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## Article

Exstrategic management accounting and competitiveness affecting sustainable performance: The moderating role of organizational learning capability and competitive culture

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# Strategic Management Accounting and Competitiveness Affecting Sustainable Performance: The Moderating Role of Organizational Learning Capability and Competitive Culture

Sareeya Wichitsathian  and Sumalee Ekkaphol 

## ABSTRACT

This research aimed to: (a) analyze the influence of strategic management accounting information on business strategy, competitiveness, and sustainable performance; (b) investigate the role of mediating variables on business strategy and competitiveness, and (c) study the role of moderating variables on organizational learning capability and competitive culture. The sample comprised 200 companies listed on the Stock Exchange of Thailand. The research methodology employed structural equation modeling to test direct and mediating influences and hierarchical multiple regression analysis to test moderating influence. The findings of the study revealed that all aspects of strategic management accounting information, except for environmental scanning, had a positive impact on business strategy. Market intelligence had a positive influence on competitiveness, while technology intelligence had a positive impact on sustainable performance. The research also found that business strategy had a mediating influence on strategic management accounting information in the areas of technology intelligence, market intelligence, and forward-looking information, which in turn affected organizational competitiveness. Additionally, organizational competitiveness had a mediating impact on market intelligence and sustainable performance. Furthermore, the study revealed that organizational learning capability and competitive culture played a moderating role in organizational competitiveness and sustainable performance.

## KEY WORDS:

strategic management accounting, sustainable performance, business strategy, competitiveness; learning capability, competitive culture.

**JEL Classification:** M14, M41, D81.

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## 1. Introduction

Strategic management accounting (SMA) is a concept that was introduced by Simmonds et al. (1981). It was developed from traditional management accounting, which has been in use since before the 20th century. Originally, traditional management accounting was information gathering, based on historical and financial data, to support strategic decision-making (Ali et al., 2020). However, in to-

day's complex and rapidly changing business environment, traditional practices may be ineffective for decision-making (Dang et al., 2021; Oboh & Ajibolade, 2017). In the modern business world, executives need supporting data that adequately reflects changes in the business environment (Turner et al., 2017). To address these shortcomings, the concept of strategic management accounting was put in place.

Strategic management accounting involves gathering business environment information more ex-

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tensively than the conventional approach. Unlike traditional management accounting, SMA focuses on providing executives with information that can help them assess opportunities and obstacles in operations, support strategic decision-making, and formulate action plans in response to current business situations (Hossain et al., 2022; Valdiansyah & Augustine, 2021). It also concentrates on the monitoring of business situations that may affect future business operations. This information enables executives to assess the current performance of the company and determine the operational direction in line with long-term goals (Bravo, 2016; Menicucci, 2018).

Concurrently, SMA emphasizes gathering information on the external environment. This includes tracking the general business environment, such as legal, political, economic, social, and cultural factors, which indirectly affect business operations (also known as environmental scanning). SMA, additionally, involves studying future business information that can impact operations in the long run, such as operating policies, business growth trends, and operational goals (referred to as forward-looking information). To ensure competitive operations, it's crucial to have in-depth information that keeps track of changes and the impact of technology on operations (known as technology intelligence). This information is used to make executive decisions that mitigate business risks (Asikhia et al., 2019; Yoshikuni & Albertin, 2018). Additionally, tracking information about customers, competitors, and products (referred to as market intelligence) can support strategic decision-making and create competitive advantages in this changing era, as well as optimize excellent business performance (Hendar et al., 2020; Thapayom, 2021).

As mentioned earlier, strategic management accounting is a way to improve an organization's competitiveness and operational performance. However, other factors can impact a company's success. The two important factors are organizational learning capability and competitive culture. If a company possesses learning capability, it means that that business can develop the knowledge and skills of its employees in line with rapidly changing business environment (Tsou & Chen, 2022). A competitive culture, on the other hand, is the set of values that a com-

pany instills in its employees to ensure more efficient operation than its competitors. Overall, a company's learning capability and competitive culture are two critical components that can help achieve operational efficiency and remain competitive in today's fast-changing business environment (Migdadi, 2021).

Several studies have suggested that strategic management accounting information helps make better strategic decisions and results in improved business performance (Phornlaphatrachakorn & Na-Kalasinhu, 2020). SMA also supports business strategy development, which is an approach to promoting competitiveness and sustainable performance of the company (Koçyiğit & Tabak, 2020). Additionally, organizational learning capability and competitive culture are found to be driving mechanisms for operational innovation, which, in turn, strengthens competitiveness and creates sustainable performance (Gopalakrishnan & Zhang, 2017; Hadi, 2023). However, there is limited research that focuses on the study of causal relationship between the variables mentioned above, especially the application of environmental scanning and forward-looking information from conventional management accounting, and market intelligence and technology intelligence of SMA.

Therefore, in order to bridge the gap, this study investigated the influence of strategic management accounting information on business strategy formulation. It also explored how this information has an effect on operational performance and outcomes. Additionally, the study investigated the role of learning capability and competitive culture in enhancing competitive performance. This research, therefore, aims to investigate the influence of strategic management accounting on business strategy, competitiveness, and sustainable performance. It also aims to explore the mediating roles of business strategy and competitiveness, as well as the moderating roles of learning capability and competitive culture on sustainable performance. The study seeks to confirm conceptual and theoretical consistency related to these matters.

This article is structured into four parts. First, related concepts and theories are explored and hypotheses are developed in the literature review and hypotheses section. In this section, resource-based

theory is presented to illustrate the influences of company resources on business performance, as reflected by sustainable performance. Then, strategic management accounting is mentioned in aspects of environmental scanning, technology intelligence, marketing intelligence, and forward-looking information. Moreover, business strategy, organizational competitiveness, organizational learning capability, and competitive culture are reviewed. Second, research methodology is reported, followed by results and discussion. Lastly, in conclusion, summary of results, research contribution, limitations, and recommendations for further studies are discussed.

## 2. Literature Review and Hypotheses

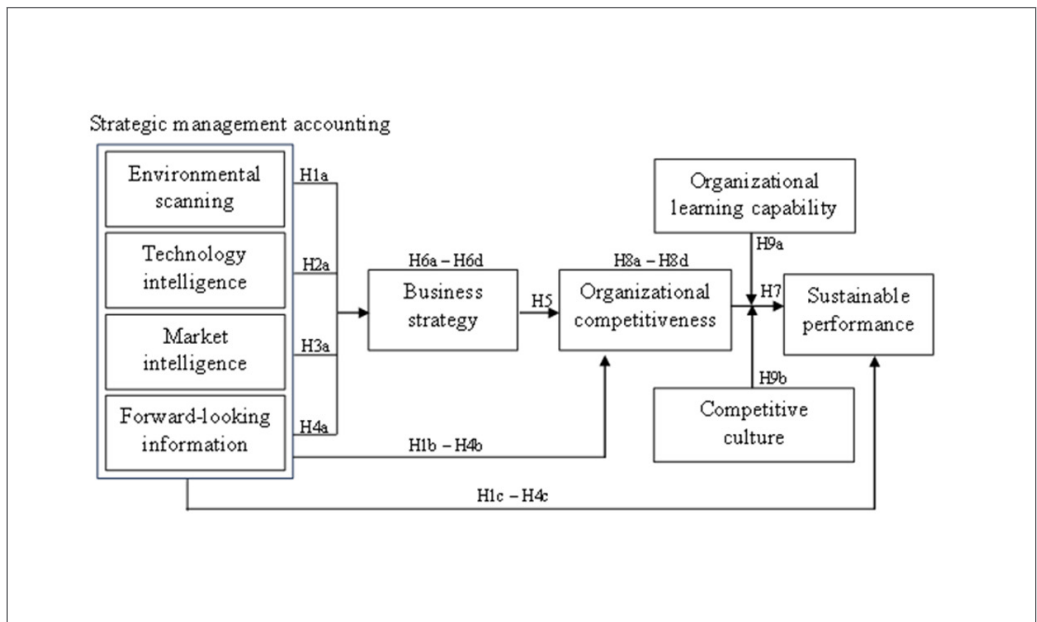
Resource-based theory is a framework describing company resources that contribute to sustainable competitive advantage (Rehman et al., 2021). The resource characteristics that can enhance business competitive potential include valuable, rare,

imperfectly imitable, and irreplaceable resources (Barney, 1991; Nayak et al., 2022). This study, therefore, used Resource-Based Theory to illustrate the relationship between company resources and business performance. The mentioned resources include all strategic management accounting information, namely, environmental scanning, technology intelligence, market intelligence, and forward-looking information, as independent variables. Sustainable performance is a dependent variable, whereas business strategy and competitiveness are mediating variables, and organizational learning capability and competitive culture are moderating variables. Figure 1 depicts the conceptual framework of this research

### 2.1. Sustainable Performance

The true business success is reflected by sustainable performance (SP) (Ogunleye et al., 2021). SP is operational outcomes resulting from the efficient use of resources to reduce the impact

**Figure 1**  
*Conceptual Framework*



on the environment, increase financial wealth, and create a positive image of the business in society (Joy, 2020). According to the Tribble bottle line principle (Rehman et al., 2021), the dimensions of sustainable performance include economic, social, and environmental aspects. Economic performance is measured by cost management, profit growth and market share, operational expansion, and return on investment. Social performance is demonstrated through occupational safety management, social risk management, reduction of conflicts between enterprises and communities, and creation of benefits for all stakeholders. Environmental performance is indicated by work process design to reduce environmental impact, environmental management, and environmental certification (Zgrzywa-Ziemak & Walecka-Jankowska, 2021). SP is also the result of using strategic management accounting information to determine operational guidelines that boost competitiveness and promote business success (Thapayom, 2021; Wajdi & Arsajah, 2019).

## 2.2. Strategic Management Accounting

Strategic management accounting (SMA) is a source of information used by the management to support strategic decision-making (Dang et al., 2021; Wajdi & Arsajah, 2019) and a source of information that contributes to competitive advantage and sustainable performance (Berliantiningrum et al., 2017). It is the information gathering on general business environment that may affect the operations, including environment orientation and forward-looking orientation (Phornlaphatrachakorn & Na-Kalasindhu, 2020). However, the management currently should also consider market orientation and technology orientation as information to enhance operational efficiency and optimize competitiveness (Yu et al., 2019). In this study, four components of SMA were defined as follows:

### 2.2.1. Environmental Scanning

Environmental scanning (ES) is a collection of information that focuses on events and uncertainties of business environment. This is an economic signal that may affect strategic decisions to determine

business operations. ES is considered information searching to support strategic decision-making of the management on determining operational guidelines in highly competitive business situations (Aldehayyat, 2015). Moreover, ES helps the company to adapt to volatile business environment and increase flexibility in business operations in order to achieve sustainable performance (Yu et al., 2019). In conclusion, ES is information that affects operational efficiency, therefore, it can uphold the strategic planning process (YahiaMarzouk & Jin, 2022a). The hypothesis is as follows:

H1: Environmental scanning has a positive effect on (a) business strategy, (b) organizational competitiveness, and (c) sustainable performance.

### 2.2.2. Technology Intelligence

Technology intelligence (TI) is the information gathering, analysis, and dissemination of technological trends for internal management purposes (An et al., 2018). It helps in identifying business opportunities and obstacles. Companies can use TI to develop operational strategies in response to threats and, concurrently, take advantage of opportunities arising from technological advancement (Asikhia et al., 2019; Loh & Mortara, 2017). Moreover, TI helps the management generate new methods or innovations and create distinctions to increase competitiveness (Putra & Darmawan, 2022). Organizations that continuously and quickly track technology information can adapt their operating methods to changing business conditions, increase operational efficiency, and achieve sustainable performance (Safdari Ranjbar & Tavakoli, 2015). Therefore, the hypothesis is formulated as follows:

H2: Technology intelligence has a positive effect on (a) business strategy, (b) organizational competitiveness, and (c) sustainable performance.

### 2.2.3. Market Intelligence

Market intelligence (MI) is gathering, analyzing, and connecting data about competitors, customers, and markets. MI supports making strategic management decisions (Navarro-García et al., 2016) and enhances market capability (Carson et al., 2020) in response to rapid changes in the

market. This information helps create value for customers (Hendar et al., 2020), improve competitive potential and advantages, ultimately increase productivity, and enhance sustainable performance (Katsikea et al., 2019; Stocker et al., 2021). Therefore, the hypothesis is set as follows:

H3: Market intelligence has a positive effect on (a) business strategy, (b) organizational competitiveness, and (c) sustainable performance.

#### 2.2.4. Forward-looking Information

Forward-looking information (FLI) is data about the current operational plan and forecast of the future operating situation. FLI helps the management assess business opportunities (Bravo, 2016; Firmansyah & Irwanto, 2020), including financial forecasts (profit, sales, and future cash flow) and non-monetary forecasts (risks and uncertainties that may cause differences from the expected results in the formulated operational plan) (Phornlaphatrachakorn & Na-Kalasinthdu, 2020). Moreover, FLI can be used for selection of appropriate strategies to gear the operation superior to competitors and strengthen sustainable performance of the business (Waweru et al., 2016). The hypothesis is formulated as follows:

H4: Forward-looking information has a positive effect on (a) business strategy, (b) organizational competitiveness, and (c) sustainable performance.

#### 2.3. Business Strategy

Business strategy (BS) is the planned approach for conducting business based on information on business performance to gain a competitive advantage over competitors (Bansal & Bashir, 2023). BS is crucial for achieving operational efficiency, as business strategies are established to comply with the competitive goals of the market (Koçyiğit & Tabak, 2020). According to the literature review, businesses continuously modify their strategic models to outsmart their competitors. There are two current business strategies that are commonly implemented: innovation orientation and efficiency orientation. The former strategy gives importance to developing or launching a product or service to the market and using innovation to add value and distinctness to the new product or service to increase business

competitiveness (Hilman & Kaliappen, 2015; Prajogo, 2016). The latter strategy concentrates on improving cost management efficiency, distribution of goods or services, and standardized operations to increase price advantage and maintain operation standards (Tenhiälä & Laamanen, 2018; Yuan et al., 2018). Therefore, the hypotheses are set as follows:

H5: Business strategy has a positive effect on organizational competitiveness.

H6: Business strategy mediates the relationship between (a) environment scanning and organizational competitiveness, (b) technology intelligence and organizational competitiveness, (c) market intelligence and organizational competitiveness, and (d) forward-looking information and organizational competitiveness.

#### 2.4. Organizational Competitiveness

Organizational competitiveness (OC) refers to the effective use of resources in operation (Panjaitan et al., 2018; Thapayom, 2021) to the degree that the organization can deliver products and services in response to customer needs better than its competitors (Sukumar et al., 2020; Xu & Au, 2023). It is an important factor that helps businesses maintain their market position and enable them to survive in a severely competitive business environment (Valdiansyah & Augustine, 2021). Organizations that are able to maintain their competitiveness tend to consistently promote sustainable performance of their business (Hossain et al., 2022). Organizational competitiveness can arise from the adoption of SMA information to plan and boost operating methods in accordance with the volatile business environment, maintain competitive advantages, and increase business value towards excellent performance (Kaneko & Yimruan, 2017; Phornlaphatrachakorn, 2018). Therefore, the research hypotheses are determined as follows:

H7: Organization competitiveness has a positive effect on sustainable performance.

H8: Organization competitiveness mediates the relationship between (a) environment scanning and sustainable performance, (b) technology intelligence and sustainable performance, (c) market intelligence and sustainable performance, and (d) forward-looking information and sustainable performance.

### 2.5. Organizational Learning Capability

Organizational learning capability (OLC) arises from skill development, new knowledge-building, and creation of positive attitudes to work, which affect the effective performance of personnel (Zheng & Wang, 2017). OLC is the ability of personnel to operate according to organizational management, organizational structures, and business policies to achieve the ultimate goals (Migdadi, 2021). It is the integration of innovative work skills of personnel that enables the company to quickly cope with changes in the business world and drive the creation of business innovation to boost competitive advantages (Hadi, 2023; Khan et al., 2021). In addition, OLC is a compilation of knowledge that is important for the development of operational capabilities and promotes excellent performance of the company (Ferreira et al., 2021). The research hypothesis is as follows:

H9a: Organizational learning capability moderates the relationship between organizational competitiveness and sustainable performance.

### 2.6. Competitive Culture

Competitive culture (CC) is one of the strategic resources of the business, which refers to the behaviors of personnel that value operations which can improve business competitiveness (Fantazy & Tipu, 2019). CC includes values, beliefs, norms, and practices of personnel focused on creating excellent value of products to raise customer satisfaction (Arokodare et al., 2019). A company that values competitive culture gives importance to the development of necessary competitive skills of employees. Employees are encouraged to realize the importance of product development to stand out from competitors and perform their duties effectively (Tsou & Chen, 2022). CC is also a driver of excellent operational capability to achieve sustainable performance (Gopalakrishnan & Zhang, 2017). The research hypothesis is set as follows:

H9b: Competitive culture moderates the relationship between organizational competitiveness and sustainable performance.

## 3. Research Methodology and Data

### 3.1. Data Collection and Research Design

This study is quantitative research conducted on the population of 814 companies listed on the Stock Exchange of Thailand (Stock Exchange of Thailand, 2023). These companies are large firms that use internal and external business environment data to support strategic decision-making. The sample size was purposively selected to align with the research objectives and calculated based on the criteria of structural equation analysis, which requires at least 200 samples (Hair et al., 2010). Data were collected through a questionnaire sent via mail from May to July 2023. The key informants were the management of the accounting department. 200 questionnaires were returned, accounting for 24.57%, which is greater than the recommended response rate of 20% or above (Pielsticker & Hiebl, 2019).

### 3.2. Measurements

The questionnaires in this study included questions about the physical data of companies along with close-ended questions to measure variables in the hypotheses. The 5-point Likert scale was used, where 1 indicated the least agreement and 5 indicated the strongest agreement. The questionnaires were developed from previous studies, as shown in Table 1.

### 3.3. Data Analysis Techniques

The research employed structural equation modeling (SEM) with path analysis to examine the direct influence of strategic management accounting and business strategy, competitiveness, and sustainable performance. It also investigated the mediating role of business strategy and competitiveness. Moreover, hierarchical multiple regression analysis was used to test the moderating influences of organizational learning capability and competitive culture. To avoid multicollinearity between independent variables, the interaction variable between independent variables and moderating variables was calculated by mean centering variables. The following is the regression equation used to test moderating influence:

$$SP = a_1 + b_1OC + b_2CC + b_3OLC \quad (1)$$

$$SP = a_2 + b_4OC + b_5CC + b_6OLC + b_7OC * OLC + b_8OC * CC \quad (2)$$

**Table 1***Descriptive Statistics on the Factors Affecting Green Credit and the Green Economic Growth*

Variable	Item	Reference
Environmental scanning	4	YahiaMarzouk and Jin (2022a)
Technology intelligence	6	YahiaMarzouk and Jin (2022a)
Market intelligence	5	Hendar et al. (2020)
Forward-looking information	4	Phornlaphatrachakorn and Na-Kalasinhu (2020)
Business strategy	10	Ilmudeen and Bao (2020); Keskin et al. (2021)
Organizational competitiveness	6	YahiaMarzouk and Jin (2022a)
Competitive culture	5	Tsou and Chen (2022)
Organizational learning capability	5	Ferreira et al. (2021)
Sustainable performance	9	Ogunleye et al. (2021); Saqib and Zhang (2021)

### 3.4. Preliminary Analysis

The questionnaire was assessed for content validity by five experts. The index of item objective congruence (IOC) of the questionnaire ranged from 0.60 to 1.00, which is higher than the criterion of 0.50. This indicates that the questionnaire is consistent with the research objectives (Rovinelli & Hambleton, 1976). To ensure the reliability of the questionnaire, 30 pilot tests were conducted. The Cronbach's alpha coefficient values ranged from 0.921 to 0.981, which is higher than 0.70, indicating that the questionnaire is appropriate for collecting research data (Hair et al., 2019). Furthermore, an exploratory factor analysis was conducted to test the coherence of the questions to each observable variable using the principal component analysis and the Varimax rotation. The results showed that the observed variables for each component is consistent. The Kaiser-Meyer-Olkin index (KMO) values ranged from 0.805 to 0.919 (KMO > 0.5), the P-value of Bartlett's sphericity test was 0.000 (p-value < 0.05) (Gomes et al., 2022), and the factor loading values ranged from 0.538 to 0.907 (factor loading  $\geq$  0.5) (Hair et al., 2010). All of these results indicate that the questionnaire is suitable for collecting data and that the questions are appropriate to the contexts of companies in Thailand.

To avoid non-response bias, a t-test was conducted to test the hypothesis that there was no difference in the opinions between the fastest and the slowest responders (Armstrong & Overton, 1977). The results demonstrated that there are no sig-

nificant differences in responses between the two groups at a statistically significant level of .05 for all aspects, including the type of business (t-test = -1.630), year of operation (t-test = -1.739), and number of employees (t-test = 0.517).

## 4. Results and Discussion

The results of the company's physical data are demonstrated in Table 2, including type of business, year of operation, and number of employees.

Table 3 presents the results of descriptive statistical analysis, which includes mean, standard deviation, skewness value, and Kurtosis value. The mean scores of the variables ranged from 3.775 to 4.252, and the standard deviation was between 0.574 and 0.677. The Skewness values were within the acceptable range of -3 and +3, ranging from (0.623) to (0.222). Similarly, the Kurtosis values were between -10 and +10, ranging from (0.679) to 1.052. This suggested that the research data had a normal distribution (Kline, 2016; Yoshikuni & Albertin, 2018).

To verify that the measurement model is consistent with observable variables, a confirmatory factor analysis (CFA) was conducted. The CFA criteria included a relative Chi-square ( $X^2/df$ ) less than or equal to 3, comparative fit index (CFI) greater than or equal to 0.90, Tucker-Lewis index (TLI) greater than or equal to 0.90, root mean square residual (RMR) less than or equal to 0.05 (Hair et al., 2010), and root mean square error of approximation (RMSEA) less than or equal to 0.08 (Kline, 2016). Table

4 demonstrates that the  $X^2/df$  values range from 1.219 to 2.073, the CFI values range from 0.985 to 0.999, the TLI values range from 0.972 and 0.996, the RMR values range from 0.003 to 0.033, and the RMSEA values range from 0.033 to 0.073. The results indicate that the measurement model is consistent with observable variables.

In order to test the convergent validity, the researchers used the average variance extracted (AVE) and factor loading values higher than 0.50, while the composite reliability (CR) higher than 0.70 was used to test the reliability (Hair et al., 2010). Table 5 shows AVE values range between 0.542 and 0.706, factor loading values vary between 0.515 and 0.945, and CR values range between 0.867 and 0.92. The findings indicate that the observed variables used to measure each latent variable are consistent.

The results of validation analysis of the difference in latent variables are presented in Table 6. Discriminant validity was assessed by comparing the square root of AVE value and correlation coefficient. The findings revealed that the square root of AVE value ranged from 0.736 to 0.931, while the correlation coefficient values were 0.341 and 0.731. This implies that all variables have the square root of AVE values greater than their correlation coefficient values, indicating no multicollinearity error and the latency variables used in this research are distinct or not correlated (Hair et al., 2010).

Table 7 depicts the analysis results of the structural equation modeling by bootstrapping technique to investigate the direct influence and mediating roles. The findings illustrated that the model is consistent with empirical data, with  $X^2/df = 2.180$  ( $\leq 3$ ), CFI = 0.928 ( $\geq 0.90$ ), TLI = 0.914 ( $\geq 0.90$ ), RMR = 0.022 ( $< 0.05$ ); and RMSEA = 0.077 ( $< 0.08$ ) (Kline, 2016). According to structural equations modeling, environmental scanning does not influence business strategy, organizational competitiveness, and sustainable performance ( $\beta = -0.033$ ,  $\beta = -0.094$ ,  $\beta = 0.049$ , P-value  $> 0.05$ , respectively). Some previous studies suggested that monitoring the business environment would help businesses make effective strategic planning decisions and encourage high performance (Phornlaphatrachakorn & Na-Kalasindhu, 2020). However, it may not be clear how general environment tracking impacts

business operations in the economic system. In contrast, the findings of this study revealed that tracking business environment information with indirect influence (legal, political, economic, social, and cultural factors) does not contribute to the formulation of business strategy, internal operations, and resource management in an era of complex and rapidly changing business competition (YahiaMarzouk & Jin, 2022b). Monitoring the operational environment facilitates the analysis of business strengths, weaknesses, opportunities, and threats. This is the procedure before business strategy formulation and implementation (Dhyani, 2021). Therefore, the hypotheses 1a – 1c are not supported.

On the other hand, technology intelligence has a positive influence on business strategy ( $\beta = 0.201$ , P-value  $< 0.05$ ). Continuous monitoring of modern technological information enables the company management to accurately identify opportunities and assess operational obstacles. Technological know-how also provides executives with the information for developing business strategies (An et al., 2018). Therefore, hypothesis 2a is supported. Technology intelligence, however, does not influence organizational competitiveness ( $\beta = 0.037$ , P-value  $> 0.05$ ). Although some previous studies claimed that businesses with continuous monitoring of technology data can enhance their competitiveness, the results of this study showed different. Technological knowledge cannot directly promote competitiveness, as technology data is an insight that is used in the decision-making process for strategic planning, the procedure before enhancing operational capabilities (Manzini, 2013). Therefore, hypothesis 2b is not supported. Technology intelligence, however, has a positive influence on sustainable performance ( $\beta = 0.234$ , P-value  $< 0.05$ ). Specifically, technology intelligence includes monitoring of technology trends; thus, it helps the management understand the changing nature of technology, which reduces future risks and failures of the company. Furthermore, technology information tracking plays an important role in resource management efficiency and it affects the survival and sustainable performance of the company (Asikhia et al., 2019). Therefore, hypothesis 2c is supported. In addition, market

**Table 2**  
*Physical Data of Listed Companies on the Stock Exchange of Thailand*

Characteristics	Categories	Frequencies	Percentage
Type of business	Argo and food industry	15	7.5
	Resources	15	7.5
	Technology	19	9.5
	Financials	16	8.0
	Services	49	24.5
	Industrials	37	18.5
	Consumer products	15	7.5
	Property and construction	34	17.0
Years of operation	<10 years	8	4.0
	10-15 years	15	7.5
	16-20 years	35	17.5
	>20 years	142	71.0
Number of employees	<500 employees	107	53.5
	500-1,000 employees	45	2.5
	1001-1500 employees	19	9.5
	>1500 employees	29	14.5

Note. n = 200

**Table 3**  
*Descriptive Statistics*

Variable	Mean	Std. Deviation	Skewness	Kurtosis
ES	4.183	0.607	-0.232	-0.557
TI	4.122	0.584	-0.623	1.052
MI	4.105	0.638	-0.222	-0.679
FLI	4.252	0.578	-0.415	0.212
BS	4.058	0.639	-0.476	-0.139
OC	3.775	0.677	-0.283	-0.270
CC	4.251	0.574	-0.418	-0.255
OLC	4.029	0.643	-0.460	0.411
SP	3.946	0.640	-0.275	-0.010

Note. ES = Environmental scanning; TI = Technology intelligence; MI = Market intelligence; FLI = Forward-looking information; BS = Business strategy; OC = Organizational competitiveness; CC = Competitive culture; OLC = Organizational learning capability; SP = Sustainable performance

Table 4

Variable	X2/df	CFI	TLI	RMR	RMSEA
ES	1.755	0.996	0.991	0.021	0.062
TI	2.073	0.989	0.976	0.014	0.073
MI	1.219	0.999	0.996	0.008	0.033
FLI	1.291	0.999	0.996	0.020	0.038
BS	1.905	0.986	0.972	0.029	0.067
OC	1.298	0.997	0.993	0.013	0.039
CC	1.273	0.999	0.996	0.005	0.037
OLC	1.518	0.999	0.991	0.003	0.051
SP	1.994	0.985	0.974	0.033	0.071
Criteria	≤ 3	≥ 0.90	≥ 0.90	< 0.05	< 0.08

Table 5

*Convergent Validity and Reliability of the Constructs*

Construct	Coding	Loading	AVE	CR
Environment scanning	ES	0.749-0.878	0.706	0.905
Technology intelligence	TI	0.669-0.828	0.591	0.896
Market intelligence	MI	0.727-0.887	0.649	0.902
Forward-looking information	FLI	0.728-0.894	0.622	0.867
Business strategy	BS	0.605-0.879	0.550	0.923
Organization competitiveness	OC	0.515-0.885	0.542	0.874
Competitive culture	CC	0.754-0.875	0.618	0.890
Organizational learning capability	OLC	0.595-0.915	0.576	0.868
Sustainable performance	SP	0.611-0.945	0.703	0.876

intelligence positively influences business strategy and organizational competitiveness ( $\beta = 0.407$ , P-value < 0.001,  $\beta = 0.257$ , P-value < 0.05, respectively). Tracking marketing data about customers, competitors, and products allows the management to obtain data for business strategy formulation and gain competitive competitiveness over competitors (Hendar et al., 2020; Navarro-García et al., 2016). The hypotheses 3a and 3b, therefore, are supported. On the contrary, market intelligence does not impact sustainable performance ( $\beta = 0.095$ , P-value > 0.05). Although some studies (Stocker et al., 2021) claimed that market-savvy results in sustainable

performance of the business, the findings of this study come out in opposition. Tracking marketing data by collecting insights related to behaviors of marketing factors used for analyzing opportunities and threats in business strategy formulation does not directly affect the performance of the company in extremely competitive conditions (Phornlaphatrachakorn & Na-Kalasinth, 2020). Therefore, the hypothesis 3c is not supported.

Forward-looking information has a positive influence on business strategy ( $\beta = 0.313$ , P-value < 0.001). Tracking future operational data aims to evaluate opportunities and forecast future busi-

**Table 6**  
*Discriminant Validity and Correlation Matrix*

Variable	ES	TI	MI	FLI	BS	OC	CC	OLC	SP
ES	<b>0.840</b>								
TI	0.652	<b>0.769</b>							
MI	0.569	0.640	<b>0.806</b>						
FLI	0.543	0.559	0.669	<b>0.931</b>					
BS	0.478	0.589	0.694	0.640	<b>0.742</b>				
OC	0.341	0.442	0.577	0.495	0.672	<b>0.736</b>			
CC	0.412	0.446	0.440	0.480	0.573	0.471	<b>0.786</b>		
OLC	0.528	0.580	0.590	0.613	0.654	0.626	0.700	<b>0.759</b>	
SP	0.463	0.554	0.581	0.547	0.611	0.614	0.644	0.731	<b>0.838</b>

Note. The bold digit represents square root of AVE; the normal digit represents Pearson correlation.

**Table 7**  
*Assessment of Structural Model and Hypothesis Testing*

Hypothesis	Path analysis	Path coefficient	Results
H1a	ES → BS	-0.088	Not support
H1b	ES → OC	-0.094	Not support
H1c	ES → SP	0.049	Not support
H2a	TI → BS	0.201*	Support
H2b	TI → OC	0.037	Not support
H2c	TI → SP	0.234*	Support
H3a	MI → BS	0.407***	Support
H3b	MI → OC	0.257*	Support
H3c	MI → SP	0.095	Not support
H4a	FLI → BS	0.313***	Support
H4b	FLI → OC	0.039	Not support
H4c	FLI → SP	0.136	Not support
H5	BS → OC	0.482***	Support
H6a	ES → BS → OC	-0.043	Not support
H6b	TI → BS → OC	0.097*	Support
H6c	MI → BS → OC	0.196***	Support
H6d	FLI → BS → OC	0.151***	Support
H7	OC → SP	0.355***	Support
H8a	ES → OC → SP	-0.033	Not support
H8b	TI → OC → SP	0.013*	Support
H8c	MI → OC → SP	0.091*	Support
H8d	FLI → OC → SP	0.014	Not support

$X^2/df = 2.180$ , CFI = 0.928, TLI = 0.914, RMR = 0.022; RMSEA = 0.077

Note. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

ness situations. It is an important piece of information that the management uses for planning strategic operations to align with rapidly changing competitive business conditions (Menicucci, 2018). Therefore, the hypothesis 4a is supported. Forward-looking information, however, does not influence organizational competitiveness and sustainable performance ( $\beta = 0.039$ ,  $\beta = 0.136$ , P-value  $> 0.05$ , respectively). Although some previous studies (Waweru et al., 2016) mentioned that future data may help the management understand business nature and properly manage the organization, resulting in improved performance, the results of this study showed the opposite. Forward-looking information which is a collection of future forecast information about financial position, liquidity, and future performance can help executives and other users understand and predict future performance appropriately. However, this information does not directly affect operational efficiency and current operating results of the business. Anyhow, it can facilitate the strategic planning process in improving competitiveness and strengthening business performance in the future (Benameur et al., 2023; Bravo, 2016). Therefore, the hypotheses 4b and 4c are not supported.

In reference to the study, business strategy has a positive influence on organizational competitiveness ( $\beta = 0.482$ , P-value  $< 0.001$ ). Business strategy is an operational approach that the management formulated to make the company adapt to the business environment and strengthen business operational capabilities (Bansal & Bashir, 2023). In other words, developing appropriate business strategies stimulates competitiveness. Therefore, hypothesis 5 is supported. Likewise, business strategy is the result of employing strategic management accounting to guide strategic decisions, with the exception of environmental scanning. It can be concluded that business strategy does not play a mediating role in the relationship between environmental scanning and organizational competitiveness ( $\beta = 0.043$ , p-value  $> 0.05$ ). This maybe because tracking general business information does not directly relate to the decision-making on strategic operation planning to promote business competitiveness. Hypothesis 6a, therefore, is not supported. However, business

strategy does play a mediating role between strategic management accounting—in the aspects of technology intelligence, market intelligence, and forward-looking information—and organizational competitiveness ( $\beta = 0.097$ ,  $\beta = 0.196$ ,  $\beta = 0.151$  respectively, P-value  $< 0.05$ ). This indicated that developing a business strategy based on strategic management accounting information (in the aspects of technology intelligence, market intelligence, and forward-looking information) can enhance competitiveness of the company. Therefore, hypotheses 6b-6d are supported. Interestingly, the data used to formulate the current business strategy focuses on information directly related to business operations and can be analyzed in an in-depth business environment. This information enables the management to assess opportunities and obstacles of the operation clearly and develop business strategies that optimize operational efficiency in severe business competition conditions.

In addition, it has been found that organizational competitiveness has a positive influence on sustainable performance ( $\beta = 0.355$ , P-value  $< 0.001$ ). Competitiveness is the outcome of utilizing valuable resources to determine market position (Hossain et al., 2022). Accordingly, competitiveness is an important factor in enhancing sustainable performance. Therefore, hypothesis 7 is supported. Furthermore, it can be observed that organizational competitiveness plays a mediating role in the relationship between market intelligence and sustainable performance ( $\beta = 0.091$ , P-value  $< 0.05$ ). Marketing data refers to business information about competitors' operations and customer needs (Carson et al., 2020). This information enhances the operational capability of the company and affects excellent business performance. Consequently, the competitiveness of the company is an operational outcome resulting from the employment of market insights for effective management to achieve sustainable performance. Hypothesis 8c, therefore, is supported.

Organizational competitiveness, on the other hand, does not play a mediating role in the relationship between strategic management accounting—in the aspects of environmental scanning, technology intelligence, and forward-looking infor-

mation—and sustainable performance ( $\beta = -0.033$ ,  $\beta = 0.013$ ,  $\beta = 0.014$ ,  $P\text{-value} > 0.05$ , respectively). Competitiveness does not result from monitoring information on operational environment, technology trends, and business situations in the future. Although such information is useful for organizational management as a whole, it does not provide insight data into competitive trends in the market. In conclusion, environmental scanning, technology intelligence, and forward-looking information cannot promote operational capability that contributes to sustainable performance. Therefore, hypotheses 8a, 8b, and 8d are not supported.

Table 8 illustrates the results of hierarchical multiple regression analysis. It revealed that competitiveness (OC), competitive culture (CC), and organizational learning capability (OLC) influence sustainable performance ( $\beta = 0.244$ ,  $\beta = 0.407$ ,  $\beta = 0.245$ ,  $P\text{-value} < 0.001$ , respectively), with a decision coefficient (R2) of 0.605. Correspondingly,

the regression equation analysis of Model 2 showed that the interaction variables of competitiveness and organizational learning capability and the interaction variables of competitiveness and competitive culture correlated to sustainable performance ( $\beta = 0.171$ ,  $\beta = -0.159$ ,  $P\text{-value} < 0.05$ , respectively), with a decision coefficient (R2) of 0.616.

Furthermore, the results of the analysis of hierarchical regression equations revealed that the decision coefficient of Model 2 was higher than that of Model 1 ( $\Delta R^2 = 0.011$ ). This demonstrated that organizational learning capability and competitive culture have moderating influence on the relationship between competitiveness and sustainable performance. Organizational learning capability refers to the ability of the organization's personnel to manage knowledge that stimulates innovation creation. This is an important factor for improving business competitiveness and enhancing sustainable performance (Ferreira et al., 2021; Pham & Hoang, 2019).

**Table 8**  
*Result Hierarchical Multiple Regression Analysis and Hypothesis Testing*

Hypothesis	Dependent variable	Coefficient	t-value	Result
Model 1: $SP = a_1 + b_1OC + b_2CC + b_3OLC$				
	OC	0.244***	4.226	-
	OLC	0.407***	5.709	-
	CC	0.245***	3.881	-
	R <sup>2</sup>			
Model 2: $SP = a_2 + b_4OC + b_5CC + b_6OLC + b_7OC * CC + b_8OC * OLC$				
	OC	0.274***	4.632	-
	CC	0.185**	2.756	-
	OLC	0.456***	6.138	-
H9a	OC**OCL	0.171*	2.323	Supported
H9b	OC*CC	-0.159*	-2.166	Supported
	R <sup>2</sup>		0.616	
	$\Delta R^2$		0.011	

Note. \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

Likewise, competitive culture is the organization's value to make personnel realize the importance of operational innovation. Innovation drives competitiveness, resulting in excellent performance (Tsou & Chen, 2022). It confirmed that learning capability and competitive culture play moderating roles in enhancing competitiveness, and affect sustainable performance. Therefore, hypotheses 4a and 4b are supported.

According to the principles of Resource-Based Theory (RBT), business resources that are valuable, rare, imperfectly imitable, and irreplaceable contribute to sustainable competitive advantages (Barney, 1991). The research results indicated that strategic management accounting, organizational learning capability, and competitive culture are resources according to RBT due to their unique features. These resources arise from talents and skills of the personnel which are transferred and learned from work experience. Therefore, strategic management accounting, organizational learning capability, and competitive culture enhance business competitiveness and achieve sustainable operation of the company.

## 5. Conclusion

### 5.1. Summary of Results

Strategic management accounting information that is insightful and directly related to business operations in the aspect of technology intelligence, market intelligence, and forward-looking information correlates with business strategy formulation. It influences competitiveness and sustainable performance in economic, social, and environmental aspects. However, this relationship does not include environmental scanning, which collects general business data related to business operations as a whole.

Organizational learning capability and competitive culture are resources that can strengthen competitiveness and increase the economic, social, and environmental performances of the company. Therefore, businesses that adopt technology information, market information, and future business information to support decision-making can effectively plan their operations. Also, businesses that

give importance to learning ability of employees and competing values tend to possess competitiveness over competitors. Therefore, organizational learning capability and competitive culture have a positive impact on the sustainable performance of the company.

### 5.2. Theoretical Contribution

The findings of this study showed that strategic management accounting information in the aspects of technology intelligence, marketing intelligence, and forward-looking information supports decision-making in formulating business strategies, promotes effective organizational management, increases personnel's learning capability, and creates competitive culture of the company. In other words, technology intelligence, marketing intelligence, and forward-looking information are significant factors in strengthening business competitiveness and sustainable performance in economic, social, and environmental aspects. This is consistent with the Resource-Based Theory, which states that business resources that are valuable, rare, imperfectly imitable, and irreplaceable can raise competitive advantages and enhance excellent performance of the company (Barney, 1986). The results of this study can complement knowledge on the use of strategic management accounting information and business natures in favor of competitiveness and sustainable performance.

### 5.3. Managerial Contribution

Business environment information is very essential to strategic planning and operations. As mentioned earlier, strategic management accounting information involves gathering information on business environment, which includes the operational environment, technology, marketing, and long-term forecasting. This information contributes to decision-making on determining action, approach, and competitiveness building, including sustainable performance. Therefore, the company should seriously consider the design of model that can gather business environment information continuously and effectively. In addition, the company should develop personnel competencies to increase operational efficiency and achieve sustainable per-

formance economically, socially, and environmentally. Additionally, the company should promote competitive culture by encouraging employees to recognize the significance of learning capabilities. These factors are the cornerstone for achieving excellent performance and the ultimate goal of sustainable performance.

#### 5.4. Limitations and Recommendations for Future Studies

The limitation of this research is the small sample size due to the short data collection period. Consequently, this study employed a sample size that meets only the minimum response rate required for structural equation modeling analysis. The application of these research findings in the future may yield different results. Therefore, future research should gather data from a larger sample group to validate the findings of this study's model.

Furthermore, this research studied the concept of strategic management accounting in the context of listed companies on the Stock Exchange of Thailand. To confirm the results of the study, the research framework should be applied to comparative studies of companies in other countries with different economic systems. Additionally, future research may include a study about other aspects of strategic management accounting, such as environmental data tracking and advanced digital technology data tracking.

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## Appendix A

**Table 1**

*Measurement of All Variables*

<b>Environmental scanning (ES)</b>
ES1: The company searches the operating environment from a variety of sources, thus providing the company with complete information to make operational decisions.
S2: The company systematically collects information on the operating environment, thus providing the company with reliable information to make strategic decisions.
ES3: The company analyzes the operating environment, thus making it possible to properly identify opportunities and obstacles that affect the company's operations.
ES4: The company continuously uses the information on the operating environment to support strategic decisions, thus allowing the company to make appropriate strategic plans.
<b>Technology intelligence (TI)</b>
TI1: The company searches for technology that fits the nature of the operation, thus making the most of the use of technology in the company's operations.
TI2: The company collects technology information related to its operations from a variety of sources, thus allowing the company to choose the right technology information to make strategic decisions.
TI3: The company regularly analyzes technological changes that affect the operation of the enterprise, thus allowing the company to clearly identify the impact.
TI4: The company uses information derived from technology in its operations (e.g., Internet systems, artificial intelligence, or big data), thus enabling the company to make operational decisions quickly.
TI5: The company disseminates information about changes and the impact of technology to internal agencies, thus allowing each agency to plan the operation appropriately.
TI6: The company encourages learning and applying information derived from advanced technologies to support strategic decisions, thus allowing the company to plan its operations appropriately.
<b>Market intelligence (MI)</b>
MI1: The company searches for a variety of market information (e.g., customer needs, competitor strategies, or innovative products), thus the company has the information to make a proper strategic plan.
MI2: The company systematically collects marketing information, thus the company has complete information to make strategic decisions.
MI3: The company regularly analyzes market information using advanced techniques, thus making it possible to use the information to make strategic decisions quickly.
MI4: The company disseminates marketing information to internal agencies, thus allowing the company to use the information to formulate relevant operational plans appropriately.
MI5: The company encourages the use of market information to support strategic decisions, thus allowing the company to formulate proper operational plans.
<b>Forward-looking information (FLI)</b>
FLI1: The company believes that the presentation of future corporate information (e.g., operational plans or financial information) allows the company to plan its operations in line with the company's ultimate goals.
FLI2: The company focuses on presenting information for forecasting future operations, thus allowing the company to plan the operation appropriately.
FLI3: The company analyzes future data to identify opportunities and obstacles in the operation, thus allowing the company to plan the operation appropriately.

**Table 1***Measurement of All Variables (Continued)*

<b>Environmental scanning (ES)</b>
FLI4: The company encourages the use of information in the future, thus allowing the company to formulate proper operational planning and decisions.
<b>Business strategy (BS)</b>
BS1: The company focuses on using modern technology to produce products or provide services and make them stand out.
BS2: The company is committed to clearly differentiating its products or services compared to its competitors.
BS3: The company focuses on producing products or providing services with a quality advantage rather than a price advantage.
BS4: The company focuses on the development of new products or services for the market to continuously meet the needs of customers.
BS5: The company offers new products or services to the market quickly.
BS6: The company focuses on supplying large quantities of raw materials or operational goods to distribute the cost of supply or have the power of price negotiation.
BS7: The company focuses on the use of technology in production to increase the efficiency of production or service provision (such as producing more products in the same production time or providing faster services while still maintaining the quality of service).
BS8: The company has adopted advanced production technology to reduce the cost of products or services while maintaining the same quality of product or service or improving the quality.
BS9: The company constantly improves the production or service provision methods to be effective.
BS10: The company can provide the factors used to produce a product or provide a service at a reasonable price and quality.
<b>Organization competitiveness (OC)</b>
OC1: The company can set a price for its products or services lower than its competitors.
OC2: The company can produce durable products or provide distinctive or valuable services to customers compared to competitors.
OC3: The company can produce products or provide services to respond to customer needs better than the competition.
OC4: The company takes less time to deliver products or provide services to customers compared to competitors.
OC5: The company's freight processes are reliable and standardized compared to industry averages.
OC6: The company can quickly adjust the production of products or provision of services according to customer needs compared to competitors.
<b>Competitive culture (CC)</b>
CC1: The company focuses on developing the skills needed to build business competitiveness for its employees.
CC2: The company focuses on employees to realize the importance of operations that make them stand out and distinctive from competitors.
CC3: The company always emphasizes its employees to realize the importance of product or service quality improvement to be better than competitors.
CC4: The company is committed to encouraging employees to work for maximization of the company's effectiveness.
CC5: The company encourages employees to be active in their work to achieve its ultimate goals.
<b>Organizational learning capability (OLC)</b>
OLC1: The company encourages employees to learn new methods used to operate in a changing business environment.
OLC2: The cost of improving the knowledge and skills of employees is a significant cost of company development.

**Table 1***Measurement of All Variables (Continued)*

<b>Environmental scanning (ES)</b>
OLC3: The company can make employees learn and find ways to appropriately handle customer complaints or customer satisfaction with products or services.
OLC4: The company's employees accept criticism for their work and improve the operation to be effective.
OLC5: The company's employees readily embrace and adapt to changing business environment and new ideas.
<b>Sustainable performance (SP)</b>
SP1: The company's profit and market share have grown steadily from the past to the present.
SP2: The company achieves its business goals and can continue to expand its operations.
SP3: The company has achieved an outstanding return on investment and can continue to make a profit.
SP4: The company has a good image in managing the impact of the company's operations on the quality and safety of employees.
SP5: The company can effectively manage the risks and impacts of its operations on society or the community.
SP6: The company builds good relationships with society or the community by focusing on working with the community to reduce conflicts between operations and the way of life of local people.
SP7: The company can create benefits for stakeholders by listening and responding to the proposals of all groups of stakeholders.
SP8: The company creates innovations or designs work processes that can reduce the operational impact on the environment.
SP9: The company is certified or undergoes regular environmental audits from relevant authorities.