FACTORS AFFECTING THE STAGES OF MANAGEMENT ACCOUNTING EVOLUTION: THE DEVELOPING MARKET RESEARCH

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Abstract

Management accounting is essential in supporting strategic decision-making and organizational competitiveness. However, the majority of Vietnamese businesses have not paid enough attention to management accounting practices (MAPs) (Doan, 2012; Nguyen et al., 2019). This study aims to analyze the factors influencing the evolution of management accounting in Vietnam based on the International Federation of Accountants (IFAC) model. Primary data were collected from 250 enterprises in Vietnam, and SPSS 26 was employed to examine the hierarchical multiple regression model. The findings show that production technology, intensity of competition, business environment stability, business strategy, and age of enterprises influence the evolution of management accounting in Vietnam. However, the research model was unable to verify the anticipated correlation between the characteristics of products, the information demands of managers, the qualifications of accountants, the information technology systems, and the management accounting evolution in Vietnamese companies. A variety of related parties may benefit from this study's results. Corporate managers could identify the determinants influencing management accounting development in their companies. In addition, the research findings provide scholars, and practitioners with empirical evidence about the evolutionary stages of management accounting and the factors influencing its progress in an emerging market. Furthermore, the state authorities may consult these factors to establish a framework guiding the application of strategic management accounting in Vietnam.

Keywords: Management Accounting, Factors, Evolution, Stages, Vietnam

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1. INTRODUCTION

Vietnam's economy has deeply integrated into the regional and world economies by joining the World Trade Organization (WTO) and various free trade agreements (FTAs). International integration has driven Vietnam's economic growth since Vietnam implemented the innovation policy in 1986. As a result, the competition has become increasingly fierce, and domestic firms have to compete not only with each other but also with foreign firms. Therefore, Vietnamese businesses must improve their competitiveness to survive, develop, and adapt to rapid economic changes and strict competition. Along with the development of businesses, management accounting information has played an essential role in supporting the management to make strategic decisions and assess business performance (Lasyoud & Alsharari, 2017). However, management accounting practices (MAPs) have not been given enough attention in most Vietnamese enterprises (Doan, 2012; Nguyen et al., 2019). The development stages of management accounting in Vietnamese companies are uneven, and significant gaps exist between enterprises of different sizes. At present, Vietnamese enterprises mainly use absorption costing, traditional budgeting, and profitability analysis (Nguyen et al., 2021), while advanced MAPs such as target costing, lean accounting, and environmental management accounting have not been widely adopted, especially in small and medium enterprises.

There are few macro-level studies on the evolution of MAPs in Vietnamese companies based on the International Federation of Accountants (IFAC) and the factors impacting the development of MAPs in Vietnam. Therefore, this study aims to identify and analyze the factors influencing the evolutionary stages of MAPs in Vietnamese enterprises. Using a survey of 250 Vietnamese enterprises operating in manufacturing, commercial, and service industries, the research determined the factors influencing the evolutionary stages of MAPs in Vietnamese enterprises. The findings can help managers evaluate their current level of MAPs, the state authorities promulgate guidance for Vietnamese enterprises to develop MAPs to enhance their competitiveness and gain long-term benefits.

The structure of this study includes six sections. After Section 1 of the introduction, Section 2 explains the literature review and research hypotheses. Section 3 presents the research methodology. Section 4 presents the statistical results and the factors influencing the evolutionary stages of MAPs in Vietnamese enterprises. Section 5 discusses the results, and Section 6 summarizes the findings, research limitations, and future orientations.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Literature review

In March 1998, the IFAC released a framework to explain the historical development of management accounting as a four-stage evolution framework. There are numerous previous research utilized the IFAC model to evaluate the evolutionary stages of MAPs in other countries (Mahfar & Omar, 2004; Abdel-Kader & Luther, 2008; Grosu et al., 2014; Sunarni, 2015; Terdpaopong et al., 2018; Dung, 2018; Acintya, 2020; Chu & Chiu, 2021; Benelifa & Nasfi Salem, 2023). Specifically, Abdel-Kader and Luther (2008) employed the IFAC model to study the development of MAPs in the British food and drinks industry. They found that many British food and drink enterprises reached stage 3 and stage 4 of the IFAC model. However, they also identified that traditional MAPs are widely adopted in many enterprises. In contrast, innovative MAPs such as activity-based costing (ABC) or non-financial performance techniques are supposed to be significant but used at a relatively lower rate. Terdpaopong et al. (2018) studied the evolution of MAPs in large Thai companies using the IFAC model. They employed a postal questionnaire survey with 1,500 companies, which elicited 205 usable responses, equivalent to a 13.67% response rate. The results showed that most companies were in stage 1 or 2, but some had advanced to stage 3 or 4 of the IFAC model. Similarly, Chu and Chiu (2021) showed that most Taipei hotels in the sample shifted from using cost determination and financial control tools to providing information for management planning and control procedures. Only 23.3% of the hotels in Taipei City transitioned to a more advanced mode where they created value by effectively using their resources. To increase operational effectiveness and management performance, the efficacy of applying management accounting is becoming more and more crucial. The use of management accounting in individual and group businesses was positively impacted by human resource skills, business features, business strategy, and business environment (Suryana et al., 2023).

In Vietnam, there needs to be more macro-level research on the evolution of MAPs in enterprises based on an international measure. The research on the evolution of MAPs in Vietnamese enterprises is also modest compared to other countries. Doan et al. (2011) reported that the application rates of modern MAPs in Vietnamese enterprises were critically low. Less than 40% of large enterprises applied modern MAPs. Meanwhile, the rate was nearly zero in small and medium enterprises. Nguyen and Aoki (2014) studied the evolutionary stages of MAPs in Vietnamese food and beverage companies based on the Nishimura's (2003) model and identified that the majority of Vietnamese enterprises are in the first and second initial stages of the Nishimura's model. They also found that the adoption rates of modern MAPs are meager compared to traditional ones. In addition, Hieu and Dung (2018, p. 1617) conducted a questionnaire survey in 161 manufacturing enterprises and received responses from 63 companies at a 39.1% rate. The study stated that MAPs in Vietnam are in stage 2 of the Nishimura's model, and most enterprises applied traditional MAPs in controlling and decision-making. Moreover, the IFAC model has been used to assess the level of MAPs at commercial banks in Vietnam. Dao and Nguyen (2021) indicated that the application of management accounting at five large commercial banks in Vietnam was in

stage 3, and several management accounting tools of stage 4 have been considered. Recent study results also demonstrated that traditional management accounting procedures were implemented at a high level while advanced management accounting tools were still limited (Nguyen et al., 2023; Huyen et al., 2024).

2.2. Hypotheses development

Numerous studies on the factors associated with the development of MAPs based on the contingency theory have been conducted in different countries as mentioned in the previous literature review section. However, only a few studies deeply investigated the factors impacting the stages of management accounting evolution in Vietnamese enterprises. This research will analyze the following nine contingent factors based on contingency theory and prior studies.

2.2.1. Characteristics of products

Abdel-Kader and Luther (2008) conducted a large-scale survey of food and drink companies to identify factors influencing the evolution of MAPs in the United Kingdom (UK). One of their hypotheses is that characteristics of products, such as components, perishability, and the limited valuable lives of products, may influence the development of MAPs. Their final statistical results could not support the initial hypothesis. However, this study stimulated others to test whether or not there were significant differences between the characteristics of products and the sophistication level of MAPs in enterprises. Tsifora and Chatzoglou (2016) identified that the diversification of the manufacturing process and the number of products produced creates a demand for establishing more advanced costing systems. In addition, there is a positive relationship between the more sophisticated costing systems and categories of products, ranges of products, and the diversification of products. Suryana et al. (2023) also proved that business features including product characteristics have positive impacts on MAPs in Indonesian companies. Similarly, Hang et al. (2024) found that the characteristics of plastic enterprises positively impact the application of social responsibility accounting in Vietnamese plastic enterprises. Therefore, the following hypothesis will be tested:

H1: The characteristics of products will have a positive influence on the evolutionary stages of MAPs in Vietnamese enterprises.

2.2.2. Production technology

In the 1970s, the application of contingency theory in studying management accounting was introduced to explain why MAPs were different among firms (Otley, 2016). Based on the contingency theory, one of the most significant factors is production technology, which might affect management accounting systems (Abdel-Kader & Luther, 2008; Lasyoud & Alsharari, 2017). Advanced production technologies using advanced manufacturing technologies (AMT), total quality management (TQM), or just-in-time (JIT) have significantly affected the MAPs in enterprises. In firms adopting TQM, the management accounting systems are designed to be flexible and innovative (Chenhall & Langfield-Smith, 1998). Ahmad and Zabri (2015) found that manufacturing technology advancement positively impacted the application of management accounting in Malaysian medium firms. Firms significantly investing in TQM and JIT tend to use sophisticated management accounting systems (Abdel-Maksoud et al., 2005; Abdel-Kader & Luther, 2008). Phornlaphatrachakorn (2019) identified that technological innovation is a valuable factor influencing the successful application of strategic management accounting techniques in Thai organizations. Technological advancement was also found to have a positive impact on strategic management accounting in Vietnamese logistics firms (Vu et al., 2022). Therefore, the following hypothesis will be tested:

H2: Modern production technology will positively influence the evolutionary stages of MAPs in Vietnamese enterprises.

2.2.3. Information demand of managers

Top managers and management networking were positively correlated with strategic MAPs in Vietnamese firms (Do & Tran, 2024). To make good decisions, managers need timely and accurate information. The management accounting system can provide managers with relevant information for decision-making and operational control (Chu & Chiu, 2021). By using manageable accounting information, leaders can make relevant decisions to enhance the performance and competitiveness of their companies (Cadez & Guiding, 2008). Wu et al. (2007) also found that senior managers' knowledge levels positively impact changing MAPs in Chinese joint ventures and state-owned enterprises (SOEs). Interestingly, Zheng (2012, p. 94) reported that a factor hindering the application and development of management accounting in Chinese enterprises is that 70% of the leaders need to show interest in adopting MAPs. Therefore, the following hypothesis will be tested:

H3: The information demand of managers will positively influence the evolutionary stage of MAPs in Vietnamese enterprises.

2.2.4. Qualifications of accountants

Accountants play vital roles in a management accounting system. They provide information for the whole business management process. According to Collis and Jarvis (2002), if enterprises have enough competent accountants, the managerial accounting systems would be more effective, and more professional reports would be produced. Nowadays, the roles of management accountants have changed to the proactive contribution in building strategies, operations, and long-life improvement for enterprises (Zainuddin & Sulaiman, 2016). Also, knowledge of accounting staff was considered a positive factor affecting the adoption of MAPs in Chinese joint ventures (Wu et al., 2007). Nguyen et al. (2019) and Dau et al. (2024) found that the qualifications of accountants positively affect the development of management accounting systems in Vietnamese enterprises. Similar results

could be observed in MAPs in Zimbabwe's small and medium companies (Dlamini, 2022). Therefore, the following hypothesis will be tested:

H4: The qualifications of accountants will positively influence the evolutionary stage of MAPs in Vietnamese enterprises.

2.2.5. Intensity of competition

Williams and Seaman (2001) indicated that the intensity of business competition negatively impacted the application of MAPs in Singaporean businesses. However, Mia and Clarke (1999) found that competitive intensity positively impacted the adoption of modern MAPs. In addition, O'Connor et al. (2004) identified that market competition and government influence had no impact on adopting modern MAPs in Chinese SOEs. Meanwhile, Doan (2012) surveyed 220 medium and big companies and found that competitive intensity positively correlated with adopting MAPs in Vietnamese enterprises. Using online surveys from 145 respondents, comprising managers, accountants, and owners of small and medium-sized enterprises in Thailand, Nair et al. (2022) found that MAPs had a strong positive correlation with competitive strategy in the food and beverage industry. Therefore, the following hypothesis will be tested:

H5: Enterprises with higher intensity of competition have higher evolutionary stages of MAPs in Vietnamese enterprises.

2.2.6. Information technology system

Information technology was the most important driver of recent changes to management accounting. Businesses that utilize modern information technology have better performance and increase production efficiency. Information technology had taken over the firm's financial ledgers and reporting systems, and management accounting was no longer possible without it (Granlund & Mouritsen, 2003). Granlund (2007) also found that information technology has tended to be the "essential carrier" of management accounting information. Organizations with high-quality information technology systems can provide detailed data that is needed by more sophisticated costing systems (Anderson & Lanen, 1999). Spraakman (2010) found that management accounting does change with enterprise resource planning (ERP) systems. The work of management accountants changes because the ERP system allows them to become more involved in designing and improving business processes and decision-making. The information technology system has improved the usage and performance of MAPs and facilitated the exchange of information between departments in the enterprises. This result is consistent with Dlamini (2022), and Suryana et al. (2023). Therefore, the following hypothesis will be tested:

H6: Information technology will positively influence the evolutionary stage of MAPs in Vietnamese enterprises.

2.2.7. Business environment stability

Kallunki and Silvola (2008) identified that MAPs are used to a greater extent and provide more helpful information in a more stable business environment. Alattar et al. (2009) indicated that adopting management accounting techniques increases environmental stability in micromanufacturing firms in the Gaza Strip. Also, Abdel-Kader and Luther (2008) found that ecological uncertainty impacted the adoption of MAPs in UK enterprises. Their research showed that firms perceiving a higher degree of environmental uncertainty use more complicated MAPs than firms perceiving lower ecological uncertainty. However, Albu and Albu (2012) identified that environmental uncertainty hurt the presence and complexity of costing practices. They indicated that strategic planning is used less in more uncertain environments. The results from the quantitative survey approach also showed that environmental uncertainty is statistically correlated with the adoption of strategic management accounting in Vietnamese firms (Do & Tran, 2024). Based on the previous research results, the following hypothesis has been proposed:

H7: Business environment stability will positively impact the evolutionary stage of MAPs in Vietnamese enterprises.

2.2.8. Business strategy

Business strategy has been identified as a significant factor influencing the evolution of MAPs in enterprises. There are many methods to classify business strategies. As one of the most popular models, Porter's (2008) model classifies business strategies into differentiation, cost-leadership, and focus strategies. Langfield-Smith (1997) showed empirical evidence that cost-leadership strategy enterprises do not require complex management systems. Still, enterprises that utilize a differentiation strategy need these complex management systems. Anderson and Lanen (1999) found that differences in competitive strategies are one of the explanatory factors for differences in MAPs. Abdel-Kader and Luther (2008) hypothesized that enterprises following a differentiation strategy adopt more sophisticated MAPs than those following a cost-leadership strategy. However, their sample of food and drinks UK enterprises could not support this initial hypothesis. On the other hand, strategy formulation was found to be a significant factor influencing the intensity of strategic management accounting adoption of listed firms on the Nigerian Stock Exchange (NSE) (Oyewo, 2022). Therefore, the following hypothesis will be tested:

H8: The evolutionary stage of MAPs of Vietnamese enterprises utilizing the cost leadership strategy will be lower than enterprises utilizing the differentiation and focus strategies.

2.2.9. Age of enterprises

The enterprise age is also considered to influence the adoption of MAPs and should be mentioned more in previous research. O'Connor et al. (2004) hypothesized that the adoption of Western management accounting in Chinese SOEs decreases with age. In other words, they proposed that older established SOEs tend to maintain the current MAPs and fear changing to modern MAPs. However, in contrast to their hypothesis, the final result showed that enterprise age is a positive factor because the adoption of Western MAPs was higher in older Chinese SOEs than in younger ones. A business with a long history and strong organizational structure

would expect to adopt strategic management accounting to maintain its competitive position (Vu et al., 2022). Therefore, the following hypothesis will be tested:

H9: The age of enterprise will positively impact the evolutionary stage of MAPs in Vietnamese enterprises.

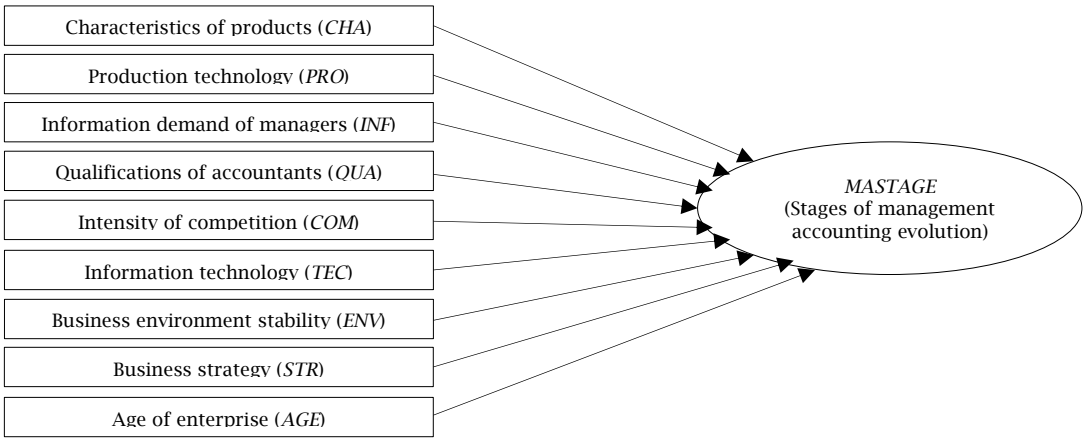
3. RESEARCH METHODOLOGY

This study employs a large-scale questionnaire survey after conducting preliminary interviews and a pilot survey. The enterprises are selected from the following sources: 1) the General Statistics Office of Vietnam, 2) the Hanoi Stock Exchange (HNX), and 3) the Ho Chi Minh Stock Exchanges (HOSE). Two main criteria were used to select enterprises for this study. First, the chosen enterprises were listed on the stock market. Second, all necessary data of the selected enterprises were available. Based on these criteria, we selected 700 manufacturing, commercial, and services enterprises listed on the HNX and HOSE. The questionnaire was designed to collect necessary information from respondents to ensure the reliability of their responses. In total, 257 responses were received from the 700 enterprises, of which seven survey answers were incomplete due to a lack of essential information. Finally, 250 questionnaires were selected, which was equivalent to the usable response rate of 35.7%.

The statistical techniques including cluster analysis, and hierarchical multiple regression model using SPSS version 26 were employed for analyzing the data. This quantitative research model was commonly employed by prior studies (Nguyen et al., 2023; Do & Tran, 2024; Huyen et al., 2024). A five-point Likert scale was used to evaluate how factors influence the evolutionary stage of MAPs in Vietnam. Based on the literature review, the following nine factors were selected in this study: 1) characteristics of products (*CHA*), 2) production technology (*PRO*), 3) information demand of managers (*INF*), 4) qualification of accountants (*QUA*), 5) intensity of competition (*COM*), 6) information technology (*TEC*), 7) business environment stability (*ENV*), 8) business strategy (*STR*), and 9) age of enterprise (*AGE*).

The dependent variable is *MASTAGE*, which represents the stages of management accounting evolution. *MASTAGE* equals 0 if the enterprises are in stages 1 and 2 of the IFAC model, while *MASTAGE* equals 1 if the enterprises are in stages 3 and 4 of the IFAC model. The business strategy (*STR*) consists of three forms: 1) differentiation, 2) cost leadership, and 3) focus strategies. Therefore, two dummy variables were created: 1) *STRADIF* (differentiation strategy) and 2) *STRACOST* (cost leadership strategy). The focus strategy is the default for the model. The control independent variable is the age of enterprises (*AGE*), which equals 1 if the enterprise is over ten years old; it equals 0. The proposed model is described in Figure 1.

Figure 1. Research model



4. RESULTS

4.1. Data description

Table 1 provides the working divisions of the respondents. Most respondents (90%) are from the accounting-finance division and the board of management.

Table 1. Working division of respondents

Division	*Frequency*	*Percent*
Board of directors	15	6.0
Board of management	35	14.0
Accounting-finance	190	76.0
Internal audit	2	0.8
Planning	4	1.6
Others	4	1.6
Total	**250**	**100.0**

Source: Authors' compilations.

Regarding respondents' field of work, 92 persons (approximately 37%) are working in manufacturing firms, 77 respondents (31%) in service firms, and 81 persons (32.4%) in commercial enterprises. Total assets are among the most popular criteria for identifying an enterprise's size. Therefore, this criterion was used for classifying the size of the surveyed enterprises. Half of the enterprises have large size with more than 100 billion Vietnam dongs (VND), 33.6% are small enterprises with total assets below VND 20 billion, and 16.8% are medium-sized firms with total assets from VND 20 billion to VND 100 billion (Table 2).

Table 2. Size of enterprises

Field of work	*Small-sized enterprises (total assets below VND 20 billion)*	*Medium-sized enterprises (total assets from VND 20 billion to VND 100 billion)*	*Large-sized enterprises (total assets over VND 100 billion)*	*Total*
Manufacturing	18	16	58	92
Service	24	10	43	77
Commercial	42	16	23	81
Total	**84**	**42**	**124**	**250**

Source: Authors' compilations.

Regarding the business strategy, 121 surveyed enterprises (48.4%) adopted the cost leadership strategy, and 91 enterprises (36.4%) chose a focus strategy. Only 38 enterprises (15.2%) pursued a differentiation strategy. Therefore, the cost leadership strategy is the most popular among Vietnamese enterprises

Table 3. Business strategy adoption rate

Types of business strategy	*No. of enterprises*	*Adoption rate (%)*
Cost leadership strategy	121	48.4%
Focus strategy	91	36.4%
Differentiation strategy	38	15.2%
Total	**250**	**100%**

Source: Authors' compilations.

One more outstanding characteristic of the enterprises in this sample is the information technology application in their accounting systems. Most of the surveyed enterprises (91.6%) apply information technology in accounting work, of which two enterprises use ERP for the whole management system. Only 8.4% of enterprises use the combination of manual accounting and Excel. Many researchers have figured out that the application of information technology is a vital condition to develop MAPs. In other words, management accounting is only feasible with information technology (Granlund, 2007; Spraakman, 2010).

Table 4. Information technology adoption rate

Accounting system	*No. of enterprises*	*Adoption rate (%)*
Adoption of information technology in accounting	229	91.6%
Manual accounting work	0	0%
Usage of both manual accounting and Excel	21	8.4%
Total	**250**	**100%**

Source: Authors' compilations.

4.2. The cluster analysis

Cluster analysis is a technique for collecting similar data objects into the same cluster and classifying dissimilar data into a different cluster. This technique is employed in the study to classify the surveyed enterprises, equivalent to the four evolutionary stages of the IFAC model. We developed the proposal of Abdel-Kader and Luther (2006, 2008) that enterprises were classified into four clusters representing the four stages in the IFAC model. As shown in Table 5, regarding the manufacturing enterprises, there are seven enterprises in stage 1, 59 in stage 2, 24 in stage 3, and two firms in stage 4 according to the IFAC model. For the commercial enterprises, two companies are in stage 1, 52 are in stage 2, 27 are in stage 3, and none are in stage 4 based on the IFAC model. Regarding the service enterprises, there are 30 firms in stage 1, 17 in stage 2, 28 in stage 3, and two companies in stage 4 of the IFAC model. It is found that the adoption rates of MAPs in Vietnamese firms in stages 1 and 2 are much higher than the adoption rates of MAPs in stages 3 and 4 based on the IFAC model.

Table 5. IFAC model stages of enterprises

Types of enterprise	*Stage 1*	*Stage 2*	*Stage 3*	*Stage 4*	*Total*
Manufacturing enterprises	7	59	24	2	92
Commercial enterprises	2	52	27	0	81
Service enterprises	30	17	28	2	77
Total	**39**	**128**	**79**	**4**	**250**

Source: Authors' compilations.

4.3. Statistical methods and hypotheses testing

Nine-factor groups are tested in the research model, of which seven of the factor groups have multiple factor components. The reliability test for Cronbach's alpha is employed to ensure the representativeness of each factor group. The correlation between variables by exploratory factor analysis (EFA) analysis is used to verify the appropriateness in grouping. Principal components analysis (PCA) and varimax rotation are recognized as popular and effective methods for EFA according to Meyers et al. (2016). As shown in Table A.1. in the Appendix, all seven-factor groups have Cronbach's alpha coefficients that are more significant than 0.7, which is more than the threshold level of 0.5 (Brown, 2002). There is no overlap between the factor components for each group factor based on the reasonable range for Cronbach's alpha coefficients. All factors' corrected item-total correlation coefficients are more significant than 0.3, which is usually acceptable. However, the variable *TEC4* has a Cronbach's alpha if the item deleted equal to 0.856, indicating that the factor group's reliability will increase if this variable is deleted. Therefore, *TEC4* is deleted for model testing.

Table 6. Principal component analysis

Item	Group factor						
	1	2	3	4	5	6	7
COM1	0.775						
COM3	0.745						
COM4	0.742						
COM2	0.699						
COM5	0.669						
CHA3		0.841					
CHA2		0.779					
CHA1		0.770					
CHA4		0.727					
CHA5		0.537					
INF4			0.792				
INF3			0.752				
INF1			0.742				
INF2			0.725				
ENV3				0.797			
ENV2				0.782			
ENV1				0.739			
ENV4				0.641			
QUA2					0.826		
QUA1					0.765		
QUA3					0.691		
QUA4					0.411		
TEC3						0.850	
TEC2						0.826	
PRO2							0.770
PRO3							0.739
PRO1							0.689
TEC1							0.502

Note: principal component analysis, varimax with Kaiser normalization.
Source: Authors' compilations.

Table 7 provides the results for the Kaiser-Meyer-Olkin (KMO) coefficients and Bartlett's test. The KMO coefficient is 0.866, which is between 0.5 and 1.0. This result states the appropriateness of the factor analysis. Bartlett's test also demonstrates that the observed variables have a significant overall correlation, with a significance level less than 0.05. As shown in Table 7, after conducting PCA with varimax rotation, group factor 3 — information technology (*TEC*) — will be excluded because of only two compositions, and factor *TEC1* will be merged into the production technology — *PRO* group. Thus, the regression model will use six groups of factors, including *CHA*, *PRO*, *INF*, *QUA*, *COM*, and *ENV*.

Table 7. KMO and Bartlett testing

Kaiser-Meyer-Olkin testing		0.866
Bartlett testing	Approx. Chi-square	4348.029*
	df	378
	Sig.	0.000

*Note: * significance level less than 0.05.*
Source: Authors' compilations.

Table 8. Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	8.686	31.022	31.022	8.686	31.022	31.022
2	3.761	13.432	44.454	3.761	13.432	44.454
3	2.903	10.367	54.821	2.903	10.367	54.821
4	1.383	4.938	59.759	1.383	4.938	59.759
5	1.196	4.271	64.031	1.196	4.271	64.031
6	1.099	3.925	67.955	1.099	3.925	67.955
7	0.984	3.513	71.468	0.984	3.513	71.468
8	0.838	2.993	74.461			
9	0.749	2.675	77.137			
10	0.642	2.292	79.429			
11	0.584	2.085	81.514			
12	0.543	1.939	83.453			
13	0.503	1.795	85.248			
14	0.454	1.622	86.870			
15	0.438	1.564	88.433			
16	0.394	1.408	89.842			
17	0.375	1.338	91.179			
18	0.336	1.201	92.381			
19	0.326	1.163	93.544			
20	0.296	1.057	94.601			
21	0.241	0.862	95.463			
22	0.229	0.817	96.280			
23	0.224	0.800	97.080			
24	0.214	0.763	97.843			
25	0.190	0.678	98.521			
26	0.172	0.615	99.136			
27	0.149	0.531	99.667			
28	0.093	0.333	100.000			

Source: Authors' compilations.

The results of the regression model are shown in Table 9. The independent variables include six-factor groups and two factors: characteristics of products (*CHA*), production technology (*PRO*), information demand of managers (*INF*), qualification of accountants (*QUA*), intensity of competition (*COM*), business environment stability (*ENV*), business strategy (*STR*) and age of enterprise (*AGE*). The regression equation is expressed as follows:

$$MASTAGE = -1.108 + 0.104\,PRO - 0.104\,INF + 0.096\,COM + 0.094\,ENV - 0.222\,STR + 0.117\,AGE \quad (1)$$

Table 9. Regression model result

Description of regression model	*The evolutionary stages of MAPs (MASTAGE)*	
Panel A: Regression coefficient		
CHA	0.006	(0.885)
PRO	0.104***	(0.006)
INF	-0.104**	(0.013)
QUA	0.035	(0.433)
COM	0.096*	(0.063)
ENV	0.094*	(0.073)
STR	-0.222***	(0.000)
AGE	0.117**	(0.048)
Constant	-1.108***	(0.000)
Panel B: Model suitability		
R	0.594	
R-square	0.353	
Adjusted R-square	0.329	
Sig F change	0.000	
F	14.554	
Durbin Watson	1.767	

*Note: *** Significant at 0.01, ** Significant at 0.05, * Significant at 0.10.*
Source: Authors' compilations.

5. DISCUSSIONS

The regression model shows significant results and is unaffected by multicollinearity, autocorrelation, and heteroskedasticity. Its correlation coefficient is 0.594 and explains 35.3% of the variation in the dependent variables. The constant and six variables, *PRO*, *COM*, *ENV*, *INF*, *STR*, and *AGE*, have significant coefficients.

H1 is not accepted. The model could not confirm the relationship between the characteristics of products and the development of MAPs because the p-value for the *CHA* was insignificant (p-value = 0.885). This result is consistent with Abdel-Kader and Luther (2008), stating that there was no relationship between the product features and the sophistication level of MAPs in British food and beverage enterprises. However, this finding is different from the results of Tsifora and Chatzoglou (2016), Suryana et al. (2023), and Hang et al. (2024), which found positive relationships between the sophisticated MAPs and the characteristics of products.

H2 is accepted. The production technology (*PRO* variable) positively impacts the evolutionary stages of MAPs in Vietnamese enterprises (p-value = 0.006). This is consistent with the findings of Abdel-Kader and Luther (2008), Lasyoud and Alsharari (2017), Phornlaphatrachakorn (2019), and Vu et al. (2022), indicating that the utilization of modern production technology, such as TQM, JIT, and AMT, does positively affect the evolutionary stage of MAPs. Also, this result is relevant to the economic development in Vietnam where production technology has been enhanced strongly in recent years, which may influence the adoption of modern MAPs.

H3 is rejected. The *INF* variable (p-value = 0.013) was significant but, interestingly, had a negative coefficient. The result contrasts with the findings of Cadez and Guiding (2008), Wu et al. (2007), and Chu and Chiu (2021), who found a positive relationship between MAPs and managers' information demand. In addition, Nguyen et al. (2019) found that Vietnamese companies need more knowledge and experience on how to apply modern MAPs successfully. Therefore, it can be demonstrated that managers of Vietnamese enterprises may not be fully aware of the benefits of modern MAPs and, therefore, lack the motivation to apply new MAPs.

H4 is not accepted. The model could not confirm this relationship between the qualifications of accountants (*QUA*) and the development of MAPs because the p-value for the *QUA* (0.433) was statistically insignificant. This result is in contrast to the findings of Wu et al. (2007), Nguyen et al. (2019), Dlamini (2022), and Dau et al. (2024), who found that accounting staff is a positive factor influencing the adoption of MAPs. This can be justified when the functions of strategic management accounting have not been applied effectively in Vietnamese businesses due to the lack of knowledge and experience in modern management accounting techniques of accountants.

H5 is accepted. The intensity of competition (*COM*) positively affects the evolutionary stage of MAPs in Vietnamese enterprises (p-value = 0.063). This finding is contrary to O'Connor et al. (2004), which found that market competition might not affect the adoption of modern management accounting in Chinese enterprises. The positive correlation between COM and MAPs development found in this study does not agree with the research results of William and Seaman (2001), where management accounting was negatively associated with business competition. However, this result is consistent with Doan (2012), and Nair et al. (2022), showing the positive impacts of market competition on the use of MAPs in Vietnam.

H6 proposed that the information technology system (*TEC*) would positively impact

the evolutionary stage of MAPs in Vietnamese enterprises. However, during the data processing stages to ensure its reliability, this variable was removed from the model, therefore, *H6* cannot be confirmed.

H7 is accepted. The business environment stability positively influences the evolutionary stages of MAPs in Vietnamese enterprises (p-value = 0.073). This finding is consistent with Kallunki and Silvola (2008), and Alattar et al. (2009), indicating that management accounting techniques are used to a greater extent and provide more helpful information in a more stable environment. This finding also agrees with Albu and Albu (2012), and Do and Tran (2024), which found the negative impact of environmental uncertainty on the existence and complexity of costing practices. However, this finding contrasts with Abdel-Kader and Luther (2008), who identified that enterprises perceiving a higher degree of environmental uncertainty adopt more sophisticated MAPs than firms perceiving lower ecological uncertainty.

H8 is accepted. A negative correlation between business strategy (*STR*) and the evolutionary stages of MAPs in Vietnamese firms could be found (p-value = 0.000). More specifically, the model confirms that enterprises adopting the cost leadership strategy have a lower level of MAPs development than those pursuing the differentiation strategy. This result contradicts the findings of Langfield-Smith (1997), Anderson and Lanen (1999), and Oyewo (2022).

H9 is accepted. The age of enterprise (*AGE*) would positively impact the development of MAPs in Vietnamese enterprises (p-value = 0.048). This finding is consistent with O'Connor et al. (2004), and Vu et al. (2022), which found that the use of Western management accounting in Chinese SOEs increases with firms' age. It can be concluded that older Vietnamese enterprises tend to use more sophisticated MAPs than younger ones.

6. CONCLUSION

This research provides empirical evidence on the factors influencing the evolutionary stages of MAPs in Vietnamese enterprises. The testing of the model found that production technology, intensity of competition, business environment stability, business strategy, and age of enterprises affect the evolutionary stages of MAPs in Vietnamese enterprises. First, production technology positively influences the evolutionary stage of MAPs in Vietnamese enterprises. The more advanced production technology, such as TQM, JIT, and AMT, the more strategic MAPs the enterprises adopt. Second, the market competition level positively impacts the development of MAPs in Vietnam. The market condition in Vietnam is becoming increasingly competitive, which motivates higher adoption rates of modern MAPs in businesses to strengthen their positions in the market. Third, the stability of the business environment positively influences the evolutionary stages of MAPs in Vietnamese enterprises. Political, socio-economic, government guidance, and national culture stability improve the adoption rates of modern MAPs in Vietnamese enterprises. Fourth, the model also confirmed a negative relationship between the business strategy and the development of MAPs in Vietnamese firms.

Finally, the age of enterprises positively impacts the MAPs evolution in Vietnamese companies. This result demonstrated that the older the enterprises are, the more likely they are to apply more advanced management accounting techniques. On the contrary, the research model could not confirm the expected positive relationship between the characteristics of products, the information demands of managers, the qualifications of accountants, the information technology systems, and the MAPs development in Vietnamese enterprises.

The findings from this study could benefit a variety of related parties. First, managers of the surveyed enterprises could evaluate the evolutionary stages of MAPs based on an international measure (IFAC model) and what factors affecting the evolution of MAPs in their businesses. This will help increase the quality of managers' decision-making in enhancing those factors to strengthen their competitiveness. Second, the research results provide empirical evidence to scholars, researchers, educators, and practitioners on the evolutionary stages of MAPs in Vietnam and the factors impacting its development. Third, the Ministry of Finance and other state agencies could refer to the factors affecting MAPs to promulgate a framework to guide strategic management practices for Vietnamese businesses. The application of management accounting techniques based on the IFAC model is an excellent metric to measure the actual level of management accounting advancement in Vietnam.

This study has several inherent limitations related to the sample selection process and the validity of the self-reported data. Low response rates to questionnaire surveys can lead to non-response biases, especially among small enterprise groups. The selection of surveyed businesses needs to be expanded to various cities throughout the country. In addition, timing, financial factors, and non-response bias may also affect the study results. Therefore, future research needs to focus more deeply on the factors affecting the differences and changes in the evolutionary stages of MAPs of businesses in different industries.

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APPENDIX

Table A.1. Cronbach's alpha analysis

Number	*Variable*	*Scale mean if item deleted*	*Scale variance if item deleted*	*Corrected item-total correlation*	*Cronbach's alpha if item deleted*	*Cronbach's alpha*
Group factor 1: Characteristics of products (CHA)						0.847, N = 5
1	*CHA1*	11.668	8.765	0.686	0.807	
2	*CHA2*	11.796	9.280	0.686	0.809	
3	*CHA3*	11.964	8.790	0.721	0.798	
4	*CHA4*	11.972	9.047	0.632	0.822	
5	*CHA5*	11.816	9.404	0.559	0.841	
Group factor 2: Production technology (PRO)						0.840, N = 3
1	*PRO1*	5.856	3.367	0.675	0.805	
2	*PRO2*	5.592	2.271	0.709	0.772	
3	*PRO3*	5.816	3.299	0.727	0.756	
Group factor 3: Information technology (TEC)						0.802, N = 4
1	*TEC1*	9.144	8.276	0.586	0.768	
2	*TEC2*	9.312	6.280	0.805	0.649	
3	*TEC3*	9.488	6.492	0.742	0.685	
4	*TEC4*	8.956	9.392	0.368	0.856*	
Group factor 4: Information demand of managers (INF)						0.856, N = 4
1	*INF1*	10.324	5.256	0.748	0.796	
2	*INF2*	10.356	5.604	0.658	0.835	
3	*INF3*	10.440	5.573	0.732	0.804	
4	*INF4*	10.244	5.703	0.663	0.832	
Group factor 5: Qualifications of accountants (QUA)						0.776 N=4
1	*QUA1*	10.076	5.661	0.651	0.698	
2	*QUA2*	10.192	5.144	0.734	0.650	
3	*QUA3*	10.236	5.137	0.669	0.676	
4	*QUA4*	10.684	5.103	0.385	0.666	
Group factor 6: Intensity of competition (COM)						0.850, N = 5
1	*COM1*	13.932	6.931	0.673	0.817	
2	*COM2*	14.120	6,797	0.665	0.818	
3	*COM3*	14.160	6.360	0.695	0.811	
4	*COM4*	14.012	6.831	0.651	0.822	
5	*COM5*	14.196	7.091	0.622	0.829	
Group factor 7: Business environment stability (ENV)						0.843, N = 4
1	*ENV1*	10.644	3.925	0.646	0.815	
2	*ENV2*	10.644	3.708	0.709	0.788	
3	*ENV3*	10.736	3.818	0.704	0.791	
4	*ENV4*	10.732	3.811	0.655	0.812	

Note: Variable excluded from group factor because the reliability level can increase if this variable is deleted.
Source: Authors' compilations.