รายงานการวิจัยฉบับสมบูรณ์

ความคิดเห็นของบริษัทมหาชนในตลาดหลักทรัพย์แห่งประเทศไทยที่มีต่อเป้าหมายความยั่งยืน SDGs

Perspectives of Public Companies in Thailand towards SDGs

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FINAL REPORT

PERSPECTIVES OF PUBLIC COMPANIES IN THAILAND TOWARDS SDGS

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ชื่อโครงการ	ความคิดเห็นของบริษัทมหาชนในตลาดหลักทรัพย์แห่งประเทศไทยที่มีต่อเป้าหมายความยั่งยืน SDGs Perspectives of Public Companies in Thailand towards SDGs
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ABSTRACT

The UN 2030 Agenda for Sustainable Development encourages both public and private sectors to contribute in achieving the 17 Sustainable Development Goals (SDGs), which include 169 targets covering all social, economic, and environmental dimensions. Thai government incorporated SDGs as the key agenda to be addressed in its 12th National Economic and Social Development Plan and the 20-yr National Strategy. The government has to rely on private sector's contribution to achieve the national targets. In the past few years, the Stock Exchange of Thailand (SET) and some Thai listed companies have been very active in promoting sustainability practices; however, their understanding and contribution to the SDGs remain unclear. This study investigated their perspectives, policy, and planned actions towards SDGs using structural equation modelling technique. The results show that investor is the key driver for SDGs and can influence business strategies of companies towards achieving the SDGs. The findings can contribute to understanding current directions and conditions of Thai listed companies to integrate government sustainability policies in their business strategies.

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1. INTRODUCTION

The 2030 Agenda, generally known as the Sustainable Development Goals (SDGs), have been recognized since September 2015 by 193 countries ratified as global political agreement [1]. The SDGs consist of 17 goals and 169 targets that are expected to be the key tools to sustainably transform the world. These goals and targets will take critical actions in people, planet, prosperity, peace, and partnership [2]. The SDGs are the sharing duty of actions, called spur epistemic community networks of expertise, knowledge, and practice [3]. Multiple perspectives on SDGs are required responses from various actors such as businesses, cities, and civil society [4]. However, private sector is the most critical actors in achieving the SDGs in terms of economic, social, and environmental dimensions, which could help secure long term operation and success of business [5]. Private sector is the main source of job creation, economic growth and innovation, skills, and financial resources. For example, SDG 8: Decent Work and Economic Growth deems as the main role of private sector to promote productivity, technology innovation, and job creation, which lead to achieving others SDGs, such as End Poverty, Sustainable City, and Gender Equality. In contrast, private sector is also the main source of some negative impacts from its operations, which consume raw materials, water, and energy.

Thailand is an emerging economy that some large companies have contributed and promoted their strategies to achieve the SDGs. However, there are some barriers such as regulations, lack of information, lack of systematic public-private sector collaboration for responding to the SDGs [6]. Therefore, the Stock Exchange of Thailand (SET) have been working closely with listed companies to raise awareness about sustainability. In 2015, SET launched "Thailand Sustainability Investment"

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scheme as a guideline for investors to select to invest in sustainable companies. Recently, SET issued a new index, called "SETTHSI" index that lists companies with high performance on environmental, social and governance (ESG) perspectives. There is a need to raise awareness of SDGs among listed companies to achieve the target by 2030. However, their understanding and contribution to the SDGs remain unclear because there is a gap among those companies to perform sustainability practice and understanding for long term benefit of the SDGs. Therefore, this study aims to investigate perspectives of listed companies on the SDGs. The findings will help shed the light on responsiveness of knowledge, actions, and key drivers to achieve the SDGs.

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2. LISTED COMPANIES AND THE SDGS

1.1 Awareness of Listed Companies on SDGs

Sustainable Development (SD) was defined by the United Nations Brundtland commission as the development which meets the needs of the present without compromising the ability of future generations to meet their own needs [7]. Many studies have structured SD into three dimensions, namely the economy, society, and environment [8]. The concept of SD has been the benchmark to measure sustainability performances. In the environmental dimension, SD is the safeguarding of using natural resources effectively by transforming to systems of sustainable consumption and production, so called circular economy [9]. Environmental goals and business strategies usually are related and linked together to achieve business missions [10]. The social dimension of SD is a complex action that involves with human activities related to stakeholder's engagement such as employees, suppliers, customers, investors, and communities [11]. The economic dimension of SD is the source of economic growth and welfare for everyone that reduces poverty and unemployment, while maintaining corporate responsibility [12]. Thus, raising environmental, social, and economic awareness will abide to the SDGs performance of company.

The SDGs have been integrated in national and business strategies of many nations. However, there are still some challenges of understanding and implementation because this concept is relatively new to benchmark and measure. Based on the 2018 survey of Global Compact Network Canada, there is a gap between awareness, implementation, and accountability that only 13% of the respondents were highly engaged with SDGs [13]. Similarly, there is generally low awareness of SDGs among government and private sectors in Australia [14]. Companies are likely to contribute

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less to SDGs if the process is not mediated by the government [15]. The basic awareness of SDGs will encourage listed companies to set up their strategies in responding to the SDGs. For example, managers' environmental awareness is leading to better environmental practices [16].

1.2 Strategy of Listed Companies on SDGs

Stock exchanges are the accelerator of achieving SDGs through giving incentive and establishing sustainability indices and policy instruments of listed companies to raise awareness, participation, and commitment [17]. Sustainable financing has integrated SDGs into consideration. Based on the survey of World Federation of Exchanges (WFE) in 2018, public companies have been actively addressing the SDGs and incorporating sustainability into their business activities [18]. Stock exchanges have encouraged and required listed companies to deal with climate change through creating and promoting financial for green growth, providing climate-related disclosure initiative, and supporting national policies in low-carbon investment. They operate in cleaner production to reduce waste, emissions, and noise [19].

Similarly, social issues also affect companies' operation such as Goal 3: Good Health and Well-being, which encourages operation in safe manner abide by minimum working standard. Transparency and anti-corruption are required for corporate governance policy in SET that is in line with Target 16.5 of Goal 16 for substantially reduce corruption and bribery in all forms. Thus, in the new trend of business investment, companies should take concept of environmental, social, and economic sustainable development as part of their business strategies.

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1.3 Key Drivers of Listed Companies on SDGs

1.3.1 Supplier

Through supply chain management, suppliers have important influence to improve social and environmental compliances. Many companies especially in developed countries are under pressure of NGOs and social activists over its sustainable performance which pertinent based on their suppliers. For example Nike has responded to the pressure of International Labor Organization (ILO) to improve working condition by strengthening strategies with key suppliers [20]. Furthermore, the world's most popular companies (PepsiCo, Unilever, and Nestle) were accused of illegal logging rainforest in Indonesia by its palm oil production sourcing [21].

1.3.2 Consumer

Consumers or buyers are also the key driver to achieve SDG targets. While consumers put price and quality as priority, sustainability is also particularly considered. Based on survey of Unilever, 33 per cent of consumers choose to buy products by considering factors related to sustainability [22]. Similarly, the Nielsen Global survey of corporate social responsibility and sustainability showed that 66 per cent of global respondents are willing to pay more for products and services that come from companies' commitment to positive social and environmental impacts [23]. When consumers are aware of the environmental impacts of their consumption patterns, demand for eco-friendly products will increase, which would demand companies to deliver their products and services in sustainable way [24]. This relationship contributes to SDG12: Responsible Consumption and Production, which

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businesses design and adopt a responsible, circular economy model, and reduce negative impacts to the environment.

1.3.3 Investor

Many studies have proven that companies' sustainability activities are linked to investment decision [25]. Investors have the major role in transforming the concept of investing by integrating social and environmental dimensions [26]. Typical investor's goal is to gain high return with, if possible, low risks from their investment. This is related to companies' social and environmental performance or image [27]. Thus, sustainability performance is a factor for investors to make investment decision.

1.4 Research Framework

This study proposes some hypotheses to investigate the effects of SDGs to listed companies to test research objectives as presented in Figure 1:

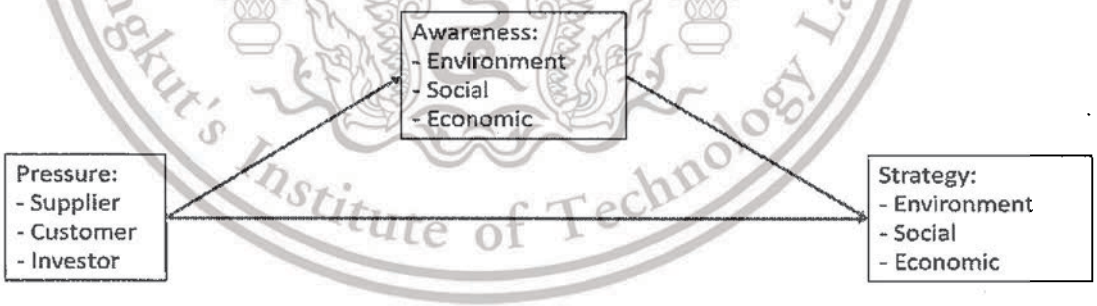

Figure 1. Research framework.

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3. RESEARCH METHOD

3.1 Sample and Data Collection

Sample population of this study are Thai listed companies in the SET 2018, which include a total of 758 entities. This study excludes listed 46 funds and 18 trust investments because they are passive open-ended mutual funds and do not participate in corporate decision-makings. Moreover, there are 27 listed companies that will be delisted due to policies for their financial performance and legal issues.

Thus, this study aims to examine a total sample of 657 listed companies. Those companies were mailed the survey invitation letter by post services and email through companies' contact information. They were requested to scan QR code in order to access survey in Google Form. Throughout the data collection period of 3 weeks, there were a total 66 respondents from 657 companies, who responded to the survey. According to Roscoe's rule of thumb, the sample size larger than 30 and less than 500 is appropriate for most studies [28-30]. The detailed online surveys often exhibit lower response rates of around 10–25% [31]. Thus, it is an acceptable sample size of around 10% in this study.

3.2 Questionnaire Design

This questionnaire consist of three parts. Part 1 is about demographic informnation of respondents as Table 1. In this part, the questions are about gender, position, work experience, industry sector, and type of SET that companies are listed in. The responses were collected using multiple choice questions. Part 2 is about awareness of environment, social, and economic sustainability. Part 3 is about action and strategy of listed companies for sustainability practices and pressure of suppliers, customers, and

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investors. Part 2 and Part 3 were measured on a five point "5-Likert Scale" from 5 (strongly agree) to 1 (strongly disagree). There were 60 pool questions, designed to ask about awareness, action, and pressure of suppliers, customers, and investors in environmental, social and economic aspects.

Table 1. Demographic information.

Demographic information	Number	Percentage	Demographic condition	Number	Percentage
Gender:			**Industry type:**		
Male	27	41.10	Agro & Food Industry	7	10.61
Female	39	59.09	Consumer Products	3	4.55
Position:			Financials	8	12.12
Top management	5	7.58	Industrials	6	9.09
Middle Management	36	54.55	Property & Construction	11	16.67
Low management	25	37.87	Resources	13	19.70
Type of listed:			Services	10	15.15
SET	33	50.00	Technology	8	12.12
SET50	12	18.18	**Work Experience:**		
SET100	5	7.58	<5 years	34	51.52
SETTHSI	7	10.61	5-10 years	17	25.76
MAI	9	13.64	>10 years	15	22.73

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4. RESULTS AND DISCUSSIONS

4.1 Model Fit of Constructed Variables

Exploratory Factor Analysis (EFA) was conducted to load the main factors for each scaled questions into variables, using Maximum-Likelihood (ML) method for exaction and rotation by Promax with Kaiser Normalization. After EFA, 60 pool questions were reduced to 25 questions covering 7 variables. The tested variables are awareness, supplier pressure, customer pressure, investor pressure, social strategy, environmental strategy, and economic strategy. The questions satisfied validity and reliability pretested as presented in Table 2. Preliminary analysis was examined to ensure suitability for conducting factor analysis, using the Kaiser–Mayer–Olkin (KMO) test and Bartlett's test of sphericity. The results of KMO was 0.733, which is greater than the minimum threshold of 0.5 and Bartlett's test was significant (Approx.chi-square = 1464.958; df=300) [32]. These tests indicated that variables for factor analysis were suitable.

This study also examined the Confimation Factor Analysis (CFA) to confirm the factor structure after extracting in the EFA. The results showed that the propose framework was valid. According to Joseph, Hair [32], the model fit of this study was acceptable (Chi-square = 337.3 (df = 253), CFI= 0.95. PColse = 0.052. However, RMSEA = 0.072 is greater than the threshold of 0.06. This is due to a small sample size. These variables were examined for covariance validity. The results showed that there was no covariance validity concern as Average Variance Extracted (AVE) are all greater than 0.500 as presented in Table 3. In summary, this model demonstrated adequacy, reliability, convergent validity, and discriminant validity.

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Table 2. Factor analysis of variables.

Variables	Scale Item	abbr.	Factor	Cronbach's α
Awareness	Improving employee's chances for long and healthy life contribute to sustainable development.	AWSo1	.750	0.826
	A culture where conflicts are resolved peacefully through discussion is necessary for sustainable development	AWS02	.863	
	Sustainable development requires that company acts responsibly.	AWEco1	.756	
	Reducing our environmental impact can have significant cost benefits.	AWEn8	.644	
	Improving environmental performance usually improves production efficiency.	AWEn9	.629	
Supplier Pressure (SupPres)	My suppliers' sustainability concerns have impacted on my company.	PSu1	.919	0.971
	My suppliers consider environmental, social, and economic issues to be very important.	PSu2	.982	
	My company has evaluated suppliers' responsible production processes.	PSu3	.959	
	My company has offered guidance for suppliers' eco-friendly production processes.	PSu4	.928	
Customer Pressure (CusPres)	Environmental, social, and economic issues critically affect the buying decisions of my customers.	PCu1	.865	0.954
	My customers often mention environmental, social, and economic factors when making choices.	PCu2	.959	

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Variables	Scale Item	abbr.	Factor	Cronbach's α
	My customers have a guideline for sustainable production that my company has to follow	PCu3	.893	
	My customers only purchase from suppliers that comply with environmental standards.	PCu4	.953	
Investor Pressure (InvPres)	My investors tend to invest when my sustainability performance is good.	PIn1	.765	0.886
	Investor causes my company consider on environmental, social, and economic issues.	PIn2	.951	
	My investors consider risks associated with sustainability performance when making an investment decision.	PIn4	.796	
Social Strategy (SoAct)	Strategy for giving employee the opportunity to acquire the knowledge, values, and skills that are necessary to live sustainably.	ACSo1	.814	0.929
	Strategy to respect the diversity and differences of employees.	ACSo3	.989	
	Strategy to improve living conditions of employees and community.	ACSo5	.821	
Environmental Strategy (EnvAct)	It is important to take measures against problems which have to do with climate change	ACEn3	.746	0.890
	Strategy to design environmentally friendly products/ services.	ACEn5	.760	
	Strategy to check and prevent pollution ecosystem.	ACEn6	.971	
Economical Strategy	Your company has a responsibility to reduce unnecessary packaging materials.	ACEco1	.696	0.859

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Variables	Scale Item	abbr.	Factor	Cronbach's α
(EcoAct)	Strategy to ensure sustainable economic development in area of operation.	ACEco2	.842	
	Strategy to source from local suppliers in order to provide economic benefit to community.	ACEco3	.809	

Note:

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

abbr. means abbreviation

Table 3. Correlation matrix.

	CR	AVE	EnvAct	Awareness	SupPres	CusPres	InvPres	SoAct	EcoAct
EnvAct	0.890	0.731	0.855						
Awareness	0.826	0.502	0.406	0.708					
SupPres	0.971	0.894	0.062	0.044	0.946				
CusPres	0.954	0.838	0.026	0.105	-0.248	0.915			
InvPres	0.886	0.722	0.580	0.446	0.095	0.026	0.850		
SoAct	0.929	0.815	0.605	0.555	0.048	0.160	0.591	0.903	
EcoAct	0.859	0.679	0.123	0.095	0.088	0.184	0.282	0.222	0.824

Note:

CR: Construct Reality

AVE: Average Variance Extracted is greater than 0.500, there is no validity concern.

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4.2 The Structural Model

4.2.1 Direct Effects

This effect examined the relationship between variables shown in Table 4. Investor pressure is significantly related to company's awareness at p-value less than 0.001. Similarly, investor pressure is also positively and significantly related to social, environmental, and economic strategies which environmental and social strategies have p-value less than 0.001. Economic strategies have p-value of 0.044. The direct effect of awareness to environmental and social strategies have p-value less than 0.001. These relationships support hypothesis of the research framework. The statistical results suggest that the investors concern about the companies' environmental, social and economic performance along with associated risks with sustainability issues when making investment decision. They are influenced by sustainability practices of listed companies, which are in line with the findings of Clark et al [33] for low carbon economy and findings of McLachlan and Gardner [34] for Austrialian investment context. The results stress on the fact that listed companies are pressured to improve that sustainability performance due to investor's preference towards well-performed sustainability.

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Table 4 Results of direct effects

Path coefficient	Estimated Coefficient	Standard Error
Supplier Pressure → Awareness	0.018	0.090
Customer Pressure → Awareness	0.068	0.087
Investor Pressure → Awareness	0.473***	0.122
Awareness → Social Action	0.703***	0.148
Awareness → Environmental Action	0.594***	0.168
Awareness → Economic Action	0.103	0.084
Supplier Pressure → Social Action	0.013	0.076
Supplier Pressure → Environmental Action	0.004	0.092
Supplier Pressure → Economic Action	0.048	0.050
Customer Pressure → Social Action	0.087	0.074
Customer Pressure → Environmental Action	0.001	0.090
Customer Pressure → Economic Action	0.085	0.051
Investor Pressure → Social Action	0.451***	0.126
Investor Pressure → Environmental Action	0.561***	0.158
Investor Pressure → Economic Action	0.164**	0.082

*, **, and *** are significance level at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively.

4.2.2 Indirect Effects

Indirect effects test how each moderating variable strengthen or weaken the effects of independent and dependent variables [16]. This study examined the impacts of suppliers, customers, and investors pressure on business strategies by mediating of awareness. The results of indirect effect are shown in Table 5. Investors affect environmental and social strategies indirectly through sustainability awareness at 95% confident level which means that awareness has linked relationship between investor pressure and environmental and social strategies

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Table 5. Results of indirect effects.

Path coefficient	Estimated Coefficient	Standard Error
Supplier Pressure → Awareness → Social Action	0.014	0.062
Supplier Pressure → Awareness → Environmental Action	0.012	0.051
Supplier Pressure → Awareness → Economic Action	0.002	0.015
Customer Pressure → Awareness → Social Action	0.047	0.063
Customer Pressure → Awareness → Environmental Action	0.040	0.053
Customer Pressure → Awareness → Economic Action	0.007	0.017
Investor Pressure → Awareness → Social Action	0.332*	0.178
Investor Pressure → Awareness → Environmental Action	0.281*	0.151
Investor Pressure → Awareness → Economic Action	0.049	0.070

*, **, and *** are significance level at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively.

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5. CONCLUSIONS

This study aims to examine perspectives of listed companies on the SDGs by testing their sustainability awareness and gather information regarding sustainability strategies. The results generated from the structural model indicate that the respondents believe that investors' investment decisions have strong relationship with companie's perceived awareness and sustainability strategies. Moreover, listed companies' sustainability awareness helps moderating relationship between investors and sustainability strategies and performances. The convergent and discriminant validity test of model confirmed that data fit well to develop model from global test (model fit) to local test (p-value). Therefore, it can be concluded that listed companies should increase sustainability key performance indicators for setting and reporting SDGs. They should also come up with appropriate and sound sustainability strategies to attract more investors. This study focuses on perspectives on the listed companies side. Another study on investors' perspectives is recommended. The results should be analyzed in conjunction with the results of this study.

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ข้อมูลประวัติหัวหน้าโครงการ

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- KMITL International College Grant (2017), research project entitled "Relationship between Sustainability and Stock Performance of Listed Companies in Thailand"

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- KMITL International College Grant (2014), research project entitled "Green Campus: a concept of sustainability for higher educational institutions in Thailand – A comparative case study on Green- and Non-Green-Campus universities in Thailand"
- KMITL International College Grant (2012), research project entitled "Reverse Vending Machine for Municipal Waste Management in Thailand"
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CONFERENCE PROCEEDINGS

Arnoma Grand Hotel, Bangkok, Thailand
Hosted by The Waste Incineration Research Center
Department of Mechanical and Aerospace Engineering
Faculty of Engineering
King Mongkut's University of Technology North Bangkok
Bangkok, Thailand

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	Nida Tuna
ICIPEC-0080	OPTIMIZATION AND INVESTIGATION OF A FREE-PISTON STIRLING ENGINE BASED ON POWER AND FREQUENCY USING GENETIC ALGORITHM
	Pongnarin Savangvong, Banterng Silpsakoolsook, Sutapat Kwankaomeng
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	Ram Kumar, Scott W. Campbell, Jeffrey A. Cunningham
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ICIPEC-0072

Perspectives of Thai Listed Companies on the United Nations' Sustainable Development Goals

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Abstract. The UN 2030 Agenda for Sustainable Development encourages both public and private sectors to contribute in achieving the 17 Sustainable Development Goals (SDGs), which include 169 targets covering all social, economic, and environmental dimensions. Thai government incorporated SDGs as the key agenda to be addressed in its 12th National Economic and Social Development Plan and the 20-yr National Strategy. The government has to rely on private sector's contribution to achieve the national targets. In the past few years, the Stock Exchange of Thailand (SET) and some Thai listed companies have been very active in promoting sustainability practices; however, their understanding and contribution to the SDGs remain unclear. This study investigated their perspectives, policy, and planned actions towards SDGs using structural equation modelling technique. The results show that investor is the key driver for SDGs and can influence business strategies of companies towards achieving the SDGs. The findings can contribute to understanding current directions and conditions of Thai listed companies to integrate government sustainability policies in their business strategies.

1. Introduction

The 2030 Agenda, generally known as the Sustainable Development Goals (SDGs), have been recognized since September 2015 by 193 countries ratified as global political agreement [1]. The SDGs consist of 17 goals and 169 targets that are expected to be the key tools to sustainably transform the world. These goals and targets will take critical actions in people, planet, prosperity, peace, and partnership [2]. The SDGs are the sharing duty of actions, called spur epistemic community networks of expertise, knowledge, and practice [3]. Multiple perspectives on SDGs are required responses from various actors such as businesses, cities, and civil society [4]. However, private sector is the most critical actors in achieving the SDGs in terms of economic, social, and environmental dimensions, which could help secure long term operation and success of business [5]. Private sector is the main source of job creation, economic growth and innovation, skills, and financial resources. For example, SDG 8: Decent Work and Economic Growth deems as the main role of private sector to promote productivity, technology innovation, and job creation, which lead to achieving others SDGs, such as End Poverty, Sustainable City, and Gender Equality. In contrast, private sector is also the main source of some negative impacts from its operations, which consume raw materials, water, and energy.

Thailand is an emerging economy that some large companies have contributed and promoted their strategies to achieve the SDGs. However, there are some barriers such as regulations, lack of information, lack of systematic public-private sector collaboration for responding to the SDGs [6].

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information, lack of systematic public-private sector collaboration for responding to the SDGs [6]. Therefore, the Stock Exchange of Thailand (SET) have been working closely with listed companies to raise awareness about sustainability. In 2015, SET launched "Thailand Sustainability Investment" scheme as a guideline for investors to select to invest in sustainable companies. Recently, SET issued a new index, called "SETTHSI" index, that lists companies with high performance on environmental, social and governance (ESG) perspectives. There is a need to raise awareness of SDGs among listed companies to achieve the target by 2030. However, their understanding and contribution to the SDGs remain unclear because there is a gap among those companies to perform sustainability practice and understanding for long term benefit of the SDGs. Therefore, this study aims to investigate perspectives of listed companies on the SDGs. The findings will help shed the light on responsiveness of knowledge, actions, and key drivers to achieve the SDGs.

2. Listed Companies and the SDGs

2.1. *Awareness of listed companies on SDGs*

Sustainable Development (SD) was defined by the United Nations Brundtland commission as the development which meets the needs of the present without compromising the ability of future generations to meet their own needs [7]. Many studies have structured SD into three dimensions, namely the economy, society, and environment [8]. The concept of SD has been the benchmark to measure sustainability performances. In the environmental dimension, SD is the safeguarding of using natural resources effectively by transforming to systems of sustainable consumption and production, so called circular economy [9]. Environmental goals and business strategies usually are related and linked together to achieve business missions [10]. The social dimension of SD is a complex action that involves with human activities related to stakeholder's engagement such as employees, suppliers, customers, investors, and communities [11]. The economic dimension of SD is the source of economic growth and welfare for everyone that reduces poverty and unemployment, while maintaining corporate responsibility [12]. Thus, raising environmental, social, and economic awareness will abide to the SDGs performance of company.

The SDGs have been integrated in national and business strategies of many nations. However, there are still some challenges of understanding and implementation because this concept is relatively new to benchmark and measure. Based on the 2018 survey of Global Compact Network Canada, there is a gap between awareness, implementation, and accountability that only 13% of the respondents were highly engaged with SDGs [13]. Similarly, there is generally low awareness of SDGs among government and private sectors in Australia [14]. Companies are likely to contribute less to SDGs if the process is not mediated by the government [15]. The basic awareness of SDGs will encourage listed companies to set up their strategies in responding to the SDGs. For example, managers' environmental awareness is leading to better environmental practices [16].

2.2. *Strategy of listed companies on SDGs*

Stock exchanges are the accelerator of achieving SDGs through giving incentive and establishing sustainability indices and policy instruments of listed companies to raise awareness, participation, and commitment [17]. Sustainable financing has integrated SDGs into consideration. Based on the survey of World Federation of Exchanges (WFE) in 2018, public companies have been actively addressing the SDGs and incorporating sustainability into their business activities [18]. Stock exchanges have encouraged and required listed companies to deal with climate change through creating and promoting financial for green growth, providing climate-related disclosure initiative, and supporting national policies in low-carbon investment. They operate in cleaner production to reduce waste, emissions, and noise [19]. Similarly, social issues also affect companies' operation such as Goal 3: Good Health and Well-being, which encourages operation in safe manner abide by minimum working standard. Transparency and anti-corruption are required for corporate governance policy in SET that is in line with Target 16.5 of Goal 16 for substantially reduce corruption and bribery in all forms. Thus, in the

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new trend of business investment, companies should take concept of environmental, social, and economic sustainable development as part of their business strategies.

2.3. *Key drivers of listed companies on SDGs*

2.3.1. Supplier. Through supply chain management, suppliers have important influence to improve social and environmental compliances. Many companies especially in developed countries are under pressure of NGOs and social activists over its sustainable performance which pertinent based on their suppliers. For example Nike has responded to the pressure of International Labor Organization (ILO) to improve working condition by strengthening strategies with key suppliers [20]. Furthermore, the world's most popular companies (PepsiCo, Unilever, and Nestle) were accused of illegal logging rainforest in Indonesia by its palm oil production sourcing [21].

2.3.2. Consumer. Consumers or buyers are also the key driver to achieve SDG targets. While consumers put price and quality as priority, sustainability is also particularly considered. Based on survey of Unilever, 33 per cent of consumers choose to buy products by considering factors related to sustainability [22]. Similarly, the Nielsen Global survey of corporate social responsibility and sustainability showed that 66 per cent of global respondents are willing to pay more for products and services that come from companies' commitment to positive social and environmental impacts [23]. When consumers are aware of the environmental impacts of their consumption patterns, demand for eco-friendly products will increase, which would demand companies to deliver their products and services in sustainable way [24]. This relationship contributes to SDG12: Responsible Consumption and Production, which businesses design and adopt a responsible, circular economy model, and reduce negative impacts to the environment.

2.3.3. Investor. Many studies have proven that companies' sustainability activities are linked to investment decision [25]. Investors have the major role in transforming the concept of investing by integrating social and environmental dimensions [26]. Typical investor's goal is to gain high return with, if possible, low risks from their investment. This is related to companies' social and environmental performance or image [27]. Thus, sustainability performance is a factor for investors to make investment decision.

2.4. *Research framework*

This study proposes some hypotheses to investigate the effects of SDGs to listed companies to test research objectives as presented in Figure 1:

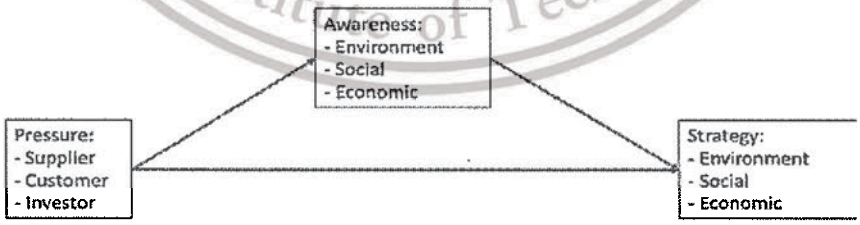

Figure 1. Research framework.

3. Research Method

3.1. Sample and data collection

Sample population of this study are Thai listed companies in the SET 2018, which include a total of 758 entities. This study excludes listed 46 funds and 18 trust investments because they are passive

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open-ended mutual funds and do not participate in corporate decision-makings. Moreover, there are 27 listed companies that will be delisted due to policies for their financial performance and legal issues. Thus, this study aims to examine a total sample of 657 listed companies. Those companies were mailed the survey invitation letter by post services and email through companies' contact information. They were requested to scan QR code in order to access survey in Google Form. Throughout the data collection period of 3 weeks, there were a total 66 respondents from 657 companies, who responded to the survey. According to Roscoe's rule of thumb, the sample size larger than 30 and less than 500 is appropriate for most studies [28-30]. The detailed online surveys often exhibit lower response rates of around 10–25% [31]. Thus, it is an acceptable sample size of around 10% in this study.

3.2. Questionnaire design

This questionnaire consist of three parts. Part 1 is about demographic informnation of respondents as Table 1. In this part, the questions are about gender, position, work experience, industry sector, and type of SET that companies are listed in. The responses were collected using multiple choice questions. Part 2 is about awareness of environment, social, and economic sustainability. Part 3 is about action and strategy of listed companies for sustainability practices and pressure of suppliers, customers, and investors. Part 2 and Part 3 were measured on a five point "5-Likert Scale" from 5 (strongly agree) to 1 (strongly disagree). There were 60 pool questions, designed to ask about awareness, action, and pressure of suppliers, customers, and investors in environmental, social and economic aspects.

Table 1. Demographic information.

Demographic information	Number	Percentage	Demographic condition	Number	Percentage
Gender:			**Industry type:**		
Male	27	41.10	Agro & Food Industry	7	10.61
Female	39	59.09	Consumer Products	3	4.55
Position:			Financials	8	12.12
Top management	5	7.58	Industrials	6	9.09
Middle Management	36	54.55	Property & Construction	11	16.67
Low management	25	37.87	Resources	13	19.70
Type of listed:			Services	10	15.15
SET	33	50.00	Technology	8	12.12
SET50	12	18.18	**Work Experience:**		
SET100	5	7.58	<5 years	34	51.52
SETTHSI	7	10.61	5-10 years	17	25.76
MAI	9	13.64	>10 years	15	22.73

4. Results and Discussion

4.1. Model fit of constructed variables

Exploratory Factor Analysis (EFA) was conducted to load the main factors for each scaled questions into variables, using Maximum-Likelihood (ML) method for exaction and rotation by Promax with Kaiser Normalization. After EFA, 60 pool questions were reduced to 25 questions covering 7 variables. The tested variables are awareness, supplier pressure, customer pressure, investor pressure, social strategy, environmental strategy, and economic strategy. The questions satisfied validity and reliability pretested as presented in Table 2. Preliminary analysis was examined to ensure suitability

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for conducting factor analysis, using the Kaiser–Mayer–Olkin (KMO) test and Bartlett's test of sphericity. The results of KMO was 0.733, which is greater than the minimum threshold of 0.5 and Bartlett's test was significant (Approx.chi-square = 1464.958; df=300) [32]. These tests indicated that variables for factor analysis were suitable.

This study also examined the Confimation Factor Analysis (CFA) to confirm the factor structure after extracting in the EFA. The results showed that the propose framework was valid. According to Joseph, Hair [32], the model fit of this study was acceptable (Chi-square = 337.3 (df = 253), CFI= 0.95. PColse = 0.052. However, RMSEA = 0.072 is greater than the threshold of 0.06. This is due to a small sample size. These variables were examined for covariance validity. The results showed that there was no covariance validity concern as Average Variance Extracted (AVE) are all greater than 0.500 as presented in Table 3. In summary, this model demonstrated adequacy, reliability, convergent validity, and discriminant validity.

Table 2. Factor analysis of variables.

Variables	Scale Item	abbr.	Factor	Cronbach's α
Awareness	Improving employee's chances for long and healthy life contribute to sustainable development.	AWSo1	.750	0.826
	A culture where conflicts are resolved peacefully through discussion is necessary for sustainable development	AWS02	.863	
	Sustainable development requires that company acts responsibly.	AWEco1	.756	
	Reducing our environmental impact can have significant cost benefits.	AWEn8	.644	
	Improving environmental performance usually improves production efficiency.	AWEn9	.629	
Supplier Pressure (SupPres)	My suppliers' sustainability concerns have impacted on my company.	PSu1	.919	0.971
	My suppliers consider environmental, social, and economic issues to be very important.	PSu2	.982	
	My company has evaluated suppliers' responsible production processes.	PSu3	.959	
	My company has offered guidance for suppliers' eco-friendly production processes.	PSu4	.928	
Customer Pressure (CusPres)	Environmental, social, and economic issues critically affect the buying decisions of my customers.	PCu1	.865	0.954
	My customers often mention environmental, social, and economic factors when making choices.	PCu2	.959	
	My customers have a guideline for sustainable production that my company has to follow	PCu3	.893	
	My customers only purchase from suppliers that comply with environmental standards.	PCu4	.953	
Investor Pressure (InvPres)	My investors tend to invest when my sustainability performance is good.	PIn1	.765	0.886
	Investor causes my company consider on environmental, social, and economic issues.	PIn2	.951	
	My investors consider risks associated with sustainability performance when making an investment decision.	PIn4	.796	
Social Strategy (SoAct)	Strategy for giving employee the opportunity to acquire the knowledge, values, and skills that are necessary to live sustainably.	ACSo1	.814	0.929
	Strategy to respect the diversity and differences of	ACSo3	.989	

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	employees.			
	Strategy to improve living conditions of employees and community.	ACSo5	.821	
Environmental Strategy (EnvAct)	It is important to take measures against problems which have to do with climate change	ACEn3	.746	0.890
	Strategy to design environmentally friendly products/ services.	ACEn5	.760	
	Strategy to check and prevent pollution ecosystem.	ACEn6	.971	
Economical Strategy (EcoAct)	Your company has a responsibility to reduce unnecessary packaging materials.	ACEco1	.696	0.859
	Strategy to ensure sustainable economic development in area of operation.	ACEco2	.842	
	Strategy to source from local suppliers in order to provide economic benefit to community.	ACEco3	.809	

Note:
Extraction Method: Maximum Likelihood.
Rotation Method: Promax with Kaiser Normalization.
abbr. means abbreviation

Table 3. Correlation matrix.

	CR	AVE	EnvAct	Awareness	SupPres	CusPres	InvPres	SoAct	EcoAct
EnvAct	0.890	0.731	0.855						
Awareness	0.826	0.502	0.406	0.708					
SupPres	0.971	0.894	0.062	0.044	0.946				
CusPres	0.954	0.838	0.026	0.105	-0.248	0.915			
InvPres	0.886	0.722	0.580	0.446	0.095	0.026	0.850		
SoAct	0.929	0.815	0.605	0.555	0.048	0.160	0.591	0.903	
EcoAct	0.859	0.679	0.123	0.095	0.088	0.184	0.282	0.222	0.824

Note:
CR: Construct Reality
AVE: Average Variance Extracted is greater than 0.500, there is no validity concern.

4.2. The structural model

4.2.1 Direct effects: This effect examined the relationship between variables shown in Table 4. Investor pressure is significantly related to company's awareness at p-value less than 0.001. Similarly, investor pressure is also positively and significantly related to social, environmental, and economic strategies which environmental and social strategies have p-value less than 0.001. Economic strategies have p-value of 0.044. The direct effect of awareness to environmental and social strategies have p-value less than 0.001. These relationships support hypothesis of the research framework. The statistical results suggest that the investors concern about the companies' environmental, social and economic performance along with associated risks with sustainability issues when making investment decision. They are influenced by sustainability practices of listed companies, which are in line with the findings of Clark et al [33] for low carbon economy and findings of McLachlan and Gardner [34] for Austrialian investment context. The results stress on the fact that listed companies are pressured to improve that sustainability performance due to investor's preference towards well-performed sustainability.

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Table 4. Results of direct effects.

Path coefficient	Estimated Coefficient	Standard Error
Supplier Pressure → Awareness	0.018	0.090
Customer Pressure → Awareness	0.068	0.087
Investor Pressure → Awareness	0.473***	0.122
Awareness → Social Action	0.703***	0.148
Awareness → Environmental Action	0.594***	0.168
Awareness → Economic Action	0.103	0.084
Supplier Pressure → Social Action	0.013	0.076
Supplier Pressure → Environmental Action	0.004	0.092
Supplier Pressure → Economic Action	0.048	0.050
Customer Pressure → Social Action	0.087	0.074
Customer Pressure → Environmental Action	0.001	0.090
Customer Pressure → Economic Action	0.085	0.051
Investor Pressure → Social Action	0.451***	0.126
Investor Pressure → Environmental Action	0.561***	0.158
Investor Pressure → Economic Action	0.164**	0.082

*, **, and *** are significance level at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively.

4.2.2 Indirect effects: Indirect effects test how each moderating variable strengthen or weaken the effects of independent and dependent variables [16]. This study examined the impacts of suppliers, customers, and investors pressure on business strategies by mediating of awareness. The results of indirect effect are shown in Table 5. Investors affect environmental and social strategies indirectly through sustainability awareness at 95% confident level which means that awareness has linked relationship between investor pressure and environmental and social strategies.

Table 5. Results of indirect effects.

Path coefficient	Estimated Coefficient	Standard Error
Supplier Pressure → Awareness → Social Action	0.014	0.062
Supplier Pressure → Awareness → Environmental Action	0.012	0.051
Supplier Pressure → Awareness → Economic Action	0.002	0.015
Customer Pressure → Awareness → Social Action	0.047	0.063
Customer Pressure → Awareness → Environmental Action	0.040	0.053
Customer Pressure → Awareness → Economic Action	0.007	0.017
Investor Pressure → Awareness → Social Action	0.332*	0.178
Investor Pressure → Awareness → Environmental Action	0.281*	0.151
Investor Pressure → Awareness → Economic Action	0.049	0.070

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*, **, and *** are significance level at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively.

5. Conclusion

This study aims to examine perspectives of listed companies on the SDGs by testing their sustainability awareness and gather information regarding sustainability strategies. The results generated from the structural model indicate that the respondents believe that investors' investment decisions have strong relationship with companie's perceived awareness and sustainability strategies. Moreover, listed companies' sustainability awareness helps moderating relationship between investors and sustainability strategies and performances. The convergent and discriminant validity test of model confirmed that data fit well to develop model from global test (model fit) to local test (p-value). Therefore, it can be concluded that listed companies should increase sustainability key performance indicators for setting and reporting SDGs. They should also come up with appropriate and sound sustainability strategies to attract more investors. This study focuses on perspectives on the listed companies side. Another study on investors' perspectives is recommended. The results should be analyzed in conjunction with the results of this study.

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