The Environmental Management's Competency Level of Listed Companies in the Stock Exchange of Thailand

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Abstract

This work has studied the competency level of environmental management of the listed companies in the stock exchange of Thailand (SET-MAI) in 7-industry groups by analyzing sampling data from closed-end questionnaires from 101 companies collected in 2017 out of the total 596 companies. The results show that the competency level for overall market was at the high level. The highest score was agro & food industry group, and the lowest score was technology group. The industrial group of the market gained the closest scores to the averages of SET-MAI and might be the representative of the listed companies. From the aspect of organization, it was found that sustainable consumption and production as well as environmental reports were the top priorities. In terms of the environmental management process, the factors with highest scores were environmental management, and corporate environmental values and norms. The factors with lowest scores appeared to be environmental management accounting, and environmental relationship with suppliers.

Keywords: 1) Environmental Management 2) Corporate Sustainability 3) Environmental Management Process

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Introduction

Since the environmental revolution in the 1960s until the sustainable development paradigm in the 21st century, global business corporations have been transforming their own businesses under the concept of corporate sustainability. They have been adjusting their corporate strategies in accordance with globalization and sustainable development concepts which implied that the business corporations must balance the outcomes in every dimension. They do not focus only on financial performance but also on the social and environmental performances. The business sector in Thailand is also impacted by economics and industrial developments which cause the environmental problems such as pollutions and resources consumption. Thailand's businesses and industrial sectors need to adapt themselves in every business's dimension including environment as well.

The stock exchange of Thailand (SET) is one of the most important and biggest financial institution in Thailand (The Stock Exchange of Thailand, 2019a). The companies which have traded in SET market and the market for alternative investment (MAI) could directly contribute to country's business and economy system. Stock market index is used as one of the tools to assess the trend of the country economic, to calculate a leading economic indicator by the Bank of Thailand. It is also used as the indicator that represents economic circumstance by the Office of the National Economic and Social Development Council (Bank of Thailand, 2019a; Bank of Thailand, 2019b).

The listed companies in the stock exchange of Thailand are the group of business corporations which play the crucial roles in directing the growth of Thailand's economy and are among the first to response to the global sustainable development concept. They implemented the management strategies to contribute to corporate sustainability in environmental dimension under the framework of ESG concept (The Stock Exchange of Thailand, 2019c), the principle of responsible investment concept (Principle of Responsible Investment, 2019), Dow Jow Sustainability Index (DJSI) (The Stock Exchange of Thailand, 2019) together with the sustainability report of the listed companies in stock market (Thaipat Institute, 2019, p. 26). This research aims to study the overall's market and the competency level of environmental management of listed companies in the stock exchange of Thailand and the market for alternative investment (SET-MAI) in 7 industry sectors, to analyses the processes of environmental management and to explain the competency's level of environmental management in the studied group. The results of the research could lead to the pathways to develop and improve environmental management in the listed companies in practical way and would be beneficial for other business organizations to create corporate sustainability in nearly future.

Literature Review

The concepts of sustainable development and corporate environmental management have been initiated since we had the conference called "The United Nations Con-

ference on Human Environment" (UNCHE) at Sweden in 1972 and published the report "Our common future" in 1987. Both circumstances had caused spreading of the sustainable development concept globally. Later the United Nations Conference on Sustainable Development or "Rio+20" had announced the concept of green economy to be the core pathway to sustainability development scheme and the United nation set the UN Sustainable Development Summit in 2015. From this summit there was a consensus to create Sustainable Development Goals (SDGs). It announced the declaration of the summit, that is the transforming our world, the 2030 agenda for sustainable development which is the goals for year 2016-2030. SDGs comprised 17 goals and 169 sub-targets, integrated to the 3-dimension of sustainable development which are economics, society, and environment to balancing the 5P's which are people, planet, prosperity, peace, and partnership (United Nations, 2015). It depends on the collaboration among the governments, the communities, the United Nations, the NGOs, and the business organizations to accomplish these goals (Sangchai, 2016, pp. 445-466). The business organizations are necessary part in driving sustainable development and the environmental management within organization is important for building the success of sustainable development scheme.

According to the principle of corporate environmental management, the processes of environmental management are not different from the processes of general business management which hold the financial profitability as a final objective of its organization. The environmental management comprises planning and corporate strategy, organizing, leading, and controlling (Bartol and Martin, 1997). The business organization have managed its human resources, finance, information as well as physical properties to reach its effectiveness and efficiency (Griffin, 2011, p. 5). The organization's environmental goals are to reduce the use of resources and to deal with pollution caused by business activities.

In addition to the environmental management processes in business organizations, the organizational environment is very important to consider as changes in organization's environment affects the environmental performance of the organization. The organizational environments can be divided into two parts. This first is the internal environment, which directly has an impact on the organization. This includes the day-to-day operations of the organization which is the basic operation of the organization (Chinpaisan, 2016, p. 14). The issue of organizational culture is also considered an important factor because it could lead to success of important environmental operations. The organization culture can build common characteristics in employees which helps to build employee commitments which are greater than their own personal commitments, increase the stability of the organization as a unit in the social system. Organizational culture could be a framework for the employees' implementation in various activities of the organization and it could help to be a guideline for them in bringing the appropriate behaviour to the organization (Wheelen, et al., 2018, pp. 177-178). The second is external environment

which is also a driving force that affect the management of the organization from outside the organization. It consists of general environments such as political, legal, economic, technological, social, cultural, and international environments. The stakeholders who directly affect the organization including customers, competitors, raw material suppliers, labour market are also the external environment. In this research, organizational stakeholder issue was used as one factor to estimate the competency level of environmental management in the organization.

When a business organization has adopted environmental management as a policy in its business operations, the level of environmental performance is therefore an indicator of the environmental management's competency level in that business organization. Dodge and Welford (Welford, 1995, pp. 21-22) have discussed the levels of environmental performance called ROAST (ROAST scale) (Welford, 2001, pp. 20-22). It was known as the environmental performance level. Welford divided the ROAST scale into 5 levels as follows: (1) Resistance level (R-level) is an organization that has no absolute environmental values and does not comply with rules. (2) Observe and compliance level (O-level) is the level at which organizations begin to be interested in environmental law. Compliance with the law is governed by court decisions or regulations from competent bodies. (3) Accommodating Level (A-level) is the degree of conductive change, that is an organization has begun to work on the environment starting to have more than what is required by law. (4) The seizing and preempting level (S-level) is a level of adherence to environmental performance which organization always considers its environmental performance, is highly responsive to external stakeholders, and starts to be in line with the concept of sustainable development. (5) Transcendent level (T-level) is the highest level and superior in environmental performance in the organization with environmental culture and values, and a strong belief in the environment.

The implementation of environmental management that exceeds the law requirement is known as the proactive environmental management. Its characteristic includes the environmental control and protection measures, the cost control, organizational stakeholders' pressures, and the need to have competitive advantages. By implementing these, the organization needs the environmental guidelines such as waste reduction and pollution prevention, demand-side management, an eco-design product, the product responsibility as well as the adoption of environmental cost accounting. The success principle of environmental performance is the leadership of the top management, environmental policies and strategies, environmental goals and indicators, participatory actions and decision-making, environmental controls, audits, and reporting including assessment and communication (Barry and Rondinelli, 1998, pp. 39-48). Environmental management in a good organization should be managed in such a way that everyone must participate. It enables the employees to exchange information both from the top to the bottom and the

bottom to the top. It must also be flexible as well as avoidable to give one-person total authority in making decisions. Additionally, decision quality should be related to environmental management knowledge. Environmental training is provided to create a broad organizational management system (Welford, 2001, pp. 9-11). Proactive environmental management can be measured at a certain level that business organizations move towards sustainable development.

Research Methodology

To study the environmental management's competency level of the listed companies in SET-MAI, the researchers studied the factors affecting the competency level in environmental management of business organizations by categorizing them to 4 organizational factors and 13 environmental management process factors divided into 88 sub-issues. The research methodology is described as follows.

The Population and Sampling Method

The target of population in this study consisted of listed companies in the stock exchange of Thailand, namely, in the Stock Exchange of Thailand (SET) and in the Market for Alternative Investment (MAI) in 7 industry groups include Ago and food (Agro), Consumer products (Consump), Industrial (Indus), Property& construction (Propcon), Resources (Resourc), Services (Service) and Technology (Tech) industry. As survey was made in 2017, there was a total of 596 companies (The Stock Exchange of Thailand, 2017). The study collected data by sending the questionnaires to all 596 companies and received 101 responses which is acceptable comparing to calculation of the sample size method at 10-percentage error by using the Taro Yamane sample size formula, (Yamane, 1967, p. 886) which yielded a sample of 86 companies.

The sample groups in this study were the same category as the previous environmental management research in Japan and in Germany (Kokubu, et al., 2019, pp. 131-148). We did not study in the financial industry due to its intangible products and non-physical businesses. In addition, other researchers found that the financial industry had a low environmental impact (Newson and Deegan, 2002, pp.183-213; Suttipun and Stanton, as cited in Suttipun, 2012, p. 53).

Data Collection Method

This study used a questionnaire to collect data. There are two types of questionnaires, which are the check-list questions and 5-rating scale questions. The questionnaires are sent to business corporations' environment or sustainability sectors. We requested the representatives of the corporation who have a good understanding of the organization and the organization's environmental management to respond to the questionnaire. This self-rating questionnaire was developed, tested, and evaluated both in Japan and in Germany (Kokubu, et al., 2019, pp. 131-148). The questionnaire had been pre-tested from a business organization in Thailand before collecting in the studied group. The structure of the questionnaire consists of 2 parts as follows:

Part 1: The organizational factors. This part is related to the corporate environmental management issues which divided in to four

factors. Factor-1 is environmental system standards and environmental performance reporting, Factor-2 deals with sustainable development goals recognition and planning, as well as sustainable production consumption (SDGs and SCPs), Factor-3 is on material flow information management, and Factor-4 is the environmental research and development activities.

Part 2: Factors in environmental management process. These were questions about the environmental management processes in the organization with 5-rating scales, consists of 13 main factors and divided into 88 sub-issues. The 13 main factors are as follows.

E = Focus on environmental issues
F = Stakeholder focus
G = Environmental Management
H = Environmental values and norms of the organizations
I = Environmental Manpower Management
J = Controlling of environmental activities
K = Environmental Performance Management
L = Environmental Decisions
M = Environmental Management Accounting
N = Environmental Contributions
P = Uses of environmental indicators
Q = The importance of environmental issues to suppliers.
and R = The environmental relationship with suppliers.

Determining The Environmental Management's Competency Level

To determine the environmental management's competency level of the sample group, the researchers used the average score of 13 environmental management process factors to rate the environmental management's competency level. The classification criteria (Class Interval) were divided into 5 levels, the highest score is 5 and the lowest score is 1. To determine the environmental management's competency level, we calculated the scores as follows: the score values from 4.21–5.00 have a very high level, 3.41-4.20 have a high level, 2.61–3.40 have a moderate level, 1.81–2.60 have a low level, and scores ranging from 1.00-1.80 have a very low level of the environmental management's competency.

Data Analysis

The researchers analyzed and interpreted the results throughout the spreadsheet program. The descriptive statistical analysis was used to summarize the sample data in the overall study and in the environmental management process factors which separately analyzed 7-industry groups of listed companies in the stock exchange of Thailand (SET-MAI) and to acknowledge the environmental management's competency levels in each factor and in each sub-issue. We also used the secondary data and analyzed the data from additional documents including textbooks, academic papers, theses, research papers and other documents.

The Results of The Study

The results of survey responses, referred to as SET-MAI, accounted for 101 companies out of a total of 596 companies (2017 data) or 16.95% of the total number of listed companies. From 7-industry groups, the group with the most response rate was the Industrial group, accounting for 29.84 percent of the total number of listed companies, and the least response rate was the Property & Construction group, with 9.82% of the total number of listed companies as shown in Table No. 1

Table No. 1 The number of listed companies on the Stock Exchange of Thailand in the SET and MAI compared to the number of the responding companies in 2017.

No.	SET-MAI Industry group	Number of companies			Number of the responses			Response rate
		MAI	SET	Total Companies	MAI	SET	Total Responses	
1	Agro & Food (Agro)	9	50	59	1	8	9	15.25
2	Consumer Products (Consump)	10	40	50	2	6	8	16.00
3	Industrials (Indus)	34	90	124	11	26	37	29.84**
4	Property & Construction (Propcon)	17	95	112	3	8	11	9.82*
5	Resources (Resourc)	12	48	60	1	15	16	26.67
6	Services (Service)	39	104	143	5	10	15	10.49
7	Technology (Tech)	9	39	48	0	5	5	10.42
	The total number of listed companies	130	466	596	23	74	101	16.95

Note: * = the lowest value and ** = the highest value.

1. The Organizational Factors

According to a sample group of 101 listed companies in the SET-MAI categorized into 7-industry groups, the results of the organizational factors in the questionnaire's topics (No. 1-4) are shown in Table No. 2.

Table No. 2 The number of companies and the percentage of each industry group implementing the organizational issues from surveys.

Factors	Issues	The number and the percentage of implementing on organizational issues							
		Agro	Consump	Indus	Propcon	Resourc	Service	Tech	SET-MAI
1	ISO	5 (55.56)	6 (75.00)**	21 (56.76)	8 (72.73)	8 (50.00)*	3 (60.00)	3 (60.00)	60 (59.41)
1	En.Rep.	8 (88.89)**	6 (75.00)	23 (62.16)*	8 (72.73)	14 (87.50)	11 (73.33)	4 (80.00)	73 (72.28)

Factors	Issues	The number and the percentage of implementing on organizational issues							
		Agro	Consump	Indus	Propcon	Resourc	Service	Tech	SET-MAI
2	SDGs	5 (55.56)	2 (25.00)*	19 (51.35)	3 (27.27)	9 (56.25)**	8 (53.33)	2 (40.00)	48 (47.52)
2	SDGs Plan	5 (55.56)**	0 (00.00)*	12 (32.43)	3 (27.27)	8 (50.00)	5 (33.33)	2 (40.00)	35 (34.65)
2	SCP	6 (66.67)	6 (75.00)	26 (70.27)	7 (63.64)	14 (87.59)	14 (93.33)**	3 (60.00)*	76 (75.25)
2	SCP Plan	7 (77.78)**	4 (50.00)	22 (59.46)	7 (63.64)	11 (68.75)	11 (73.33)	2 (40.00)*	64 (63.37)
3	MF	8 (88.89)**	5 (62.50)	27 (72.97)	1 (9.09)*	7 (43.75)	8 (53.33)	2 (40.00)	59 (58.42)
4	En.R&D	5 (55.56)**	3 (37.50)	17 (44.95)	3 (27.27)	2 (13.33)	4 (26.67)	0 (00.00)*	41 (40.59)
averaged score (%)		69.84	50.00	56.29	45.46	57.15	58.33	45.00	56.44
Rank		1	5	4	6	3	2	7	

Note: 1) * and ** = The industry groups with the lowest averaged percentage and the highest averaged percentage of the factors among the groups respectively, ISO = The adopted standard system, En.Rep. = environmental performance reporting, SDGs = the perception of sustainable development goals, SDGs Plan = having sustainable development goals plans as a part of the goals of business activities, SCP = the perception of sustainable production and consumption, SCP Plan = having sustainable consumption and production plans as a part of the business activities, MF =managing material flow information, En.R&D = implementing environmental research and development

From Table No. 2 it was found that SET-MAI in overall valued the perception of sustainable production and consumption (SCP) (75.25%) and environmental performance reporting (En.Rep) (72.28%) as priority while having sustainable development goals plans as a part of the goals of business activities (SDGs Plan) (34.65%) and implementing environmental research and development (En.R&D) (40.59%) were not prioritized at that time. As this survey was conducted in 2017, having sustainable development goals and SDG plans a part of the business activities (SDGs and SDGs Plan) were in the early stages comparing with the present time (2022) when businesses are increasingly focusing on the sustainable development goals (SDGs). The current movements from government sector, civil society, the private sectors, as well as the international organizations could drive the achievement of SDGs (Bunnag, 2018). The environmental research and development factor (En.R&D) also gained lower score which could be due to the fact of R&D budgets in the private sector in Thailand are still low. According to the World Economic Forum (WEF), Thailand ranked in the stage 2 (the efficiency driven stage) which is the level of R&D in developing countries while the

developed countries mostly ranked in stage 3 which referred to a group of Innovation-driven country (Mahatthanalai, 2010, pp. 6-7).

Considering each industry groups, Agro ranked on the top of all the groups with 69.84% average scores based on four organizational factors divided into 8 issues. The Agro had 5 issues at the highest percentage, including environmental performance reporting issue (88.89%), the issues of having sustainable development goals plans as a part of the goals of business activities (55.56%), having sustainable consumption and production plans as a part of the business activities (77.78%), managing material flow information (88.89%), and Environmental research and development activities. (58.33%). The second rank was Service (58.33% average score) which had 99.33% in the issue of having sustainable consumption and production plans as a part of the business activities. The third rank was the Resourc (57.15% average score), with the sustainable development goals' recognition at the highest (56.25%). Indus ranked fourth with 56.29% average score and was closest to the SET-MAI average score of 56.44%. However, Indus got the lowest score in environmental performance reporting at 62.16%. Consump (50% averged score) ranked fifth but has the highest percentage of adoption of the standard system at 75%. The last two groups, Propcon, and Tech, adopted organizational factors less than half of the sample group, 45.46% and 45.00% respectively. Propcon had a level of management of material flow information at the lowest percentage (9.09%) and Tech group had three lowest issues including the issues of sustainable consumption and production recognition (60%), sustainable production and consumption planning (40%), and environmental research and development issues, which had no activity (0%) from the sampled companies.

2. The Environmental Management Process Factors

The environmental management's competency level of the sampled companies consisted of 13 factors and 88 sub-issues. The means, the maximum, and the minimum values were analyzed. The environmental management's competency levels were analyzed according to the means, the maximum, and the minimum values and then ranked. Comparison among different factors in environmental management process within the studied groups were also presented.

2.1 The Environmental Management Process from 13 Factors

From statistical analysis, the average scores from the questionnaire per factor in the environmental management processes in each group and the overall outcomes from sampled groups of the listed companies in the Stock Exchange of Thailand are shown in Table No. 3.

Table No. 3 The average scores on environmental management processes for all 13 factors as in SET-MAI and separating into the 7 industry groups.

No.	Factors	The average scores in each group of SET-MAI							
		Agro	Consump	Indus	Propcon	Resourc	Service	Tech	SET-MAI
1	E	4.04	3.75	3.60	3.87	3.93	3.61	3.13	3.70
2	F	3.42	3.60	3.73	3.80	3.84	3.42	3.01	3.63
3	G	4.17	4.04	4.00**	4.27	4.11	4.14**	3.46	4.01**
4	H	4.33	3.80	3.95	4.40**	4.20**	3.80	3.56	3.99
5	I	3.39	3.63	3.50	3.86	3.78	3.13	3.40	3.55
6	J	4.54**	3.90	3.83	3.89	3.90	3.47	3.32	3.83
7	K	4.36	4.03	3.66	4.07	3.86	3.13	3.45	3.76
8	L	4.13	3.98	3.77	4.12	4.06	3.53	3.37	3.84
9	M	4.09	3.23*	3.37	3.29*	3.51*	3.51	3.33	3.41
10	N	4.00	4.05	3.53	3.54	3.71	3.62	3.86	3.63
11	P	3.97	4.13**	3.68	3.90	3.99	3.50	2.70*	3.73
12	Q	3.69	3.79	3.62	4.13	3.99	3.24	4.09**	3.75
13	R	3.37*	3.35	3.35*	3.38	3.65	2.90*	3.36	3.37*
The average score		3.96	3.79	3.66	3.89	3.89	3.46	3.39	3.71
Ranking		1	4	5	2	2	6	7	
MAX./MIN. Factor		J/R	P/M	G/R	H/M	H/M	G/R	Q/P	G/R

Note: The symbols * and ** are factors with the lowest in the average score and the highest in the average score in each industry group. Underlined and Bold are industry groups with the lowest in the average score and the highest in the average score for each factor.

In terms of the overall result of the SET-MAI, it was found that the average score was at 3.71. The first two factors having the highest average scores were G-the environmental management (4.01) and H-the environmental values and norm of the organizations (3.99). The two factors with the lowest in the average scores were R-the environmental relationship with suppliers (3.37) and M-the environmental management accounting factor (3.41).

Comparing the average scores of the environmental management competency level, from 13 factors for each industry group, Agro ranked at the top with an average score of 3.96. The second ranks were Propcon and Resourc with 3.89. The fourth place was Consump with 3.79. The fifth place was Indus with 3.66 which is closest to the SET-MAI. The sixth place was Services with 3.46 and the last place was Tech with an average score of 3.39.

In each industry group, these were the factors with the highest and lowest scores.

(1) Agriculture and Food (Agro) had the highest average score in J-controlling of the environmental activities (4.54) and the lowest

average score in R-the environmental relationship with suppliers (3.37).

(2) Consumer products (Consumer) had the highest average score in P-the use of environmental management indicators (4.13) and the lowest average score in M - the environmental management accounting (3.23).

(3) Industrial (Indus) (G) had the highest average score in G-the environmental management (4.00) and the lowest average score in R-the environmental relationship with suppliers (3.35).

(4) Property and construction (Propcon) had the highest average score in H-the environmental values and norms in the organizations (4.40) and the lowest average score in M-environmental management accounting (3.29).

(5) Resources (Resourc) had the highest average score in H-the environmental values and norms in the organizations (4.20) and the lowest average score in M - the environmental management accounting (3.51).

(6) Services (Service) had the highest average score in G-the environmental management (4.14) and the lowest average score in R-the environmental relationship with suppliers (2.90).

(7) Technology (Tech) had the highest average score in Q-the importance of environmental issues to suppliers (4.09) and the lowest average score in P-the use of environmental indicators (2.70)

According to average scores, six industry groups had a high competency level of environmental management (between 3.41 and 4.20). Only Tech had a moderate competency level of environmental management (between 2.61 and 3.40). Remarkably, like the results in organizational factors, Indus was the closest to the average score of the SET-MAI.

The results in this part were in accordance with the results from the earlier part, namely, 1) Agro had the top scores in both parts, 2) Indus had the average scores closely to the overall market as SET-MAI, and 3) Tech ranked in the last places both in organizational factors and in the competency level of environmental management factors.

2.2 The Competency Level of The Environmental Management Process from 88 Sub-Issues

The average scores from 13 environmental management process factors and 88 sub-issues were analyzed to identify the competency level of environmental management in the business organizations. The results were shown in Table No. 4.

Table No. 4 The level of environmental management competency of the organization in 7 industry groups and the SET-MAI (Unit: numbers and percentage of factors and sub-issues in the organization's environmental management process)

Level	Agro	Consump	Indus	Propcon	Resourc	Service	Tech	SET-MAI
The environmental management's competency level at the factor levels (13-factor)								
Very high	3 (23.08)	0 (00.00)	0 (00.00)	2 (15.38)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)
High	8 (61.54)	11 (84.62)	11 (84.62)	9 (69.23)	12 (92.31)	9 (69.23)	6 (46.15)	12 (92.31)

Level	Agro	Consump	Indus	Propcon	Resourc	Service	Tech	SET-MAI
Moderate	2 (15.38)	2 (15.38)	2 (15.38)	2 (7.69)	1 (7.69)	4 (30.77)	7 (53.85)	1 (7.69)
Low	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)
Very low	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)
The environmental management management's competency level at the sub-issue levels (88-sub-issue)								
Very high	27 (30.68)	7 (7.95)	8 (9.09)	22 (25.00)	9 (10.23)	2 (2.27)	1 (1.14)	2 (2.27)
High	57 (64.77)	62 (70.45)	63 (71.59)	55 (62.50)	74 (84.09)	53 (60.23)	37 (42.05)	72 (81.82)
Moderate	3 (3.41)	17 (19.32)	17 (19.32)	11 (12.50)	5 (5.68)	33 (37.50)	41 (46.59)	14 (15.91)
Low	1 (1.14)	2 (2.27)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	8 (9.09)	0 (00.00)
Very Low	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	1 (1.14)	0 (00.00)

Note: The numbers in parentheses represent the percentage of the number of factors and sub-issues of each industry group.

From the corporate environmental management process in all 13 factors of the 7 industry groups and the SET-MAI, most groups show a high competency level except Tech which had a moderate-high score. Only Agro and Propcon had 3 and 2 factors, respectively with a very high competency level (4.21-5.00). As for 88 sub-issues, it was found that the level of organizational environmental management competence was high in almost all groups except Tech which had a moderate-high level.

It was noted that every industry group had some sub-issues that had very high rating. The top two among groups were Agro (27sub-issues with very high rating) and Property (22 sub-issues with very high rating). As for the low competency level (1.81-2.60) at the sub-issue levels, there were 3 industry groups including Agro (with 1 sub-issue), Consumer (with 2 sub-issues) and Tech (with 8 sub-issues). Tech additionally was the only one group that had 1 sub-issue in a very low score (1.00-1.80).

In Table No. 5 and Table No. 6, the sub-issues with the highest level and the lowest competency level are shown.

Table No. 5 The level of environmental management competency of sub-issues with the highest average scores.

Industry group	Issues	The environmental management sub-issues	The average score	Competency level
Agro	H5	The organization adheres to the code of conduct in environmental aspect to determine its employee behavior.	4.78	Very high
Consump	F3	Consumer focus	4.63	Very high
Indus	F1	Community focus	4.76	Very high
Propcon	H4	The employees realize environmental values of their organization	4.55	Very high

Industry group	Issues	The environmental management sub-issues	The average score	Competency level
Resourc	F1	Community focus	4.69	Very high
Service	F8, G5	Employee focus, The company encourages environmentally friendly goods/services in its processes	4.33	Very high
Tech	N7	Pollution Reduction (air, water, soil)	4.25	Very high
SET-MAI	F1	Community focus	4.46	Very high

Table No. 6 The environmental management competency of sub-issues with the lowest average scores.

Industry group	Issues	The environmental management sub-issues	The average score	Competency level
Agro	F9	Labor union focus	2.44	Low
Consump	F9	Labor union focus	2.50	Low
Indus	F10	NGOs focus	2.69	Moderate
Propcon	E9	Biodiversity focus	2.91	Moderate
Resourc	M4	LCA assessment activity	2.94	Moderate
Service	F13	International organizational focus	2.33	Low
Tech	F9	Labor union focus	1.80	Very Low
SET-MAI	F9	Labor union focus	2.77	Moderate

Table No. 5 and 6 described the highest rated sub-issues and the lowest rated sub-issues in environmental management's competency level, respectively in each studied groups and SET-MAI. Comparing the results in these two tables with the average scores from 13 factors in Table 3, it was noted that at the 13-factor level the factors that gained the highest scores were mainly G-environmental management topic and H - the environmental values and norm in the organization. On the other hands, at the sub-issue levels most of the highest average scores, the factor F - the stakeholders' focus (F1, F3 and F8) had been observed in the 4 industry groups and the SET-MAI.

Meanwhile, considering the lowest-rated factors and the sub-issues, M - environmental management accounting and R-the environmental relationship with suppliers were the factors with the lowest levels in most of industry groups and the SET-MAI. However, in the sub-issue levels, most of lowest average scores were from F-the stakeholders' focus (F9, F10 and F13) and could be found in 5 of industry groups and the overall SET-MAI.

Discussion and Conclusion

We deduce from the survey of the environmental management's competency level in this research that the overall result of the competency level in the SET-MAI was at the high level (3.7). As for the 7-industry group, Agro and Food Industry (Agro) had the highest level of competency in corporate environmental management (3.96) and Technology (Tech) had the lowest environmental management competency level (3.39). The Industrials (Indus) had the competency level of 3.66 that was close to the average scores of listed companies in the Stock Exchange of Thailand (SET-MAI). It could be explained in another research that the industries that cause high environmental impacted would also lead to the higher level of environmental management. The types of such industries were the agro and food industry, the industrials, and the resources. The industries with less impact to environment were the consumer products, the property and construction, the services, and the technology (Suttipun, 2012, pp. 52-53). The explanation agreed well with this research that Agro and Resourc had the high average scores of the environmental management's competency level corresponding to the level of environmental impact. We noted that the result of Indus had a lower level of the environmental management's competency than Propcon considering the level of its environmental impact that could be higher. It may be explained that the uses of motivations and incentives can affect the implementation of the environmental management processes in the business organizations. Nevertheless, the level of environmental impact is not the only one cause to identify the competency's level of environmental management in the organizations. There are other requirements including environmental codes, the stakeholders such as the investors, business competitors, consumers, together with other beneficiaries of the organizations like communities and employees who are the driving forces to the level of environmental management in the organizations as well (Khanna and Speir, 2013, pp. 2687-2688).

The Thailand sustainability investment (THSI) is one of the environmental sustainability's assessments for the listed companies in the national scale. It was found that from 101 companies of the SET-MAI (2017 data), there were 18 companies listed for THSI for the year 2019 (The Stock Exchange of Thailand, 2022). The average scores from these 18 THSI companies is 4.13 when comparing with the overall score of the SET-MAI of 3.71. This may justify that the data collecting in this questionnaire survey were in accordance with the competency's level of environmental management and environmental performance in Thailand.

The environmental management (Factor-G) and the environmental values and norm in the organizations (Factor-H) are the top two of the SET-MAI with the score of 4.01 and 3.99, respectively. Both factors were known to be priorities in the business organizations for achieving the higher level of environmental management's competency which can be analyzed and explained as follows.

1. The organization manages its environmental management processes through the leadership of the top management who

enthusiastically participates in environmental decision with sound criteria included in the investment decision making operations. All employees are supported. Environmental performance indicators are always compared with environmental targets. Environmental regulations and procedures are well documented. Adequate communication processes regarding the external environment have been established.

2. The organization implements its environmental performance beyond the legal requirement through environmental management factors. It uses environmental processes in strategy planning, implementation of environmental management as risk management, development and adoption of environmentally friendly products and services in the organization as well as the creation of objectives and participation in the implementation of environmental activities of the organization more than the law requirement.

3. The organization has created a proactive sustainability throughout organizational culture and environmental values and has environmental beliefs from the company's mission. It creates the environmental core values together with applying the Code of Conduct to determine appropriate behavior for the employees.

The lowest average scores on the environmental management process factors are the environmental management accounting (Factor-M) and the environmental relationship with suppliers (Factor-R), with the score of 3.41 and 3.37, respectively. The environmental management accounting concerns the recognition of environmental performances, the valuation and measurement of environmental cost, the recording and classifying environmental accounting journals along with the disclosure of the environmental information. (Kiatkrajay and Srijunpetch, 2001, p. 156). Our surveys showed that the product lifecycle assessment (LCA) was the lowest score in the sub-issues of the environmental management accounting (3.0). As for the environmental relationship to suppliers, the sub-issue of supplier selection process based on the achievement of environmental objectives might be less important than the issue of supplier selection based on financial objectives. However, both factors are essential for achievement in environmental management performances. In the future business organizations may need to pay more attention on the followings.

1. Environmental management accounting is part of the corporate social responsibility process (Pimpalai, 2012, p. 3) which could be assisted using the material flow cost accounting approach. From this study, 58% of business organizations were using material flows as important information which did not agree well with the low competency in environmental management accounting. It could be improved by prioritizing some sub-issues such as identifying environmental costs, using environmental indicators for environmental improvement and other environmental benefits, budgeting for Environmental expenditures, implementing product life cycle assessment analysis, and analyzing the efficiency of raw material utilization by unit and valuation in financial cost.

2. To improve the competency in environmental relationship with suppliers, business organizations need to prioritize some sub-issues including the selection of suppliers based on their level of environment responsibility, sharing detailed environmental information between companies and suppliers, setting goals for suppliers to reduce environmental burdens, setting environmental policy related to suppliers, and evaluating environmental burdens in the supply chain.

From the competency levels of all 88 sub-issues in SET-MAI, 72 were at the high levels. 8 were at the moderate levels and 2 were at the very high levels. The results could be interpreted that SET-MAI's environmental management competency level has been advanced and moving beyond the Observe & Comply level in ROAST model scale (Welford, 2001, pp. 21-22). It has the characteristics of proactive environment management. The overall competency level of environmental management in the SET-MAI tends to be beyond the legal obligation level. It must be noted, however, that the highest and the lowest average score of all 88 sub-issues were from the same factor of stakeholders focus. The communities. (F1), consumers (F3) and employees (F8) are sub-issues with the highest scores. Meanwhile, labor unions (F9), the NGOs (F10) and the international organizations (F13) are sub-issues with the lowest scores. These results show that stakeholders are one of the most important factors in the environmental management in Thailand and Business organizations in Thailand have prioritized certain groups of stakeholders that primarily affect the type of business of the organization.

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