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The Causal Relationship of Strategic Management Accounting Practices, Intellectual Capital Development and Firm Success

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Abstract

This research aims to investigate the causal relationships of strategic management accounting practices on intellectual capital development and firm success. These relationships were tested with data from 298 information and communication technology firms in Thailand. Data were collected via questionnaires, and Structural Equation Modeling (SEM) was used to analyze the data. The results showed that the causal relationship model fit to the empirical data was at the acceptable level ($\chi^2 = 116.086$, $p\text{-value} = 0.008$, $CFI = 0.989$, $IFI = 0.989$, $GFI = 0.951$, $RMSEA = 0.037$). The results also indicated that strategic management accounting practices had positive direct effects on intellectual capital development, which had a positive direct effect on firm success ($b = 0.664$, 0.298 , respectively). Moreover, it showed that strategic management accounting practices had an indirect effect on firm success through intellectual capital development ($b = 0.226$). Thus, firms need to be aware of implementing five SMAPs: costing, performance measurement, strategic decision-making, competitor accounting, and customer accounting to identify and understand how intellectual capital works, and to measure and evaluate intellectual capital in diverse dimensions in order to provide information needed for intellectual capital development which play a vital role in maximizing value creation and result in good performance.

Keywords: strategic management accounting, intellectual capital, firm success

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บทคัดย่อ

งานวิจัยนี้มีวัตถุประสงค์เพื่อตรวจสอบความสัมพันธ์เชิงสาเหตุของแนวทางปฏิบัติทางการบัญชีบริหารเชิงกลยุทธ์ที่มีอิทธิพลต่อการพัฒนาทุนทางปัญญาและความสำเร็จของกิจการ โดยทำการทดสอบกับบริษัทในกลุ่มธุรกิจเทคโนโลยีสารสนเทศและการสื่อสารในประเทศไทย จำนวน 298 บริษัท เก็บรวบรวมข้อมูลโดยใช้แบบสอบถามและใช้แบบจำลองสมการเชิงโครงสร้างในการวิเคราะห์ข้อมูล ผลการวิจัย พบว่า โมเดลความสัมพันธ์เชิงสาเหตุมีความสอดคล้องกับข้อมูลเชิงประจักษ์ ($\chi^2 = 116.086$, p-value = 0.008, CFI = 0.989, IFI = 0.989, GFI = 0.951, RMSEA = 0.037) และพบว่า แนวทางปฏิบัติทางการบัญชีบริหารเชิงกลยุทธ์มีอิทธิพลทางตรงเชิงบวกต่อการพัฒนาทุนทางปัญญาซึ่งมีอิทธิพลทางตรงเชิงบวกต่อความสำเร็จของกิจการ ($b = 0.664$ และ 0.298 ตามลำดับ) นอกจากนี้ ยังพบว่า แนวทางปฏิบัติทางการบัญชีบริหารเชิงกลยุทธ์มีอิทธิพลทางอ้อมต่อความสำเร็จของกิจการโดยผ่านการพัฒนาทุนทางปัญญาด้วย ($b = 0.226$) ผลการศึกษาชี้ให้เห็นว่ากิจการต่าง ๆ ควรตระหนักถึงการนำแนวปฏิบัติทางการบัญชีบริหารเชิงกลยุทธ์ทั้งห้าด้าน ได้แก่ ด้านต้นทุน ด้านการวัดผลการดำเนินงาน ด้านการตัดสินใจ ด้านบัญชีคู่แข่ง และด้านบัญชีลูกค้า มาใช้ในการระบุนิยามการทำงาน การวัดและประเมินผลทุนทางปัญญาในหลากหลายมิติ เพื่อให้ข้อมูลที่เป็นต่อการกำหนดแนวทางในการพัฒนาทุนทางปัญญา นำไปสู่การสร้างมูลค่าและผลการดำเนินงานที่ดีขึ้นของกิจการ

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Introduction

Over the last few decades, the organizational environment has shifted towards more knowledge-based economy. In this context, many organizations need to seek knowledge-based resources, especially intellectual capital (IC), as the main source in value creation and sustaining competitive advantage (Orugun & Aduku, 2017). IC is an intangible asset including knowledge, competencies, information, intra and inter-organizational relationships that are embedded in individuals and business processes to create value and firms' success (Inkinen, Kianto, Vanhala, & Ritala, 2017). As a result of a higher recognition of IC, researchers are keen to identify, measure, and manage IC to achieve its maximum potential (Krstić & Bonić, 2016; Novas, Alves, & Sousa, 2017). In recent years some studies have attempted to explore the link between strategic management accounting (SMA) and IC (Asiaei & Jusoh, 2017; Pires, Alves, & Fernandes, 2020). SMA is a set of practices, techniques or management accounting tools used in identifying, collecting, analyzing, and reporting, and in the use of information necessary for strategic management (Căpușneanu, Topor, Constantin, Barbu, & Hint, 2020). Many studies have found that SMA practice (SMAP) has a positive effect on firm success; however, there are different perspectives on SMAP. Some authors have considered that SMAP provides a strategic orientation for an external or outward-looking focus (customers, competitors, and markets), while others have considered that SMAP provides a strategic orientation for internal resources and organizational capabilities to get sustainable competitive advantage (Lay & Jusoh, 2017; Novas et al., 2017).

SMAP assumes a particular relevance to identify, measure, and manage IC (Asiaei & Jusoh, 2017; Jordão & Almeida, 2017; Novas et al., 2017). This is because IC is the set of internal resources that organizations mobilize and articulate with other resources in their pursuit to achieve strategic and sustainable competitive advantage. Thus, SMAP should include the analysis of such resources. According to Asiaei and Jusoh (2017), firms with strong levels of IC mainly rely on SMAP and focus on the assessment, appraisal, and measurement of IC in order to avoid neglecting the organization's most valuable resources, while firms with greater IC capabilities can achieve greater business productivity, firm competitiveness, and firm success (Orugun & Aduku, 2017; Xu & Wang, 2018). Although scholars in the fields of accounting and management stress the role of SMAP in measuring and managing IC, only the relationship between some SMAP and IC components has been explored. All SMAP has not yet been clarified as to how each SMAP contributes to the development of IC. Moreover, there is scarce literature which explores the potential role of SMAP in developing IC capacity to enhance firm success. Therefore, this research has identified SMAP

as the primary factor influencing firm success through the mediating role of intellectual capital development.

For all the reasons mentioned above, this research intends to examine the causal relationship among SMAP, IC development, and firm success to extend the existing literature. The research question is “How does SMAP utilization influence IC development and firm success?” To verify the relationships, information and communication technology (ICT) businesses in Thailand were used as the population of this research. The reason is that ICT businesses rely heavily on knowledge, information, know-how, intellectual property, and reputation of products and organization to drive a greater productivity and cope with technological changes, high customer demand, and short product life cycle. Therefore, IC is the most critical asset to the success of the ICT business. This notion is consistent with previous research, which has mainly focused on high technology industries in terms of IC development discussion (Najar, Dhaouadi, & Zammel, 2020). In addition, according to the Twelfth National Economic and Social Development Plan (2017–2021), Thailand is currently focused on developing a knowledge-based economy for enhancing the country’s competitiveness through ICT and higher investment prospects in ICT. For the reasons mentioned above, the ICT businesses in Thailand have to place importance on IC development capability to response to the National Economics and Social Development Plan, and to achieve their goals in an extremely competitive environment. Therefore, the ICT business in Thailand is an interesting business to study. This research contributes to the existing literature by offering some insights about how SMAP improves the success of firms through developing IC. In addition, it also highlights the practices that are most likely to be the key tools in IC development.

Research Objectives

To investigate the causal relationships of SMAP on IC development and firm success.

Literature Review and Hypothesis Development

The Concept of SMA and SMAP

The SMA concept was first introduced in 1981 by Simmonds. SMA was defined as analyzing and providing management accounting information of business and its competitors for the purpose of an implementation in monitoring, controlling, and developing the strategy of that business. SMA comprises management accounting practices that were essential to strategic decision making and increasing organizational effectiveness. Strategic management accounting

practices (SMAP) were the techniques of identifying, collecting, analyzing, and reporting, and in the use of information necessary for various aspects of strategic management (Căpușneanu et al., 2020). SMAP has commonly been used according to the concept of Cadez and Guilding (2008), which consisted of 16 techniques and was divided into 5 categories. The first category – Costing – related to determining, analyzing, and managing strategic costs (e.g. value chain costing, target costing, life cycle costing, quality costing, attribute costing). The second category – Performance measurement – related to identifying best practices for performance planning and performance management (e.g. integrated performance measurement, benchmarking). The third category – Strategic decision-making – associated with providing information that enables the analysis and management of strategy to achieve organizational competitiveness (e.g. brand valuation, strategic pricing, strategic costing). The fourth category – Competitor accounting – focused on analyzing and providing the information released by competitors that was helpful in developing the strategy (e.g. competitive position monitoring, competitor performance appraisal, competitor cost assessment). The fifth category – Customer accounting – focused on analyzing and providing customer information that allows to assess relationships with customers and improve the development of strategies (e.g. valuation of customer as assets, lifetime customer profitability analysis, customer profitability analysis). In addition, many studies pointed out that these accounting techniques were relevant to identify, measure, and manage of IC (Asiaei & Jusoh, 2017; Jordão & Almeida, 2017; Novas et al., 2017). Thus, in this research, these five categories were also used as reflective measures representing the degree to which an organization adoption of SMAP to provide and analyze information to support the management team to develop and monitor business strategy.

The Concept of IC and IC development

The concept of IC was first introduced in 1961 by John Kenneth Galbraith. IC was the accumulation of all knowledge, information, intellectual property, and competencies that increase organizational efficiency which were embedded in individuals and business processes. Organizational managers used IC as a strategic approach to pursue and achieve their performance in a competitive business environment (Orugun & Aduku, 2017). Generally, the IC comprised three main components: human capital (HC), structural capital (SC) which can be divided into innovation capital (INC) and process capital (PC), and relational capital (RC) (Krstić & Bonić, 2016; Pedro, Leitão, & Alves, 2018). HC was defined as the abilities, the competences, and the know-how of the personnel of a business entity. INC was the combination of organizational knowledge and technical system mainly contained in innovative organizational culture, research and development

intensity, network technology, databases and information systems. PC was the organizational knowledge mainly contained in business processes, procedures, and systems. Finally, RC was the knowledge embedded in business networks, including connections outside the organization such as image and reputation, branding, customer loyalty, and supplier relations. These IC components were a set of critical and valuable strategic resources to achieve sustainable competitive advantage in the era of knowledge-based economy (Novas et al., 2017; Pedro et al., 2018). In the literature, IC development referred to a higher level of intensity in IC potential in order to deliver the value creation process, as well as to improve business performance and future growth (Orugun & Aduku, 2017). Based on IC components as mentioned above, the potentials in the development of IC could be reflected by higher level of HC, INC, PC, and RC development.

SMAP and Firm Success

SMAP could generate considerable value by providing more relevant information needed for the success of organizations in the modern era such as pricing decisions, product profitability, value of market share, costs of competitor, customer profitability, capacity expansion, brand valuation, shareholder wealth, and cash-flow (Căpușneanu et al., 2020; Lay & Jusoh, 2017; Novas et al., 2017). Many studies have shown that SMAP has a positive impact on firm performance. For instance, implementing strategic costing practice to improve cost-determining and measuring costs has led to significant savings and cost reductions that affect the firm's profitability as well (Phornlaphatrachakorn, 2018). In addition, the use of strategic performance measurements for assessment of organizational goals seemed to support an alignment of business activities to firms' strategy and assisted them to successfully perform their function and to achieve organizational goals (Endrikat, Guenther, & Titus, 2020; Jordão & Almeida, 2017). Given the above considerations related to SMAP and information from key SMAP to achieve company goals, the following hypotheses were formulated:

Hypothesis 1: SMAP is positively related to firm success.

SMAP and IC Development

The call for accounting to identify, measure, and manage IC components to maximize potential was strong. In particular, accounting information derived from SMAP has been perceived as a useful tool for the decision-making and management of IC (Coyte, 2019; Novas et al., 2017; Pires et al., 2020). This is because financial accounting alone was not enough to recognize IC, it was the goal of the management accounting to contribute to the identification, measurement,

and management of resources that constitute IC. Previous studies proposed a possible relationship between IC resources and SMAP. For instance, the costing category can improve PC, INC, and RC by assessing product costs, reviewing and assigning costs, and innovation capability to produce quality products and services (Cescon & Garlatti, 2020). The performance measurement category could enhance HC, PC, INC, and RC by identifying best practices leading to superior performance or system involves monitoring key factors to ensure customer satisfaction (Asiaei & Jusoh, 2017). The strategic decision-making category could develop IC by using management accounting data to identify and evaluate IC that affect target achievement and improve business value under each scenario (Curea, 2018). Competitor and customer accounting categories could enhance PC, INC, and RC by analyzing competitors' sales and costs to identify a specific customer or crucial technology that contribute to more efficient competition. Thus, this research used five categories of SMAP, which might affect both IC and firm success, to formulate the following hypothesis.

Hypothesis 2: The SMAP is positively related to IC development.

IC Development and Firm Success

IC was an organization's knowledge assets that significantly contributes to the improvement of competitive position and the value creation of the organization. In the literature, the development of IC was increasing the IC ability to a higher level, which enhanced the competitiveness and added value of the organization (Orugun & Aduku, 2017). Numerous studies have demonstrated the impact of IC development on organizational performance. For instance, developed HC enhanced individual and organizational competencies and optimized firm performance (Ameyaw, Peprah, & Anowuo, 2019). Furthermore, INC and PC investment could provide new technology and new products to meet customers' needs and impact firm performance (Lee, Yang, & Huang, 2019). In addition, proper internal processes would affect process efficiency, product quality, customer satisfaction, and then support the businesses to achieve the goal (Cabrilo & Dahms, 2018). The firm with greater IC capabilities could achieve greater employee commitment, operational development, business productivity, firm competitiveness, and firm success (Xu & Wang, 2018). Thus, proper IC management was the key driver of the organization's successful implementation of business strategies. The hypothesis could be stated as follows:

Hypothesis 3: IC development is positively related to firm success.

The Mediating Role of IC Development Between SMAP and Firm Success

As IC tended to be an important internal strategic resource and capability contributing to competitive advantage of the organization, the IC development has emerged as a major area of management accounting literature (Coyte, 2019; Pires et al., 2020). Several authors have attempted to explore the relationship between strategic management accounting and IC and have found that firms with strong levels of IC mainly rely on SMAP to identify, measure, and manage IC in order to develop IC resources (Asiaei & Jusoh, 2017; Novas et al., 2017). Meanwhile, firms with greater IC capabilities could achieve greater business productivity, firm competitiveness, and higher business performance (Jordão & Almeida, 2017; Orugun & Aduku, 2017; Xu & Wang, 2018). As mentioned above, it seemed that SMAP would influence the development of IC mediated for firm success. This view has been reinforced by Wajdi and Arsiah (2019) who suggested that strategic management accounting could provide a partial mediating role on the improvement of organizational performance through competitive advantage. In addition, developed IC has increasingly become a competitive competency variable that is critical to productivity development and an organization's goal achievement under a rapid change in business environment (Orugun & Aduku, 2017). Moreover, the concept of the knowledge-based theory indicated that the development of knowledge-based resources within the organization led to higher operational efficiency (Nonaka, Nishihara, & Kawada, 2018). In this context, the IC developed through SMAP was a powerful knowledge-based resource that led to firms' success and achievement. Based on the description above, this research has identified SMAP as the primary factor influencing firm success through the mediating role of intellectual capital development. The following hypothesis has been formulated:

Hypothesis 4: The SMAP has a positively indirect effect on firm success by transmission IC development.

Theoretical Framework

Organizational information processing (OIP) theory and knowledge-based theory have been integrated and used to develop the causal relationship framework. First, OIP theory explained that the fit between information processing capacity and information requirements could provide useful information to deal with environmental uncertainty and improve meaningful decisions (Srinivasan & Swink, 2018). Information processing capability was an organization's ability to collect, translate, synthesize, and provide information to manage uncertainty. In this research, SMA was an information processing capacity that identified, analyzed, and reported

information needed for management decisions to improve internal resources and to support competitive bases. Thus, OIP theory was used to identify SMAP as an important influential factor for IC development and firm success. Second, the knowledge-based theory was also used to explain the relationship between SMAP, IC development, and firm success. The core concept of the knowledge-based theory explained that knowledge-based resources that were hard to mimic were the main determinants of sustained competitive advantage and greater performance (Nonaka et al., 2018). In this context, the intellectual capital value developed through SMAP was a powerful knowledge-based resource that distinguished firms from competitors and led to a competitive advantage. According to literature reviews and theoretical concept, the conceptual framework is shown in Figure 1.

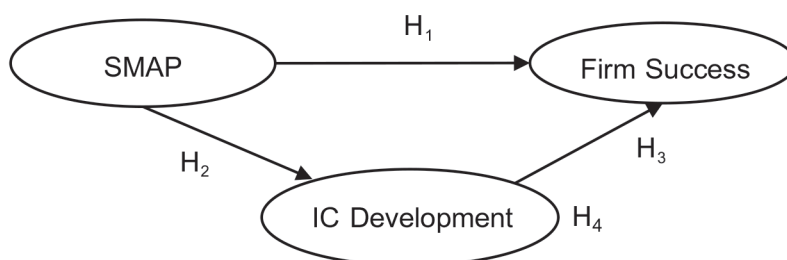


Figure 1 Conceptual Framework

Research Methodology

Population and Sample

The population of this research represents companies in Information and Communication Technology (ICT) business in Thailand. There are four main sub-sectors of ICT business; computer hardware, computer software, computer services, and communication. The ICT businesses in Thailand comprise 1,065 firms drawn from a database compiled by the Ministry of Information and Communication Technology (National Science and Technology Development Agency [NSTDA], 2019). As SEM sample size should exceed 200 and 5-100 samples per parameter (Wang & Wang, 2019), in this study, the model comprised 38 parameters; thus, the minimum sample size was 200 observations. Generally, the response rate in mail surveys is approximately 20%. In addition, the pursuit of high response rates can reduce the non-response bias problem. Thus, to achieve sufficient sample size, all 1,065 firms were used as samples.

Data Collection

Data were collected using a questionnaire mailed to 1,065 ICT firms in Thailand. The questionnaire was directly distributed to the most of senior positions in the finance and accounting department (Chief Financial Officer (CFO), finance and accounting directors). The unit of analysis for this research was organization; thus, top-level managers would be appropriate respondents because they would be familiar with all aspects of the questionnaire. Thus, CFOs or finance and accounting directors were chosen because they were strongly related to the use of SMAP and also engage in providing insight business information to support strategic decision processes. To achieve a high response rate, follow-up calls were made two weeks after the initial mail. As a result, the overall usable sample was 298 firms with a response rate of 27.98%. Then the sample was divided into early and late response groups and using t-test to test the response bias. The results found no significant difference between the early and the late responses.

Research Instruments

The research instrument was a questionnaire which was developed based on the literature. It was divided into four sections: namely section A “demographic data”, section B “SMAP utilization”, section C “IC development”, and section D “firm success”. The questionnaire has been adapted to comply with the definitions and characteristics of the variables to be measured. Consequently, each of the questionnaire’s items was verified as to ensure content validity by three academics. Specifically, to assess whether the questions remain reflective the concept of the variables and covers the research objectives. In total 26 items, 21 items were assessed as consistent and comprehensive variable definitions and language were easy to understand, while the 5 items were suggested to be improved for more concise and understandable. The revised version of the questionnaire has been re-validated and was accepted for content validity. The revised version of the questionnaire has been re-validated and was accepted for content validity. The reliability of the questionnaire (using Cronbach’s alpha) was administered from all returned questionnaires. The results indicated that the item-total correlation values in the range of 0.55-0.81 (greater than 0.40), Cronbach’s alpha coefficient values in the range of 0.73-0.84 ($\alpha > 0.80$) were considered acceptable reliability (Hair, Anderson, Tatham, & Black, 2006).

Variable Measurement

All reflective variables were measured on seven-point Likert-scale (1=extremely low or not at all to 7=extremely high or a great extent). To check the construct validity, this research applied both Principal Component Analysis (PCA) described below, and Confirmatory Factor Analysis (CFA) described in measurement model assessment section.

SMAP. This instrument has been adapted from Cadez and Guilding (2008) which comprises 16 items across five sub-dimensions, namely costing (e.g. value chain costing, target costing, life cycle costing, quality costing, attribute costing), performance measurement (e.g. integrated performance measurement, benchmarking), strategic decision-making (e.g. brand valuation, strategic pricing, strategic costing), competitor accounting (e.g. competitive position monitoring, competitor performance appraisal, competitor cost assessment), and customer accounting (e.g. valuation of customer as assets, lifetime customer profitability analysis, customer profitability analysis). The respondents were asked to determine the extent to which their organizations were implementing SMAP in 16 practices. Performing PCA result, factor analysis revealed five factors with eigenvalues greater than one. The range of factor loading was between 0.705 and 0.927. The Cronbach's α for these factors range from 0.80 to 0.84.

IC development was measured with four reflective items related to the level of intensity in organizational IC resources potential to achieve business value creation. The four items comprised an organization's ability to extend its current overall skills, knowhow levels of employees; ability to apply the systems and processes that facilitate the development or implementation of innovation; ability to store and manage knowledge of the organization to do business; and ability to share and utilize knowledge network among employees, clients, suppliers, and partners adapted from Jordão and Almeida (2017). Factor analysis revealed one factor with Cronbach's $\alpha = 0.73$.

Firm success was measured by six items assessing the extent of perceived overall firm success compared to that of competitors such as customer satisfaction, return on investment, product quality improvement, sales volume, market share, and profitability adapted from Xu and Wang (2018). Factor analysis revealed one factor with Cronbach's $\alpha = 0.82$.

Data Analysis

The survey data were analyzed using descriptive statistics that included mean, standard deviation to summarize features of the sample. SEM, which uses AMOS, was applied for CFA and

hypotheses testing. CFA was conducted to verify the construct validity of the observed variables in order to analyze that the measurement model fit data. Then, the structural model was estimated to describe the causal relationships among the constructs and their relative explanatory power and hypotheses testing. SEM has been adopted in this research because it allowed the simultaneous estimation of multiple and interrelated dependency relationships. It also had the ability to represent unobservable concepts, and accounted for the measurement error in the estimation process (Hair, Hult, Ringle, & Sarstedt, 2016).

Results

Demographic Data

Demographic data from 298 respondents indicated that a majority of respondents were female (84.69 percent), the range of age was between 41-50 years old (59.20 percent) and hold a master's degree (69.80 percent). Most of the current working positions were finance and accounting directors (56.48 percent), followed by CFO (43.52 percent). The largest number of respondents have been holding their current positions between 3 and 5 years (52.80 percent). In addition, mean scores and standard deviation of degree of involvement respondents on business partnering areas in their firms showed that they had been involved in the provision of financial and non-financial analysis, controlling and monitoring business operation, customer-oriented analyses, and market-oriented analyses at mean scores of 3.89, 3.64, 3.43, and 3.20, respectively, which exceeds 2.50.

These results showed the degree of management power, characteristics, and business partner role of the respondents in their organization. According to the upper echelon theory in management accounting literature, the individuals' attributes of manager power of the finance and accounting unit (e.g. top-level managers, education, tenure, and business partner orientation) related to greater used of SMAP to supporting business alternatives evaluation and strategic implementation (Pasch, 2019). In addition, management accountants' contribution as a business partner had greater used of multi-perspective business information to provide strategic insight and analysis to support the CEO, board of directors, or other senior managers to playing an active role in defining and developing the strategy of the organization (Pasch, 2019). For example, this is found in the evaluation of organizational performance level by comparing it with the major competitor on both financial and non-financial performance indicators such as return on equity, return on investment, sales growth rate, operating profit, customer satisfaction rate, customer, market share rate, and new service success rate. Thus, respondents in this research were likely

to have fact-based business information in order to stimulate discussions and decision making based on strategic analyses.

Descriptive Statistics

The weighted average scores of the multi-item variables have been shown in Table 1. All variables had a weighted average score exceeding 2.50, suggesting that the respondents perceived that their business were regard intense used of SMAP, their business focused on the development of IC to promote competitive advantage, and they perceived that their performance achieved attainment of the organizational goals in the last three years.

Table 1 Descriptive Statistics, Correlation Matrix, and Result of Reflectively Measurement Constructs

Variables	SMAP	ICDM	FMSC
Strategic Management Accounting Practices (SMAP)	0.819		
Intellectual Capital Development (ICDM)	0.661***	0.726	
Firm Success (FMSC)	0.518***	0.533***	0.838
Mean (\bar{X})	4.189	4.157	3.771
Standard Deviation (S.D.)	0.611	1.281	0.736
Average variance extracted (AVE)	0.670	0.527	0.703
Composite reliability (CR)	0.910	0.867	0.934

Notes: *** denote significance levels of $p < 0.01$. Numbers on the diagonal in bold = square roots of AVE of reflective variables.

Measurement Model Assessment

The measurement model was build based on existing scales from previous literature that were evaluated with the PCA as described above. Consequently, CFA was used to verify the appropriateness of a measurement model (relationships between the observed variables and their underlying latent constructs) derived from theory and/or preliminary empirical research before estimating the structural model and hypotheses testing. Model fit was assessed using indices from various fit criteria including, probability level > 0.05 ; Chi square divided by the degrees of freedom ($\chi^2/df < 3.0$); Root Mean Square Error of Approximation (RMSEA < 0.08); Incremental Fit Index (IFI), Goodness of Fit Index (GFI > 0.9); Comparative Fit Index (CFI > 0.9) (Hair et al., 2016). The test results of the measurement models for SMAP and IC development are presented below.

Measurement model for SMAP. In this research, there are five sub-dimensions of SMAP construct including costing, performance measurement, strategic decision-making, competitor accounting, and customer accounting that were also evaluated with the PCA as described above. In this case, five sub-dimensions were treated as indicators for SMAP construct. Following this precedent, the CFA was performed using the global variables for the five subcategories to confirm this anticipated dimensional structure. Figure 2 showed that all measured variables of SMAP construct reach standardize loadings equal to or greater 0.70 (exceed 0.30), suggesting that the constructs explain a substantial portion of the indicator variance. In addition, all fit indices were above minimum recommended levels ($\chi^2 = 7.922$, $df = 4$, $p\text{-value} = 0.094$, $\chi^2/df = 1.980$, CFI = 0.996, IFI = 0.996, GFI = 0.989, RMSEA = 0.057). The results posited that five measured variables – costing, performance measurement, strategic decision-making, competitor accounting, and customer accounting – can be good representatives to measure SMAP.

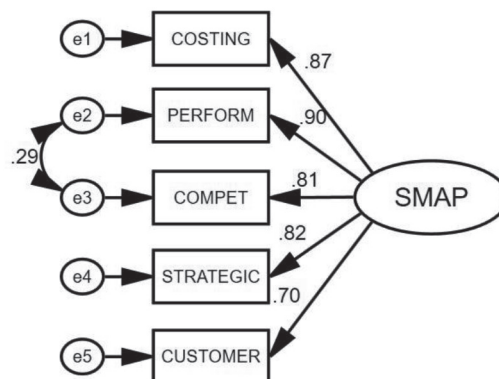


Figure 2 Confirmatory Factor Analysis for SMAP

Measurement model for IC development. As showed in Figure 3, all items reach standardized loadings equal to or greater 0.68 (exceed 0.30). The fit index yielded $\chi^2 = 2.077$, $df = 2$, $p\text{-value} = 0.816$, $\chi^2/df = 1.0385$, CFI = 1.000, IFI = 1.004, GFI = 0.999, RMSEA = 0.000. The fit index was satisfactory, thereby indicating that four observed variables: HC development, INC development, PC development, and RC development could be good representative measures of IC development.

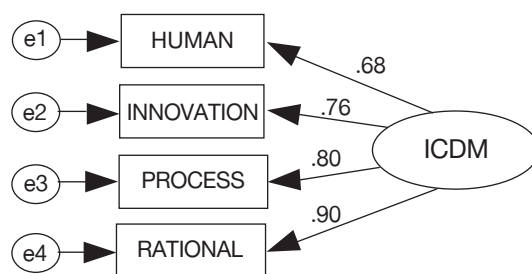


Figure 3 Confirmatory Factor Analysis for IC Development

Moreover, unidimensionality was presented by composite reliabilities (CR) of the constructs that were shown in Table 1. The CR was similar to Cronbach's α and could be similarly interpreted. The reliability level at 0.70 was acceptable for the exploratory study (Hair et al., 2016). The CR values were shown in Table 1 and range from 0.87 to 0.93, indicating that indicators consistently represented the construct. In addition, the construct validity was assessed through the estimation of each measure's convergent, discriminant validity. To assess convergent validity, the average variance extracted (AVE) were evaluated. Discriminant validity was assessed using the square root of AVE (Hair et al., 2016). Table 1 showed the AVE value for the reflectively measured constructs used in this study. The AVE value of all constructs ranges between 0.53 and 0.70 (exceeds 0.50) indicated that, on average, the construct explained more than half of the variance of its indicators. Moreover, Table 1 showed that the squared root of AVE of all constructs were higher than the construct intercorrelations in the model, indicating that each construct shared more variance with its measures than with other constructs in the model. Based on these results, it concluded that all measurement model fits the empirical data and had sufficient convergent and discriminant validity adequate to support interpretation of the structural model in this research.

Structural Model Assessment and Hypotheses Testing

SEM was used to estimates a structural equation model and describes the causal relationships among the constructs and their relative explanatory power. The results showed the fit indices of re-specified model: ($\chi^2 = 116.086$, $df = 82$, $p\text{-value} = 0.008$, $\chi^2/df = 1.416$, $CFI = 0.989$, $IFI = 0.989$, $GFI = 0.951$, $RMSEA = 0.037$), suggesting a reasonable fit of the hypothesized model to the data, illustrated in Figure 4. Thus, the estimated causal model was valid and it was a representative of the reality it sought to describe.

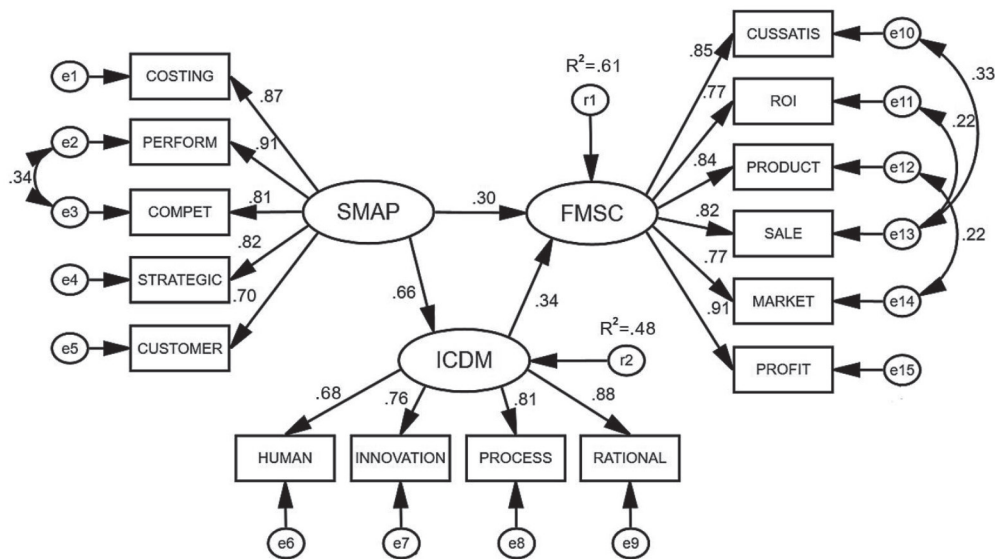


Figure 4 Results for the Structural Equation Model

According to the results from the SEM, statistical evidence was found for four hypotheses tested. Table 2 shows the regression coefficients in the final causal model, suggesting direct effect, indirect effect, and total effect of the causal relationship. Factor loadings (standardized regression weights) were presented for the statistically significant relationships. There was evidence that SMAP had a positive direct effect on IC development (0.664, $p < 0.01$) and firm success (0.298, $p < 0.01$). Thus, hypotheses H1 and H2 were supported. The result also indicated the significantly direct effect of IC development on firm success (0.341, $p < 0.01$). Therefore, H3 was supported. In addition, there was an indirect effect of SMAP on firm success by transmission IC development with a path coefficient that equaled 0.226, $p < 0.01$. Thus, H4 was supported.

Table 2 Regression Coefficients in the Revised Causal Model

Effect	Hypothesis	Structural Path Relationship	t-value	p-value ($p < .01$)	Standardized coeff.			Hypothesis Test
					Direct	Indirect	Total	
Direct Effect	H1	SMAP→FMSC	3.815***	0.000	.298	-	.298	Accept
Direct Effect	H2	SMAP→ICDM	9.235***	0.000	.664	-	.664	Accept
Direct Effect	H3	ICDM→FMSC	4.202***	0.000	.341	-	.341	Accept
Indirect Effect	H4	SMAP→ICDM→FMSC	-	-	.298	.226	.524	Accept

Discussion and Conclusion

In summary, this research examined the causal relationship between SMAP, IC development, and firm success to enhance the knowledge of SMA in IC area. In order to respond to the research objectives, OIP theory and knowledge-based theory were applied to develop the causal relationship model, and CFA and SEM were used to address the measurement model and estimate a structural equation model. Data obtained from 298 ICT firms in Thailand by mailed survey, which included the most of senior positions in the finance and accounting department (CFO/finance and accounting director) as the key informants.

Results of the CFA posited that SMAP and IC development were confirmed in the measurement portion of the model because the results showed good model fits. This empirical finding implied that sufficient characteristics of SMAP should comprise strategic costing, strategic performance measurement, strategic decision-making, competitor accounting, and customer accounting. This is consistent with management accounting literature that argued that 16 strategically oriented accounting practices that were classified into these five broad categories were the most recent and completed lists of SMAP (Căpușneanu et al., 2020). Sufficient characteristics of SMAP should be focused on these five categories to provide information based on both internal and external orientation, long-term orientation, multidimensionality, and both financial and non-financial typologies of measurement to guided operations and strategy. Moreover, these SMAP played an important role in providing relevant information associated to measurement and management IC resources (Pires et al., 2020). In addition, the result of CFA also suggested that IC development should be measure by HC, PC, INC, and RC development. This finding suggested that IC was the combination of intangible resources and activities include: employees' knowledge and skills, organization's systems and processes, organization's technology and innovation, and organization's external relationships. This empirical finding implied that sufficient features of IC development should be focused on HC, PC, INC, and RC development in order to enable organizations to enhance their effective competitive advantage and firm success (Pedro et al., 2018).

The results from SEM confirmed that the hypothesized model fit the empirical data. There was evidence that SMAP had a positive direct effect on IC development and firm success. In agreement with previous studies, SMAP created considerable value by providing more relevant information that was required for the success of modern-day organizations (Căpușneanu et al., 2020; Lay & Jusoh, 2017). SMAP was also vital to identify, measure, and manage IC in order to fulfil its maximum potential (Coyte, 2019; Pires et al., 2020). The result also indicated the significantly

direct effect of IC development on firm success. This finding confirmed the assumption of Xu and Wang (2018) who advocated that firm with higher IC capability would be able to attain greater employee commitment, operational development, business productivity, firm competitiveness, and firm success. In addition, there was an indirect effect of SMAP on firm success by transmission IC development. This finding was in line with those of Orugun and Aduku (2017); Wajdi and Arsja (2019). Their studies suggested that strategic management accounting could provide a partial mediating role on improvement of organizational performance through IC development, which represented competitive advantages. The result also confirmed the knowledge-based theory which assumed that knowledge-based resources that were hard to mimic were the main determinants of sustained competitive advantage and greater performance. The IC resources developed through SMAP was a potential knowledge-based resource that distinguished the companies from their competitors and led to a competitive advantage. This concluded that SMAP was critical to identifying, measuring and managing IC in order to increase IC potential to maximize value creation and result in good performance.

Contributions

Managerial Contributions

The findings suggest that SMAP is important factor for the development of intellectual capital, which positively affects the success of the organization. Therefore, in order to increase firm success, especially knowledge-intensive business, management should focus on employing SMAP, which is divided into five categories include: costing; performance measurement; strategic decision-making; competitor accounting; and customer accounting, to determine the approach to intellectual capital development. The results can also be used as guided tools to the design of SMAP to identify the characteristics or functions of IC. This includes the use of SMAP to design of IC assessment system in multi-dimensional. This IC assessment system will provide the information needed to formulate policies and action plans that encourage employees in the organization to make more effort to increase the knowledge and skills to work. Moreover, IC assessment system is used to develop work process that encourages a group to work efficiently and contributes to new methods and technologies to increase productivity and the ability to adapt for changes in business environment.

For example, the implementation of strategic costing would determine and report costs associated with product development, product quality and customer needs, costs based on the length of stages of a product's life, organizational innovation costs, research and development cost, and costs of engineering and marketing. This practice would provide management with information needed for assessing and developing production processes, quality management, management systems, innovation capacity, in order to increase product quality, customer satisfaction, customer loyalty, and profitability. The implementation of strategic performance measurement would assist identifying, capturing, and measuring corporate activities and internal processes. In addition, it would provide management teams with information needed for best practices to contribute to new methods and technologies in order to increase productivity and superior performance. The implementation of strategic decision-making would capture information based on marketing information to identify and analyze strategic factors such as competitor price reaction, elasticity, market growth, economies of scale, and experience. This practice would provide management with information needed to improve internal resources such as management capacity, management processes, and organizational learning that enhance the achievement of competitive advantage. The implementation of competitor accounting would determine and analyze the competitive position within the industry by assessing and monitoring competitors' information such as competitors' costs, competitors' sales trends, competitors' market share, and return on sales. This practice would provide management with information needed to assess competitors' critical sources of competitive advantages and to assess corporate reputation in order to strategically position their products in the market and increase market share. Lastly, the implementation of customer accounting would determine and analyze customer value and customer segment database by assessing sales and costs that can be traced to particular customers or customer segment. This practice would provide management with information needed to assessment of future revenue flows and costs associated with maintaining a particular customer, in order to increase customer loyalty, customer's knowledge, and relationship with customers. All the descriptions above, SMAP enables the organizations to increase their IC potentials to achieve their goals more quickly and finally increase the business success.

Limitations and Direction for Future Research

This research has some limitations that propose a direction for future research. First, the results of this research mainly depend on data collected by a self-reported questionnaire from accounting manager, which might contain personal bias that might affect the reliability of results.

According to Kantur (2016), managerial perceptions have no validity problem in the study of strategic orientation. However, the results reliability relies on the reliability of the respondents to properly convey the practices and performance of their organization. Thus, further research might use secondary data with adequate documentation analysis, or it may use a case study method to overcome this limitation. Second, this research collected data at one point of time as perceived by respondents which may not reflect the actual progress of the firms' success. Future research may use a long-time series study to overcome this limitation. In addition, future research might consider context factors such as organizational strategies or organizational structures that could strengthen or weaken the casual relationship among SMAP, IC development, and firm success. Thus, further research might consider these factors as moderating variables to generalize the results.

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