

Factor	**Initial Eigenvalues**			**Extraction Sums of Squared Loadings**			**Rotation Sums of Squared Loadings**		
	Total	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	6.325	26.354	26.354	6.325	26.354	26.354	3.227	13.447	13.447
2	3.211	13.380	39.734	3.211	13.380	39.734	3.034	12.641	26.088
3	2.706	11.274	51.008	2.706	11.274	51.008	3.029	12.620	38.709
4	2.156	8.984	59.991	2.156	8.984	59.991	3.024	12.599	51.308
5	1.800	7.501	67.492	1.800	7.501	67.492	2.937	12.236	63.544
6	1.639	6.828	74.320	1.639	6.828	74.320	2.586	10.777	74.320

The EFA results show that six factor groups were extracted with 24 observed variables. The total variance explained by these six groups is 74.32%, indicating that the extracted factors account for 74.32% of the data's variation. We have the rotated component matrix as follows, Table 7.

The rotated factor result analysis shows that the observed variables converged into six factor groups, corresponding to the independent variables in the research model.

Table 7. Rotated component matrix.

	Factor					
	1	**2**	**3**	**4**	**5**	**6**
CN3	0.883					
CN2	0.856					
CN4	0.856					
CN1	0.843					
CP3		0.885				
CP4		0.836				
CP2		0.821				
CP1		0.797				
QM4			0.888			
QM3			0.875			
QM2			0.828			
QM1			0.762			
CT3				0.894		

	Factor					
	1	2	3	4	5	6
CT4				0.841		
CT1				0.836		
CT2				0.797		
NT2					0.823	
NT1					0.818	
NT3					0.817	
NT4					0.802	
TD1						0.798
TD4						0.765
TD3						0.764
TD2						0.728

Source: Calculation results from SPSS software.

4.3.2. EFA for the Dependent Variable

KMO and Bartlett's Test for the Dependent Variable in Table 8.

Table 8. KMO and Bartlett's test for the dependent variable.

Kaiser-Meyer-Olkin measure of sampling adequacy		**0.787**
Bartlett's test of sphericity	Chi-Square	360.386
	df	10
	Significance	0.000

Through analysis using SPSS, the KMO test result = 0.792 > 0.5 meets the requirement for EFA, and factor analysis is appropriate for the research data. Bartlett's test result: Sig = 0.000 < 0.05 shows that the variables are correlated within the population, so EFA can be performed.

The EFA results show that 1 factor group was extracted with 5 observed variables. We have the component matrix table as follows, Table 9.

Table 9. Component matrix.

Component	**Factor**
	1
AD5	0.798
AD2	0.777
AD4	0.776
AD3	0.763
AD1	0.755

Based on the component matrix results, the dependent factor "Adoption of MA in Vietnamese CEs (AD)" is measured through five observed variables (AD1, AD2, AD3, AD4, AD5). These observed variables all have high factor loadings, ranging from 0.755 to 0.798, ensuring the necessary convergent validity according to the standard (factor loading ≥ 0.7).

The component matrix results affirm that the scale designed to measure the dependent factor "Adoption of MA in Vietnamese CEs (AD)" has high reliability and is suitable for empirical data.

4.4. Confirmatory Factor Analysis

4.4.1. Overall Model Fit Assessment

CFA Diagram in Figure 2.

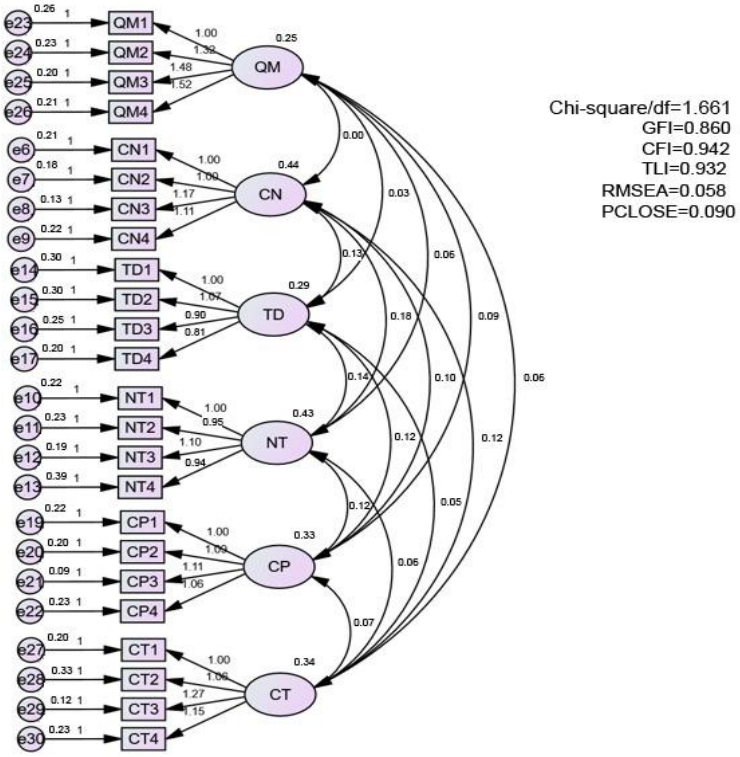

Figure 2. CFA diagram.

The commonly used indices to evaluate model fit include:

+ CMIN/df = 1.661 ≤ 3.
+ CFI = 0.942 ≥ 0.9.
+ GFI = 0.860 ≥ 0.8.
+ TLI = 0.932 ≥ 0.9.
+ RMSEA = 0.058 ≤ 0.06.
+ PCLOSE = 0.090 ≥ 0.05.

All the above indices meet the allowable conditions, indicating that the fit with the market data is good.

4.4.2. Assessment of Indicator Quality

The P-value (Regression Weights table) is less than 0.05 (this study uses a 5% significance level), and the standardized regression weights are all greater than 0.5, demonstrating that the observed variables have good explanatory power for the parent factor.

4.4.3. Assessment of Convergent and Discriminant Validity

Assessment of Convergent and Discriminant Validity of the Scale in Table 10.

Table 10. Assessment of convergent and discriminant validity of the scale.

Variable	CR	AVE	MSV	MaxR(H)	CN	NT	TD	CP	QM	CT
CN	0.916	0.733	0.166	0.922	**0.856**					
NT	0.870	0.628	0.166	0.880	0.407***	**0.792**				
TD	0.800	0.501	0.150	0.801	0.347***	0.387***	**0.708**			
CP	0.892	0.675	0.137	0.906	0.256**	0.309***	0.370***	**0.822**		
QM	0.882	0.653	0.091	0.893	0.009	0.187*	0.111	0.301***	**0.808**	
CT	0.886	0.661	0.103	0.904	0.322***	0.159+	0.174*	0.206*	0.219**	**0.813**

+ Convergent Validity: The composite reliability (CR) indices of the factors are all greater than 0.7, and the average variance extracted (AVE) indices are all greater than 0.5. Both indices meet the assessment thresholds, indicating very strong convergent validity.

+ Discriminant validity: All factors have MSV values less than AVE. If this condition is met, discriminant validity is ensured. The square root of AVE for a construct (bold values on the diagonal in the Fornell and Larcker table) is greater than the correlation between that construct and other constructs in the model, thus ensuring discriminant validity.

4.5. Structural Equation Modeling (SEM) Analysis

The factors affecting the adoption of MA in Vietnamese CEs yields the following results in Figure 3. SEM Model.

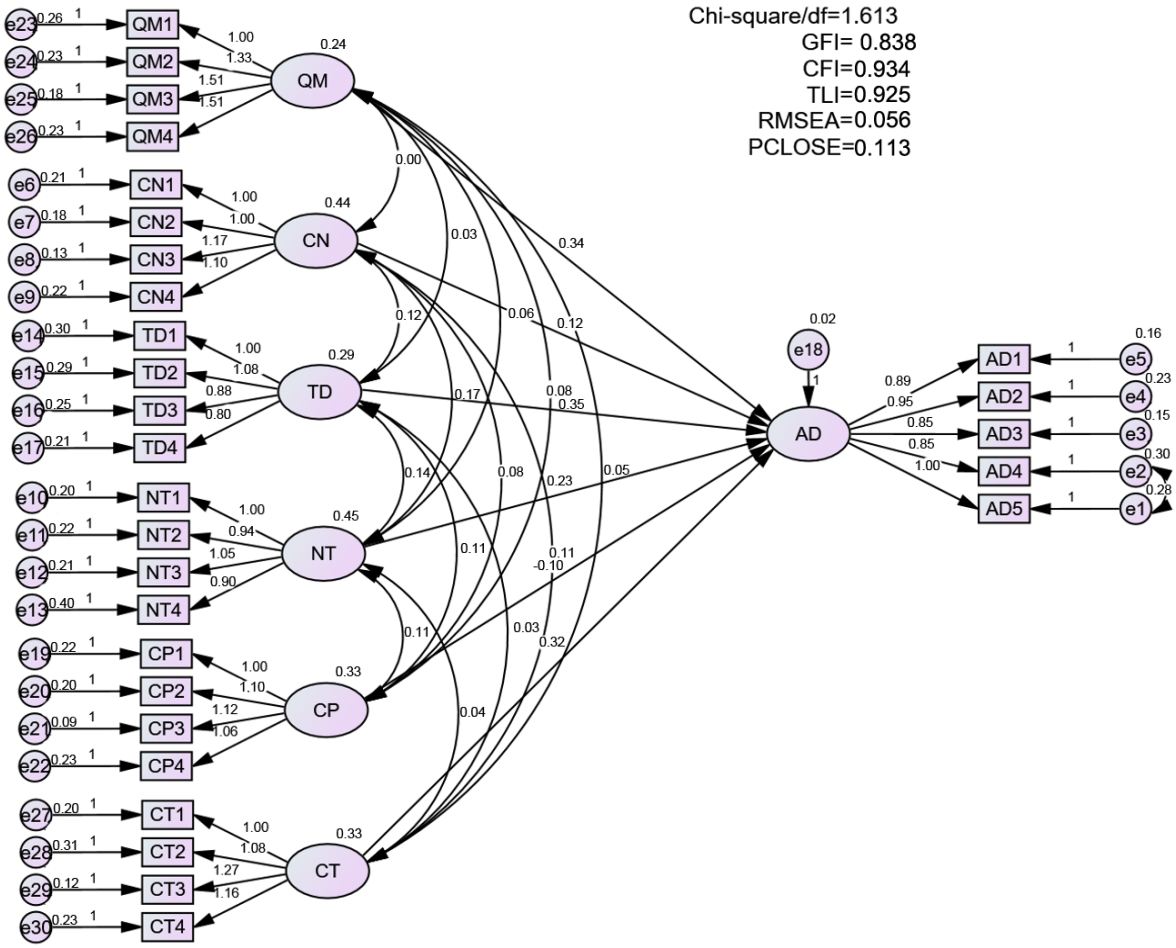

Figure 3. SEM model.

The indices used to assess the overall fit of the popular model include:

+ CMIN/df = 1.613 ≤ 3.

+ CFI = 0.934 ≥ 0.9.

+ GFI = 0.838 ≥ 0.8.

+ TLI = 0.925 ≥ 0.9.

+ RMSEA = 0.056 ≤ 0.06.

+ PCLOSE = 0.113 ≥ 0.05.

All the above indices meet the allowable conditions, indicating that the fit with the market data is good.

The results obtained are tabulated:

Table 11. Regression weights – SEM.

Factor	Weight	P-value
AD <--- CN	0.119	0.007
AD <--- NT	0.227	***
AD <--- QM	0.341	***
AD <--- CP	-0.104	0.032
AD <--- CT	0.324	***
AD <--- TD	0.349	***

In Table 11, with 95% confidence, the P-values for the six factors "Firm Size," "Technology," "Accountant Qualification," "Top Management Perception," "Level of Market Competition," and "Cost of Organizing MA System" are all less than 0.05. Therefore, all six factors influence the adoption of MA by Vietnamese CEs.

The variables QM, CN, TD, NT, and CT have Beta coefficients greater than 0, indicating that these five independent variables in the model positively impact the dependent variable. This suggests that factors such as "Firm Size," "Technology," "Accountant Qualification," "Top Management Perception," and "Level of Market Competition" all positively influence the ability to apply MA in Vietnamese CEs. The variable CP has a Beta coefficient less than 0, indicating that the "Cost of Organizing MA System" negatively affects the ability to apply MA in Vietnamese CEs. Therefore, the research model proposed by the author is appropriate and meaningful Table 12.

Table 12. Standardized regression weights – SEM.

Factor			Weight
AD	<---	CN	0.167
AD	<---	NT	0.322
AD	<---	QM	0.356
AD	<---	CP	-0.127
AD	<---	CT	0.396
AD	<---	TD	0.401

Table 12 shows the standardized regression coefficients, indicating the level of the factors on the adoption of MA by Vietnamese CEs. The degree of influence of the factors on the ability to adopt MA in Vietnamese CEs is: factor TD has the strongest impact on AD (Beta = 0.401), the next strongest impacting factor is CT (Beta = 0.396), followed by factor QM (Beta = 0.356), then factor NT (Beta = 0.322), followed by factor CN (Beta = 0.167), and factor CP has the weakest impact among the 6 factors (|Beta| = 0.127), Table 13.

Table 13. Coefficient of determination – SEM.

Variable	Weight
AD	0.899

The R-squared coefficient of the dependent variable is 0.899, indicating that the six factors "Firm Size," "Technology," "Accountant Qualification," "Top Management Perception," "Level of Market Competition," and "Cost of Organizing MA System" explain 89.9% of the variation in the dependent variable.

4.6. Multicollinearity Test

Multicollinearity Analysis in Table 14.

Table 14. Multicollinearity analysis.

Collinearity statistics		
Model	**Tolerance**	**VIF**
(Constant)		
QM	0.864	1.157
CN	0.765	1.307
TD	0.819	1.220
NT	0.795	1.258
CP	0.797	1.255
CT	0.858	1.166

The VIF coefficients of the factors are all less than 2, indicating that multicollinearity does not occur. The reliability and accuracy of the estimates are guaranteed.

5. IMPLICATIONS AND CONCLUSIONS

5.1. Implications

5.1.1. For the Firm Size factor

One of the important factors for effectively implementing MA in CEs is building an MA system appropriate to the size and resources of each enterprise. Each enterprise has unique characteristics regarding operations, projects, and complexity levels, thus requiring the development of a flexible MA system compatible with its scale to ensure efficiency. Large enterprises need complex information processing systems such as cost analysis by cost center and detailed budget control, while small and medium-sized enterprises (SMEs) only require simple systems focused on tracking direct costs. Additionally, the system should be easily updatable and adjustable according to the enterprise's changes and should incorporate modern technology to enhance the efficiency of cost management, scheduling, and project information.

5.1.2. For the Technology Factor

To enhance the effectiveness of MA applications, Vietnamese CEs need to proactively invest in technology solutions suitable for their scale and resources. Large enterprises should integrate comprehensive technology management systems to support complex MA techniques, while small enterprises can choose low-cost software or simple technology platforms to ensure feasibility. Additionally, flexible adjustment of the MA system according to each project type, combined with training to improve personnel proficiency and the application of new technologies (such as management software and process automation), will help enterprises enhance their ability to control costs, schedules, and risks. Finally, enterprises need to view investment in MA and technology not just as costs but as a long-term strategy to adapt to the increasingly competitive and uncertain business environment.

5.1.3. For the Accountant Qualification Factor

The effectiveness of management accounting (MA) application in Vietnamese enterprises requires attention to training and developing the qualifications of accounting staff. Enterprises should develop comprehensive training programs that combine theory and practice, focusing on modern MA tools such as cost analysis, activity-based costing (ABC), and cost budgeting. In addition to technical skills, it is essential to foster data analysis and decision-support skills among staff. Training courses should be organized periodically and continuously updated, with opportunities for staff to participate in seminars and specialized forums to learn and share experiences. Enterprises should also establish cooperative relationships with professional organizations and promote an internal learning culture, ensuring accounting staff stay updated with new trends and apply MA effectively in practice.

5.1.4. For the Top Management Perception of MA Factor

The perception of the management team regarding the strategic role of MA in improving management efficiency and decision-making plays a crucial role in MA adoption. Enterprises should organize training and development programs to equip managers with knowledge about modern MA tools such as cost analysis, budget control, and project performance analysis. Simultaneously, encouraging the sharing of practical experiences by inviting consulting experts helps the management team clearly understand how MA supports resource optimization and sustainable development.

5.1.5. For the Cost of Organizing the MA System Factor

To optimize costs during the MA adoption process in CEs, the relationship between the benefits and costs of organizing the MA system must be considered. From a strategic perspective, applying MA can bring benefits such as minimizing waste, optimizing budgets for projects, and improving operational efficiency. Therefore, although the cost of implementing MA might be a factor to consider, looking at the overall picture, the long-term benefits of cost optimization, enhanced financial management, and strategic decision-making will far outweigh the initial investment costs.

5.1.6. For the Level of Market Competition Factor

In the fiercely competitive landscape of Vietnamese construction enterprises, with complex projects, an uncertain environment, and high transparency requirements, the level of competition demands that enterprises adopt management accounting to enhance their advantages. To increase competitiveness, enterprises should use modern management accounting techniques to optimize costs and manage efficiently, especially in large enterprises; apply basic management accounting such as cost analysis for small enterprises to enhance bidding capabilities; increase transparency through detailed management accounting reports to build reputation; and integrate management accounting with management technology to meet digital transformation trends, helping Vietnamese construction enterprises overcome competitive pressures and meet international standards.

5.2. Conclusions

The analysis results indicate that the research model has a very high level of fit with the survey data. Specifically, the R^2 coefficient reached 0.899, meaning that the six studied factors, including "Firm Size" (QM), "Technology" (CN), "Accountant Qualification" (TD), "Top Management Perception" (NT), "Level of Market Competition" (CT), and "Cost of Organizing MA System" (CP), explain 89.9% of the variation in the ability to adopt MA in Vietnamese CEs. This suggests that the factors mentioned above play a significant role and should be considered when CEs implement MA systems.

Among the six factors, "Accountant Qualification" (TD) has the strongest impact on the adoption of MA, with a Beta coefficient of 0.401. This indicates that the professional competence and expertise of the accounting team are key factors in determining the effectiveness of MA implementation in CEs. Due to the specific nature of CEs, which require accountants to track detailed costs for each project and construction work, highly qualified accounting staff will more easily apply MA tools to plan, control, and make accurate business decisions.

Next, "Level of Market Competition" (CT) also has a very significant impact on MA adoption, with a Beta coefficient of 0.396. In the increasingly fierce competitive construction environment, enterprises are compelled to use MA as a tool to analyze costs, optimize resources, and improve competitiveness. Therefore, market pressure will encourage enterprises to develop a systematic and effective MA system.

"Firm Size" (QM) is the next influential factor with a Beta coefficient of 0.356. Large CEs often have complex organizational structures, numerous projects, and contracts, making the need to apply MA for financial management

and internal operations more urgent. Conversely, small enterprises may not fully recognize or face resource constraints in fully implementing MA.

"Top Management Perception" (NT) also has a significant impact (Beta = 0.322) on the ability to adopt MA. When enterprise leadership fully understands the role of MA in improving business performance, they will proactively invest resources, train personnel, and build a suitable system. Conversely, a lack of attention from management will create many barriers to MA adoption.

The "Technology" (CN) factor has a Beta coefficient of 0.167, indicating a moderate impact. Technology, especially accounting software and project management software, plays a significant supporting role in collecting, processing, and analyzing management data. Applying appropriate technology helps make the management accounting process more efficient, accurate, and timely, thereby supporting faster management decision-making.

Finally, the "Cost of Organizing MA System" (CP) has the weakest impact with a Beta coefficient of |0.127|. Although the initial implementation cost might be a barrier for many enterprises, in the context of the CE's strong development trend, the cost of organizing MA is viewed as a necessary investment to improve overall management efficiency. This weak impact might reflect that enterprises have recognized the long-term benefits of adopting MA, so cost is no longer a major barrier as before.

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Institutional Review Board Statement: The study involved minimal risk and followed ethical guidelines for social science fieldwork. Formal approval from an Institutional Review Board was not required under the policies of Academy of Finance, Vietnam. Informed verbal consent was obtained from all participants, and all data were anonymized to protect participant confidentiality.
Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.
Data Availability Statement: Upon a reasonable request, the supporting data of this study can be provided by the corresponding author.
Competing Interests: The authors declare that they have no competing interests.
Authors' Contributions: All authors contributed equally to the conception and design of the study. All authors have read and agreed to the published version of the manuscript.

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