The Effects of CFO Characteristics and Historical Financial Performance on the Adoption of Advanced Costing Practices: Evidence from Thai Listed Companies

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Abstract

The purpose of this paper is to examine the influence of determinant factors on the extent of advanced costing practices (ACPs) adoption in Thai listed companies operating in three industries: industrial, consumer products, and services. This study is in contrast to most previous studies which relied predominantly on contingency theory. The study mainly draws on upper echelons theory (UET) to examine the impact of chief financial officers' (CFO) demographic characteristics on the ACPs usage, specifically tenure and education levels. In addition, we investigate the effect of historical financial performance on advanced management accounting practices on costing systems that have not been conducted in Thailand. The datasets were compiled from primary and secondary sources, and hypotheses were tested using partial least squares structural equation modelling (PLS-SEM). Results indicate that CFOs with shorter tenures are more likely to implement the ACPs. Similarly, firms with low profitability are more inclined to use the ACPs extensively. Unexpectedly, the CFO's education level slightly influences the adoption of costing practice sophistication. Our article contributes to the UET and management accounting literature, as limited research has been undertaken in developing economies.

Keywords: 1) CFO characteristics 2) Advanced costing practices 3) Upper echelons theory 4) Thai listed companies

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Introduction

The evolution of the business environment and technological advancement and complexity increases the demand for management accounting (MA) information that meets the competitive world's requirements (Elhossade, Abdo and Mas'ud, 2020, p. 500). In general, MA is identified as accounting information. It generates reports for top management, including cost analyses and financial projections. This information is typically very comprehensive (Kalifa, et al., 2020, p. 92). Management accounting practices (MAPs) are accounting practices, tools, or techniques that are used in any organisation, for-profit or not-for-profit, to make business decisions. It enables the availability of relevant and accurate information to support a firm's activities and enable effective decision-making (Rufino, 2014, p. 56). Furthermore, MAPs assist an organisation in surviving in a competitive and ever-changing world by providing a significant competitive advantage for a managerial team that provides motivational attitudes and develops the cultural values necessary to accomplish strategic goals (Shahzadi, et al., 2018, p. 212).

Based on their initiation stage and characteristics, MAPs can be classified as traditional management accounting practices (traditional MAPs) or advanced management accounting practices (advanced MAPs) (Chenhall and Langfield-Smith, 1998, p. 1). Traditional MAPs such as cost-benefit analysis, return on investment, and standard costing are financial and internal in nature, are focused on the short term, and involve arbitrary cost allocations (Chenhall and Langfield-Smith, 1998, p. 1). These practices have been chastised for their narrowness and failure to meet information requirements to support transformation of business challenges. As a result, advanced MAPs such as activity-based costing (ABC), value chain analysis, and balanced scorecard (BSC) were developed. Advanced MAPs are strategic in nature, connect operations to strategy and goals, and integrate relevant financial and non-financial information. They are therefore deemed as strategic management tools (Nuhu, Baird and Appuhamilage, 2017, pp. 105-109). Most advanced MAPs, such as ABC, quality costing, target costing, value chain costing, benchmarking, and BSC, are considered strategic management accounting (Cadez and Guilding, 2008, pp. 839-842; Cinquini and Tenucci, 2010, pp. 234-235).

Some existing studies (e.g., Chenhall and Langfield-Smith, 1998, p. 1; Nimtrakoon and Tayles, 2015, p. 288; Nuhu, Baird and Appuhami, 2016, p. 67; Kalifa, et al., 2020, p. 91) found that companies continue to rely on traditional MAPs rather than advanced MAPs. These findings surprised the researchers because they expected advanced MAPs to be extensively used to benefit top management, deal with increasing levels of competition and uncertainty, and make more informed business choices. Consequently, given the low usage level, examining the factors affecting the adoption of advanced MAPs is a research attempt of significant theoretical and practical importance.

Previous research on the factors influencing the adoption of advanced MAPs has been predominantly advised by contingency theory (e.g., Cinquini and Tenucci, 2010, p. 238;

Nuhu, Baird and Appuhamilage, 2017, p. 107; Pham, Dao and Bui, 2020, p. 79). However, the findings are somewhat inconclusive. According to upper echelons theory (UET), originally presented by Hambrick and Mason (1984, pp. 194-203), top managers' characteristics influence how they deal with situations and thus influence their choices of specific practices, organisational processes, decisions, and outcomes (Hambrick, 2007, pp. 334-336). UET's theoretical development and empirical applications have mainly focused on the backgrounds and demographic characteristics of top managers (Anessi-Pessina and Sicilia, 2020, p. 467). Thus, it is implied that characteristics measures may be useful in predicting aspects of the extent of advanced MAPs adoption. Recently, UET has gradually been employed in management accounting research, but its use is still rather limited (Liem and Hien, 2020, p. 2). There have been very limited studies (Burkert and Lueg, 2013, p. 18; Naranjo-Gil, Maas and Hartmann, 2009, p. 671; Pavlatos, 2012, p. 247; Kalkhouran, Nedaei and Rasid, 2017, p. 471; Pavlatos and Kostakis, 2018, p. 456) that use UET to investigate the influence of determinants on advanced MAPs. Furthermore, there is a scarcity of research in the context of developing economies (Rashid, Ali and Hossain, 2020, p. 122). Surprisingly, to our knowledge, no single study is conducted using UEP to determine the factors that influence the use of advanced MAPs in Thailand.

The study responds to the call for research on the factors influencing advanced MAPs adoption decisions in the developing economy (Rashid, Ali and Hossain, 2020, pp. 122-123), specifically focusing on the UET (Hiebl, 2014, pp. 224-225; Liem and Hien, 2020, p. 2). This study intends to contribute to UET by investigating the effect of CFO characteristics on the adoption of advanced MAPs. In addition, we examine the impact of previous financial performance on the advanced MAPs on costing systems that have not been conducted in Thailand. The literature reveals that only a few studies focused on this factor in developed economies, such as Spain (Naranjo-Gil, Maas and Hartmann, 2009, p. 678) and Greece (Pavlatos, 2015, p. 153; Pavlatos and Kostakis, 2018, p. 460).

The rest of the article is structured as follows. The following section contains a review of the literature on MAPs and ACPs, UET, and hypothesis development. Then, in Section 3, the research methods are described, including data collection, variable measurement, and data examination. The results are then presented in Section 4. Finally, the last section discusses the conclusion and discussion.

Literature Review

Management accounting practices and advanced costing practices

Management accounting practices (MAPs) are classified according to their intended use or implementation: costing practices/costing system, budgeting, decision-making information, strategic analysis, and performance analysis (Ashfaq, et al., 2014, pp. 104-105; Sumkaew, 2016, pp. 103-106; Terdpaopong, Visedsun and Nitirojntanad, 2019, p. 399). Furthermore, each category of MAPs is divided into two groups based on their developmental

period: traditional MAPs and advanced MAPs. It should be noted that advanced MAPs are referred to interchangeably in the literature as innovative, modern, recently developed, new, or innovative accounting practices (Nuhu, Baird and Appuhami, 2016, p. 73). Costing practices are also divided into two categories: traditional costing practices (TCPs) and advanced costing practices (ACPs). These practices have received attention from academics and practitioners because many advanced MAPs require a functional costing system (Kludacz-Alessandri, 2020, pp. 224-225), particularly in costing practice sophistication (Al-Omiri and Drury, 2007, pp. 399-401).

Advanced costing practices (ACPs) are those practices that are capable of identifying cost sources, managing and reducing costs, and eliminating inefficient activities. Additionally, they are process-oriented and focused on identifying and analysing cost drivers (Nuhu, Baird and Appuhami, 2016, p. 73). According to prior research (Chenhall and Langfield-Smith, 1998, pp. 5-6; Angelakis, Theriou and Floropoulos, 2010, p. 90; Nimtrakoon and Tayles, 2015, pp. 279-280; Nuhu, Baird and Appuhami, 2016, p. 81; Kalifa, et al., 2020 pp. 92-93; Oyewo, 2021, p. 511), ACPs include kaizen costing (KC), activity-based costing (ABC), quality costing (QC), target costing (TC), and value chain costing (VCC). Furthermore, the last four practices are referred to as strategic management accounting (SMA) practices (Cadez and Guilding, 2008, pp. 839-842; Cinquini and Tenucci, 2010, pp. 234-235; Petera and Šoljaková, 2020, p. 49; Hadid and Al-Sayed, 2021, p. 7). The following are brief explanations of these practices.

KC began as a method used by automotive manufacturers in Japan to reduce production costs (Kelesbayev, et al., 2020, p. 185). This practice views improvement as a process that must be accomplished gradually and in small steps. It is one of the critical modern technologies based on progressive and continuous improvement in production, which guides in cost reduction, competitive advantage, and strategic cost management (Al-Barghuthi, et al., 2020, p. 1006).

ABC was initially developed by Cooper and Kaplan during the 1980s (Cooper and Kaplan, 1992, pp. 1-2). It addresses the drawbacks of traditional costing by determining cost drivers, permitting an organisation to obtain higher-quality information to better understand activity behaviour and identify the root causes of overhead costs. ABC was initially recommended to increase the accuracy of product or service costing in assisting in product and price decisions. Subsequently, it was highlighted that activity-based information was beneficial in assisting with continuous improvement programmes (Vetchagool, Augustyn and Tayles, 2020, p. 332).

QC was treated by Juran for the first time in 1951, identifying not only the cost associated with product quality, but also the cost that occurs when quality is not accomplished (Chatzipetrou and Moschidis, 2017, p. 325). This practice categorises and monitors the costs associated with quality prevention, appraisal and internal and external failures (Cinquini and Tenucci, 2010, p. 234). It is referred to as the SMA technique because it emphasises long-term focus and external orientation by

considering the impact of quality concerns on customers and underlining the necessity of preventing low quality issues (Hadid and Al-Sayed, 2021, p. 9).

TC is a costing practice used in product and process design. It is calculated by deducting the desired profit margin from an estimated or market-based pricing (Oyewo, 2021, p. 537). It places considerable emphasis on outward orientation by acknowledging the price that customers are inclined to spend for desired products (Hadid and Al-Sayed, 2021, p. 9). Subsequently, the product is designed to the customer's specifications. As a result, target costing is used to control the design phase of product attributes and their associated production processes (Bock and Pütz, 2017, p. 146).

VCC highlights external orientation by attempting to define where and how value is added throughout all product-related processes, from initial design to customer distribution (Hadid and Al-Sayed, 2021, p. 9). It is a costing method in which costs are allocated to value-added activities such as designing, procuring, producing, marketing, distributing, and servicing the firm's products. Consequently, VCC could increase firm productivity and business growth (Ussahawanitchakit, 2018, pp. 58-59).

Upper echelons theory (UET)

The fundamental concept of UET is captured obviously in the subheading of Hambrick and Mason's seminal paper: the organization is a reflection of its top managers. Hambrick and Mason (1984, pp. 194-202 as cited in Hambrick, 2007, pp. 334-336) indicated the importance of top management characteristics in explaining both strategic choices and organisational outcomes. Evidence from UET has focused on decision-makers' background and demographic characteristics. This is not because demographics are supposed to influence decisions. Rather, demographics are used to measure unobservable constructs such as values, cognitive models, personality traits, and other psychological aspects that influence top managers' interpretations of reality (Anessi-Pessina and Sicilia, 2020, p. 467).

In this current study, the extent to which ACPs are adopted is expected to be influenced by managerial demographics such as tenure and education levels. In other words, managerial characteristics may help in predicting ACPs usage. Even though top management characteristics are widely acknowledged in the general management literature, little is known about how individual manager differences effect the management accounting systems (Naranjo-Gil, Maas, and Hartmann, 2009, p. 669). The current study focuses on the characteristics of the organization's chief financial officer (CFO) in order to explain the extent of ACPs use, as finance and accounting topics often belong within the CFO's responsibility (Burkert and Lueg, 2013, p. 18), especially costing systems (Pavlatos, 2012, p. 243).

Previous studies provided an outline of UET and its application in management accounting and control literature. CFOs and top managers with business backgrounds who are younger and have shorter tenures are associated with more innovative and sophisticated management accounting and control systems (Hiebl, 2014, p. 223). These findings are in line

with UET, top managers' characteristics, experiences, and values have a significant impact on their interpretation of the situations they encounter, which in turn influences their strategic choices (Hambrick, 2007, pp. 334-335).

Development of hypotheses

Education has been identified as a good predictor of an individual's perceptions, values, and cognitive preferences as one of the key demographics' characteristics (Hambrick, 2007, pp. 334-336). It is likely to influence decisions because it expands managers' knowledge and skill sets (Anessi-Pessina and Sicilia, 2020, pp. 469-470). The UET suggests that education is relevant in terms of both level and field. Top managers' business education background was widely used in the literature to predict MAPs (e.g., Naranjo-Gil, Maas and Hartmann, 2009, p. 682; Pavlatos, 2012, p. 249; Pavlatos and Kostakis, 2018, p. 462; Knardal and Bjørnenak, 2020, pp. 384-385), little is known about the education level. The upper echelons perspective provides the development of the hypothesis about the relationship between the educational level of individual CFOs and their use of ACPs. Kalkhouran, Nedaei and Rasid (2017, pp. 482-484) supported that a high level of top management education correlated with a high level of ability to implement MAPs. Since a high level of formal education can help to expand a company's knowledge resources. We anticipate that higher levels of education will be associated with increased use of ACPs as top executives seek to deploy their knowledge resources more effectively and efficiently. As a result, the following hypothesis is proposed:

H1: The CFO education level has a positive effect on the extent of ACPs adoption.

According to the UET, tenure is an important indicator of CFO characteristics when it comes to predicting organisational outcomes. For instance, Pavlatos and Kostakis (2018, p. 467) discovered that the tenure of the CFO has a negative impact on accounting techniques. Firms with a relatively short tenured CFO were found to be significantly more likely to use SMA techniques. This finding is consistent with the studies of Burkert and Lueg (2013, p. 763); Naranjo-Gil, Maas and Hartmann (2009, pp. 685-686). Long-tenured executives may generally adhere to their established management practices and routines as effective formulas that help them achieve and maintain their current position. New executives, on the other hand, establish and propose new management practices in order to strengthen their internal power bases, which are initially rather weak (Burkert and Lueg, 2013, p. 7). However, according to the study of Pavlatos (2012, p. 249), CFO tenure was not a significant variable influencing the cost management system design. In this study, we anticipate that the statistical model will show a negative relationship between long tenure and high ACPs usage. As a result, we propose the following hypothesis:

H2: The CFO tenure has a negative effect on the extent of ACPs adoption.

According to Langfield-Smith (2007, pp. 753-755), high or low levels of performance, which previous studies have used as a proxy for effectiveness, may impact a firm's reactions, resulting in the adoption of specific management control systems or strategy. Thus, another factor that may influence the level of

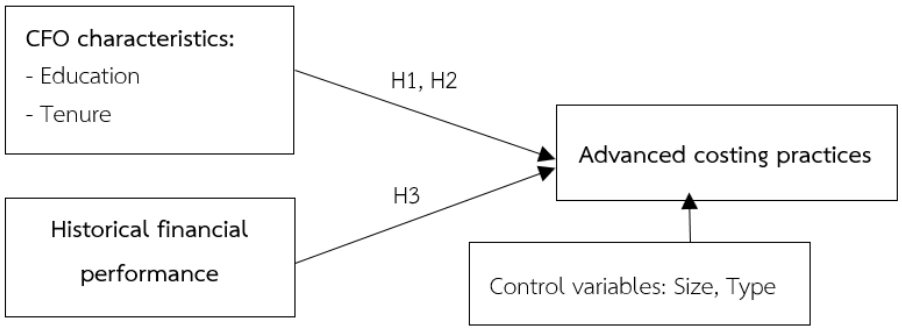
advanced MAPs usage is an organization's lagging historical performance. Poor performance causes a gap between an organization's actual performance and those desired by managers and stakeholders. In general, when traditional systems and processes fail to improve performance, businesses will consider alternatives. As a result, organisations that have performed poorly in the previous period may require management accounting system changes (Naranjo-Gil, Maas and Hartmann, 2009, p. 673).

Empirical evidence supports the notion that organisations experiencing performance declines are more willing to take risks and adopt innovations. For examples, Pavlatos (2015, p. 763) and Pavlatos and Kostakis (2018, p. 467) discovered that historical performance influenced the use of SMA in the Greek hospitality industry and the Greek manufacturing industry, respectively. The findings indicated that businesses with a history of low profitability acknowledged and used SMA more intensively to improve performance. These practices can provide the organisation more accurate information, which can support top-level managers in attaining the organization's objectives and, ultimately, improving the organization's future financial performance. Previous research (e.g., Kalkhouran, Nedaei and Rasid, 2017, pp. 482-484; Nuhu, Baird and Appuhami, 2016, p. 89; Alamri, 2019, p. 212) confirmed that advanced MAPs contribute significantly to performance improvement in both the public and private sectors.

Similarly, Naranjo-Gil, Maas and Hartmann (2009, p. 686) found that poor operational performance in the public hospital sector had an impact on SMA utilisation. In addition, Reid and Smith (2000, p. 427-428) demonstrated that cash flow crises and financial deficiencies induced the adoption of advanced management practices, including advanced MAPs, such as ABC. Recently, Crespo, et al. (2019, p. 880); Pavlatos (2021, p. 1) indicated that historical financial performance could act as a determinant for the adoption of management control systems. As above discussed, a decline in performance may encourage the search for a more useful management accounting system and the use of ACPs. Consequently, we examine the following hypothesis:

H3: Historical financial performance has a negative effect on the extent of ACPs adoption.

Picture No. 1 shows the research model of this research, according to the underpinned theory and previous research (Hambrick, 2007 pp. 340-341; Naranjo-Gil, Maas and Hartmann, 2009, pp. 685-686; Pavlatos, 2012, p. 249; Burkert and Lueg, 2013, pp. 16-17; Pavlatos, 2015, p. 763; Kalkhouran, Nedaei and Rasid, 2017, p. 482; Pavlatos and Kostakis, 2018, p. 467). This model also incorporates a firm’s size and the type of industries as control variables.



Picture No. 1 Research model

Methods

Sample and data collection

The population and sample frame for this study are all companies listed on the stock exchange of Thailand (SET) in three industries: industrial, consumer products, and services. There were 256 companies across three different industries. These three industries were chosen because they have been shown to implement and emphasise the importance of MAPs (Sumkaew, 2016, pp. 346-354).

Similar to relevant research (e.g., Naranjo-Gil, Maas and Hartmann, 2009, p. 680; Arunruangsirilert and Chonglerttham, 2017, p. 90; Pavlatos and Kostakis, 2018, pp. 460-462), the study draws data from primary and secondary sources. The usage of ACPs and its related data are gathered from survey, while CFO characteristics and historical financial performance data are collected from secondary sources such as annual reports, SETSMART, and 56-1 reports. Regarding the survey, a cover letter was sent to the CFOs, along with a QR Code for accessing an online questionnaire that outlined the scope of the survey and contained a glossary that briefly described ACPs. Respondents were clearly informed that their responses are confidential and analyzed at an aggregated level to prevent the revelation of any personal identification. All questionnaires were coded in advance, as recommended by the literature (e.g., Arunruangsirilert and Chonglerttham, 2017, pp. 90-91), in order to track non-respondents. Additionally, the coding enables the identification of primary and secondary data for each firm. Since the CFOs are in charge of developing and managing the firm's cost management system (Naranjo-Gil, Maas and Hartmann, 2009, p. 674; Pavlatos, 2012, p. 243), they were expected to be aware of, knowledgeable about, and accountable for the costing variables studied in the study (Nuhu, Baird and Appuhamilage, 2017, p. 122).

A draft of the questionnaire, which was intensively discussed with academics and experts, was developed in July 2020 after a comprehensive literature review. After the discussion, the significant feedback was incorporated into the questionnaire through minor modifications. Following that, we conducted 30 sample pilot tests to determine reliability. Cronbach alpha values range between 0.721 and 0.921, which is satisfactory (Taber, 2018, p. 1278). The questionnaire's final version was completed in December 2020. The data was collected between February and March of

2021. Three weeks after the initial mailing, a reminder letter was sent. Finally, of 256 questionnaires, 61 completed and usable responses were obtained, for a response rate of 23.83 percent, which is satisfactory and comparable to the 15–25 percent range reported in similar recent management accounting studies (Nuhu, Baird and Appuhami, 2016, p. 80; Massicotte and Henri, 2021, p. 17). The study analyses organisations as a unit of analysis; CFOs completed the questionnaire on behalf of their companies. It is supported by UET, which recognises that individual top managers have a significant impact on organisational outcomes through their choices (Hiebl, 2014, pp. 225-226).

An independent sample t-test was used to determine whether there were significant differences in the mean scores of main variables. The findings revealed no statistically significant differences between the early and late responding groups, supporting the sample's representativeness.

Variable measurement

Advanced costing practices (ACPs)

This study uses the same method as previous studies to assess the extent of ACPs adoption (dependent variable) (Naranjo-Gil, Maas and Hartmann, 2009, p. 680; Cinquini and Tenucci, 2010, p. 242; Kalkhouran, Nedaei and Rasid, 2017, pp. 478-479; Nuhu, Baird and Appuhamilage, 2017, p. 113; Pavlatos and Kostakis, 2018, p. 461; Elhossade, Abdo and Mas'ud, 2020, p. 509; Oyewo, 2021, p. 513). Respondents were asked to indicate the extent of ACPs adoption on a 5-point scale ranging from 1 (not at all) to 5 (very great extent). In other words, the minimum value for all practices is one (no use of a given practice), while the maximum value is five (very intensive use of a given practice). The following ACPs were investigated based on a review of the literature: activity-based costing, quality costing, target costing, kaizen costing, and value-chain costing (as elaborated in the literature review section). These five practices were modeled to be manifest indicators reflective of a latent construct called "the extent of ACPs adoption". Following the pre-test, a glossary of ACPs was incorporated in the questionnaire to clarify respondents' understanding.

CFO characteristics

CFO characteristics were measured using demographic data, in accordance with the UET. The variables include education level and tenure. The level of education was evaluated using a five-point ordinal scale, with 1 corresponding to secondary school and 5 corresponding to a doctoral degree, as previously used in the study of Kalkhouran, Nedaei and Rasid (2017, p. 479). Tenure is a ratio scale that indicates the CFO's years of experience in the company for their current position (Naranjo-Gil, Maas and Hartmann, 2009, p. 682; Pavlatos, 2012, p. 247; Pavlatos and Kostakis, 2018, p. 462). The data were gathered from secondary sources such as annual reports, SETSMART, and 56-1 reports.

Historical financial performance

Historical financial performance was assessed using objective performance data. Financial ratios were calculated using annual financial statements before the actual survey in accordance with previous studies

(e.g., Naranjo-Gil, Maas and Hartmann, 2009, pp. 681-682; Pavlatos and Kostakis, 2018, pp. 461-462). Return on assets (ROA) was chosen as a proxy for financial performance since it is commonly used in relevant management accounting studies to analyse financial performance (Rashid, Ali and Hossain, 2020, p. 123; Vetchagool, Augustyn and Tayles, 2020, p. 336). ROA measures a firm's profitability in relation to its total assets and is computed by dividing net income by its average total assets. Mean values of ROA were calculated for the three years before the survey.

Control variables

This study incorporates variables that are traditionally used in management accounting diffusion studies to avoid omitted variable bias. Because firm size is frequently mentioned as an influencing variable in management accounting system design (Cinquini and Tenucci, 2010, p. 243; Kalkhouran, Nedaei and Rasid, 2017, p. 479; Petera and Šoljaková, 2020, p. 55), it is included in the model as a control variable. The respondents were asked to estimate the number of employees (Hadid and Al-Sayed, 2021, p. 9) to categorise the firm's size: small, medium, and large. Consistent with previous research, the model also includes the type of industry as a control variable (Cadez and Guilding, 2008, p. 858). The respondents were asked to indicate the industry in which their company operates using the SET classification (industrial, consumer products, and services). Additionally, we also cross-checked their responses with secondary sources such as annual reports as suggested by Petera and Šoljaková (2020, p. 54).

Data examination

To estimate the relationships in a structural equation model, there are two approaches: covariance-based structural equation modelling (CB-SEM) and partial least squares structural equation modelling (PLS-SEM). For many years, the prominent method for analysing complicated interrelationships between observable and latent variables was CB-SEM (Hair, et al., 2019, p. 3). However, PLS-SEM is currently widely used in a variety of social science disciplines, including management accounting (Nitzl, 2016, p. 19). Due to the limited sample size and the research that incorporated financial ratios and a non-normal distribution, the PLS-SEM was used to test the model rather than the CB-SEM. Hair, et al. (2021, pp. 11-12) indicated that even with small sample numbers, high levels of statistical power can be achieved. In this study, Smart PLS 3.0 software was used to test both the measurement and structural models as it has been employed previously in relevant studies (e.g., Burkert and Lueg, 2013, p. 12; Kalkhouran, Nedaei and Rasid, 2017, p. 480).

The "ten-times rule" is the most often used approach for estimating the minimum sample size in PLS-SEM. However, Hair, et al. (2021, p. 20) indicated that "the 10-time rule is not a reliable indication of sample size requirements in PLS-SEM". "This method can lead to grossly inaccurate estimations of minimum required sample size" (Kock and Hadaya, 2018, p. 232). As a result, two methods were used in this study: the minimum R-squared method (Hair, et al., 2014, p. 21) and the inverse square root method (Kock and Hadaya,

2018, pp. 235-237). For the first approach, the calculated sample size ranged between 38 and 59 cases, whereas for the second approach, it was 59 cases. Hence, the sample size of 61 was suitable in these contexts. The number of cases is also consistent with the relevant PLS-SEM study (e.g., Burkert and Lueg, 2013, p. 9). In the next section, the PLS model was analysed and interpreted in two stages (Hair, et al., 2019, p. 8). We first evaluated the measurement's reliability and validity, and then the structural model.

Results

According to our respondents' industrial structure, the majority of companies are from the industrial industry (50.82 percent of respondents), followed by the consumer products industry (26.23 percent of respondents) and the services industry (22.95 percent of respondents). The respondents consist of only two groups: medium-sized and large companies in terms of employee number. The majority of respondents (54.10 percent of respondents) had a master's degree indicating a high educational qualification. The descriptive statistics are shown in Table No. 1. Tenure ranges from 2 to 14 years, with an average of 6.690 years. The mean historical performance (as measured by ROA) is 6.773, indicating that the sample firms have a moderate degree of performance.

The results show that the mean value of ACPs usage varies between 1.89 (kaizen costing) and 2.98 (ABC), indicating a low level of ACPs adoption (mean scores below 3.00). The Pearson correlation coefficients between the variables are presented in Table No. 2. All dependent variables (except for ABC) demonstrate a positive and statistically significant association (p-value < 0.01), showing that managers who engage in one practice are more likely to engage in further practices. The correlation between ABC and KC is a statistically significant positive (p-value < 0.05); however, the correlations between ABC and other practices (QC, TC, and VCC) are not statistically significant (p-value > 0.05). Correlations between CFO education and individual costing practices are positive and statistically significant in some practices (QC, KC, and VCC). Tenure is negatively related to all costing practices, but it is statistically significant in some practices (QC and TC). Similarly, historical performance (ROA) is negatively associated with costing practices (except for ABC) but only statistically significant with TC. These preliminary findings suggest that the extent of ACPs adoption increases in firms with low financial performance in the past and firms with less CFO experience in the position and higher education levels.

Table No. 1 Descriptive statistics of variables

Variables	Min	Max	Mean	S.D.
CFO tenure (Tenure)	2	14	6.690	2.446
Historical performance (ROA)	.780	19.260	6.773	4.349
Activity-based costing (ABC)	1	5	2.980	1.618
Quality costing (QC)	1	5	2.640	1.560
Kaizen costing (KC)	1	5	1.890	1.355
Target costing (TC)	1	5	2.490	1.490
Value chain costing (VCC)	1	5	2.000	1.366

Table No. 2 Correlation matrix

	Edu	Tenure	ROA	ABC	QC	KC	TC	VCC
Edu	1							
Tenure	-.133	1						
ROA	.083	.115	1					
ABC	.090	-.031	.024	1				
QC	.292**	-.414***	-.218	.136	1			
KC	.263**	-.071	-.232	.280**	.429***	1		
TC	.230	-.273**	-.316**	.238	.450***	.507***	1	
VCC	.269**	-.155	-.162	.204	.360***	.549***	.401***	1

Note: **, *** Correlations are significant at the 0.05 and 0.01 levels, respectively

The measurement model is evaluated to ensure that it meets all of the required criteria before proceeding to the step of evaluating PLS-SEM results (Hair, et al., 2019, p. 8). The validity and reliability of the measurement model (ACPs construct) are shown in Table 3. To establish convergent validity, the majority of researchers consider the outer loadings of items and the average variance extracted (AVE). At a minimum, the outer loadings of all items should be statistically significant. The desired level for convergent validity is outer loadings of more than 0.70 and an AVE value of 0.50 or greater. As a result, the ABC indicator with an outer loading (0.267) less than 0.50 is omitted from the scale of measurement (Hair, et al., 2019, pp. 8-9). This table demonstrates that all item loadings are more than 0.70, indicating that individual item reliability is satisfactory. Furthermore, the variables under investigation have an AVE greater than the 0.50 threshold, indicating that each variable has adequate convergent validity (Hair, et al., 2017; Hair, et al., 2019, pp. 8-9).

Concerning internal consistency reliability, the two most commonly used methods are composite reliability (CR) and Cronbach's alpha (Hulland, 1999, p. 199). Cronbach's alpha in this study is 0.766, indicating acceptable reliability as the standard of 0.70 (Hulland, 1999,

p. 199; Shmueli, et al., 2019, pp. 2333-2334). The CR value is 0.847, which is greater than 0.70 and considered satisfactory (Hair, et al., 2019, pp. 8-9). These findings show that construct reliability and internal consistency are satisfactory.

When the measurement model is acceptable, the structural model is evaluated as the next stage in evaluating PLS-SEM results. Since the structural model coefficients for inter-construct relationships are estimated using regression equations, collinearity must be assessed prior to examining structural relationships to ensure that it does not bias the regression results (Hair, et al., 2019, p. 11; Shmueli, et al., 2019, p. 2334). The VIF values in this study were found to be between 1.366 and 1.721, indicating that multicollinearity is not an issue (Hair, et al., 2019, pp. 8-9).

Table No. 3 The measurement model

Construct	CR	Alpha	AVE	Item	Loading	VIF
ACP	0.847	0.766	0.581	Quality costing	0.741	1.366
				Kaizen costing	0.769	1.727
				Target costing	0.830	1.503
				Value chain costing	0.705	1.496

Note: ABC was removed due to it loadings (0.267) below 0.50

The next step is to determine the coefficient of determination (R^2) value of the endogenous construct. The R^2 measures the predictive accuracy of a model and is calculated as the squared correlation between the actual and predicted values of an endogenous construct. R^2 values range from 0 to 1, with higher values indicating greater predictive accuracy. The R^2 value for ACPs in this study is 0.351, indicating that the model's ability to explain variance is relatively moderate (Hair, et al., 2019, p. 11). This explained variance is within the range of other relevant studies, such as R^2= 0.136 and 0.309 (Naranjo-Gil, Maas and Hartmann, 2009, p. 686), R^2= 0.287 (Pavlatos and Kostakis, 2018, p. 467), and R^2= 0.34 (Kalkhouran, Nedaei and Rasid, 2017, p. 482).

Table No. 4 and Picture No. 2 exhibit the PLS-SEM results for testing hypotheses about the CFO characteristics and the past financial performance that influence the ACPs adoption intensity. The results were based on a bootstrapping technique that used 1,000 replacement samples. Hypothesis H1 predicts that the CFO's educational level is significantly related to ACPs in a positive direction. Unexpectedly, the sophistication of costing practices appears to be weakly related to CFO education (0.188, p = 0.089). The null hypothesis was tested at the 0.05 level of significance; thus, we reject H1. In other words, there was no evident influence of CFO education on the extent of ACPs adoption at 95% significant. This finding contradicts the research of Kalkhouran, Nedaei and Rasid (2017, p. 482). Their findings indicated a positive and significant correlation between education level and the use of management accounting techniques. However, this

comparison is not straightforward because the mentioned study examined different management accounting practices. Furthermore, the prior study focused on CEO rather than CFO characteristics.

Hypothesis H2 investigates the effect of CFO tenure on the extent of ACPs adoption. As expected, we discovered that CFO tenure has a negative and statistically significant effect on the extent of ACPs adoption (-0.324, $p < 0.01$). As a result, H2 is supported. The finding is consistent with upper echelon theory and the findings in Naranjo-Gil, Maas and Hartmann (2009, pp. 685-686); Burkert and Lueg (2013, p. 17); Pavlatos and Kostakis (2018, p. 467) which revealed that shorter tenured CFOs were more inclined to embrace new management accounting systems. This finding contradicts Pavlatos (2012, p. 249) who discovered that CFO tenure was not statistically significantly associated with the extent to which cost management systems were used for decision making, control, and performance evaluation.

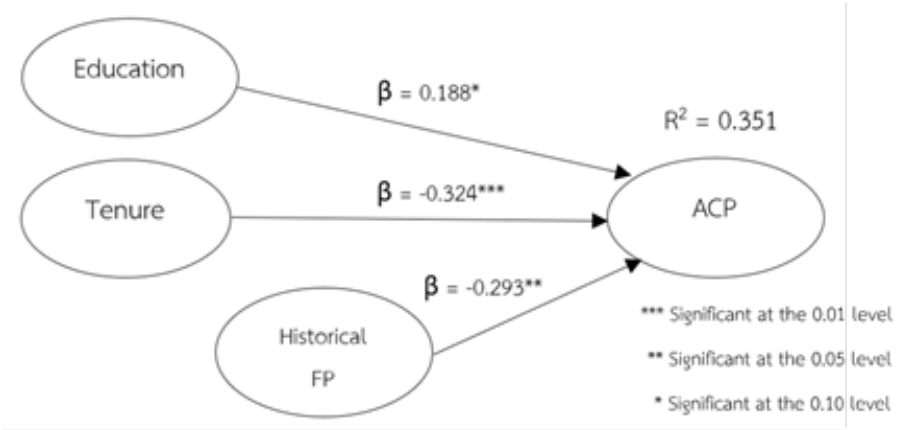
Similarly, the path coefficient from historical financial performance to the extent of ACPs adoption is negative and statistically significant (-0.293, p-value < 0.05), supporting Hypothesis H3. Our finding is in accordance with prior research (Naranjo-Gil, Maas and Hartmann, 2009, pp. 685-686; Pavlatos, 2015, p. 763; Pavlatos and Kostakis, 2018, p. 467) which revealed that historical operational performance has an effect on management accounting practices choices. As a result, we conclude that organisations with lagging historical financial performance increased their usage of ACPs. These techniques could assist the firm obtain more accurate information, which would benefit top managers in accomplishing the organization's objectives and, ultimately, improve the firm's financial performance in the future (Pavlatos and Kostakis, 2018, p. 467). In terms of control variables, only firm size has a positive and statistically significant effect on ACPs adoption. On the other hand, there was no significant influence of firm type on ACPs adoption.

The standardised root mean square residual (SRMR) is proposed as a PLS-SEM goodness of fit measure that can be used to avoid model misspecification (Henseler, et al., 2014, p. 192). It is defined as the difference between the observed and implied correlation matrices in the model. Thus, it is possible to evaluate the average magnitude of the differences between observed and expected correlations as an absolute measure of model fit criterion. In this study, the estimated structural model achieves an SRMR value of 0.073, indicating a satisfactory fit according to the SRMR cut-off of 0.08. As a result, the model specification is deemed satisfactory (Hu and Bentler, 1999, p. 1).

Table No. 4 Path coefficient and hypothesis testing

Variable	Path coefficient	P-value	Decision
H1: CFO education -> ACP	0.188	0.089	Not supported H1
H2: CFO Tenure -> ACP	-0.324	0.009	Supported H2
H3: Historical FP -> ACP	-0.293	0.046	Supported H3
Control variables			
SIZE_large	0.226	0.017	
TYPE_ industrial	-0.083	0.632	
TYPE_ services	-0.098	0.494	
	R^2 = 0.351		
	SRMR = 0.073		

Note: The null hypothesis was tested at the 0.05 level of significance



Picture No. 2 Structural model with results

Conclusion and Discussion

This study responds to recent recommendations to investigate the factors influencing the diffusion of advanced MAPs in developing countries (Rashid, Ali and Hossain, 2020, p. 129). Unlike most previous studies, which predominantly depended on contingency theory (e.g., Cinquini and Tenucci, 2010, p. 238; Nuhu, Baird and Appuhamilage, 2017, p. 107; Pham, Dao and Bui, 2020, p. 79), this study mainly draws on upper echelons theory (UET) to investigate the impact of determinant factors on the extent of ACPs adoption in Thai listed companies operating in three industries: industrial, consumer products, and services. The datasets were from both primary and secondary sources, and PLS-SEM was used to test the hypotheses.

Based on upper echelons theory, we discover that managerial characteristics, specifically CFO tenure, influence the extent of ACPs adoption. The tenure of the CFO has a negative and statistically significant effect on the extent to which ACPs are adopted. It is possible that managers who have retained their positions for a longer duration believe they already have experience formulating and implementing business strategies and that advanced prac-

tices would not assist them in exercising management and control (Pavlatos and Kostakis, 2018, p. 468). In addition, managers with a longer tenure are more risk-averse and less receptive to innovations (Hiebl, 2014, p. 236). Relevant studies also confirm this finding in the context of advanced MAPs (Naranjo-Gil, Maas and Hartmann, 2009, pp. 685-688; Pavlatos and Kostakis, 2018, p. 468). We also found the CFO's education level slightly influences the extent of ACPs adoption. As a result, our paper contributes to UET by confirming CFO characteristic is predictive of costing system design.

Importantly, this research contributes to a better understanding of how historical financial performance affects ACPs. For the first time in the context of Thailand, this study employs financial ratios, specifically ROA, from annual financial statements to assess historical financial performance. Previous research examined past financial performance employing different financing ratios (Pavlatos and Kostakis, 2018, pp. 461-462) and using objective data for measuring operational performance of the enterprises (Naranjo-Gil, Maas and Hartmann, 2009, pp. 681-682; Pavlatos, 2015, pp. 759-760). Their findings indicated that organisations with weak performance are more inclined to make extensive use of advanced MAPs. The empirical evidence presented in this study supports the assumption that organisations experiencing performance declines are more willing to take risks and adopt innovations. In other words, organisations with underperformance are more likely to increase management accounting innovation, because poor performance is frequently attributed to a lack of useful management accounting information available through traditional MAPs (Naranjo-Gil, Maas and Hartmann, 2009, p. 673). This study sheds light on the impact of historical financial performance on management accounting choices in Thailand. Only a few empirical studies have been conducted, and they have concentrated on developed economies, namely Spain (Naranjo-Gil, Maas and Hartmann, 2009, p. 678) and Greece (Pavlatos and Kostakis, 2018, p. 460).

Moreover, the article of Rashid, Ali and Hossain (2020, p. 122) indicated that studies explicitly devoted to researching influential factors in the context of developing economies appear low. This current study fills the gap and contributes to the management accounting literature. The findings demonstrate that the scope of the costing system is dependent mainly on CFO's tenure and the firm's previous performance and add significance to the limited existing evidence. The study will not only improve our general understanding of the association between top executive characteristics and management accounting systems but may also yield helpful advice for practitioners seeking to appoint suitable candidates to managerial positions and attempting to implement more sophisticated management accounting and control systems (Hiebl, 2014, p. 238). However, this suggestion should be used with caution in light of our results. The study discusses only a few of the CFO's aspects related to ACPs adoption. Thus, when searching for a managerial position (e.g., CFO), additional factors such as qualifications, abilities, and skills should be taken into consideration.

Several studies (e.g., Alamri, 2019, p. 212; Kalkhouran, Nedaei and Rasid, 2017, pp. 482-484; Nuhu, Baird and Appuhami, 2016, p. 89) confirmed that advanced MAPs usage has a considerable positive influence on business performance, emphasising the need for policies that support firms to embrace and implement advanced accounting systems. Firms with a history of low performance may consider implementing advanced MAPs in the future to improve firm performance. Rashid, Ali and Hossain (2020, p. 129) also suggested that "top management may take initiative to introduce strategic-oriented management accounting techniques in organizations to improve efficiency in resource allocation and to facilitate more accurate and timely strategic decision".

This study nonetheless has some limitations. Firstly, the limitation concerns the choice of advanced MAPs because the study only focuses on advanced costing practices. Future studies may consider a wide range of advanced MAPs from different categories. Secondly, our research places importance on the characteristics of the CFO and the firm's previous financial performance. Future studies might attempt to test additional factors that influence ACPs. Thirdly, the CFO's educational level, tenure, and historical performance were all measured on one item; thus, the measurement's reliability and validity could not be controlled. Lastly, generalisations should be drawn with caution concerning three specific industries within a country, so future research could be conducted by utilising various industries from developing countries.

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