

Factors affecting employee acceptance of ISO14001 in a small lacquer factory in Samutsakhon Province, Thailand

Chumlong Arunlertaree, Saranya Sucharitaku, Naphatsawan Nakaumka,
and Sayam Aroonsrimorakot

Faculty of Environment and Resource Studies, Mahidol University

Abstract

This study aimed to evaluate factors affecting the employee acceptance of the ISO14001 (Version 2004) Environment Management System in a small lacquer factory in Samutsakhon province, Thailand. The participants of the study were 47 employees working in the factory. Data was obtained from the participants using questionnaires and in-depth-interview. Statistical Package for the Social Sciences (SPSS) was used to perform statistical analysis including calculation of the Mean, Standard Deviation, t-test, F-test and Least Significantly Difference (LSD) test. The results of the study showed there was a significant difference in the knowledge of ISO14001 amongst the employees. Different factors such as gender, age, educational background, working period and job position appear to correspond to differences in knowledge of the ISO standard. The knowledge level was significantly different for personal factors, such as age, gender and education level, at $p < 0.05$. There were no significant differences in the acceptance level for gender, age, working period and job position. The acceptance level, however, was significantly different for education level at $p < 0.05$. On the other hand, the acceptance level was not affected by employee understanding of ISO14001. But getting ISO14001 environment management system, a process where employees obtain information about ISO14001 and employee engagement were significantly correlated with the acceptance of ISO14001 environment management system.

Keywords: environmental management system, ISO14001, lacquer factory, employee engagement

Article history: Received 19 October 2018, Accepted 23 November 2018

1. Introduction

Environmental problems have spread nationally and globally due to industrial and economic competition. The International Standards Organization (ISO) has developed the ISO14000 Series of Environmental Management Systems (EMS). It has become a widely adopted standard for international trade. Generally speaking, countries with higher capital investment have stricter environmental laws. They also have more influence on the private sector to maintain a sustainable environment by following the rules, laws, and regulations of the state, such as ISO14000 than countries which have lower investment. Due to these differences in investment, there is inequality in free and fair competition as investment is not based on the same standard. As a result, ISO14000 is indirectly pushed as a trade standard [1] to leveling the playing field from an environmental perspective. Presently, the version of ISO14001 which is updated from ISO14001:2004 to ISO14001:2015 structure is one of the major changes that presents the strategy. It focuses on standards and facilitates integration with other ISO management systems [2].

According to the e Thailand Factory Act, B.E. 2535 (1992), standardization of a factory requires the issuance of Ministerial Regulations as a law and with regulations by factory operators to operate safely, orderly and should be harmless to people, property and the environment. The first 8 regulations became effective on October 16, 1992 [3]. At present, can coating processes are being used in the metal canning and bottle cap industry. They are also being used in the packaging of food, beverage, and many other products. The production rate in Thailand is high as products are being produced both for domestic and international purposes.. In an age of high industrial competition, all types of industries have an impact on the environment [4], and each organization is committed to making its organization popular and reliable. Implementing ISO14001 as an EMS has the potential to reduce pollution and costs associated with raw materials and energy. It can also strengthen corporate image, increase business opportunities, and reduce international trade problems. Consumers can use the products with confidence with the assurance that they are not contributing to environmental degradation.

* Corresponding author; e-mail: sayamthai88@gmail.com

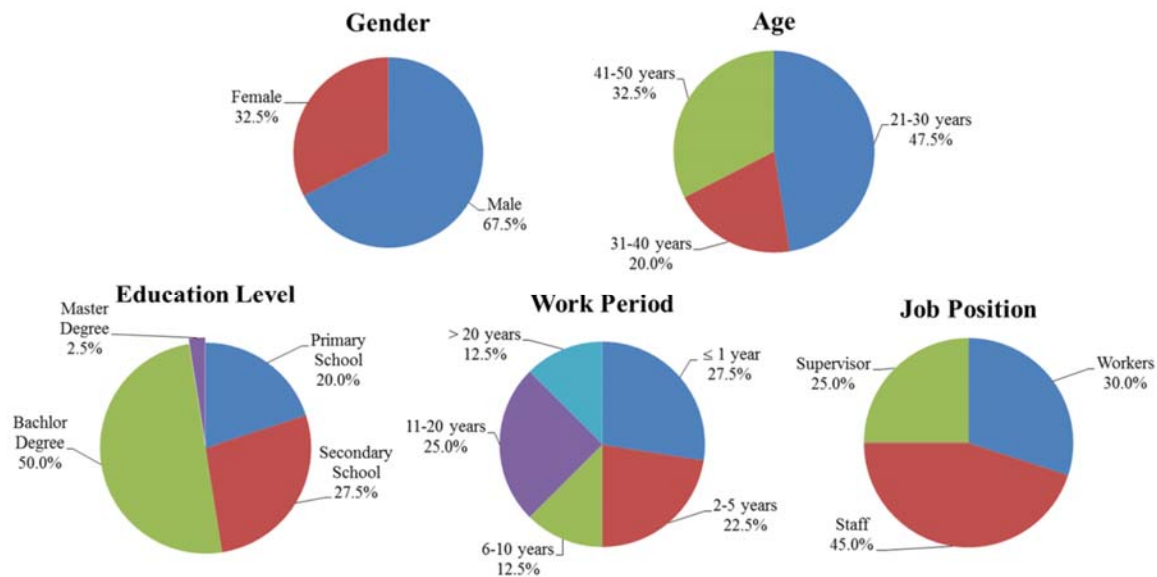


Figure 1 The percentage of personal factors

Table 1 The mean and standard deviation of age and work period

	Number	Minimum value	Maximum value	Mean	SD.
Age	40	23	50	34.03	9.03
Work period	40	1	30	9.10	8.77

Samutsakhon is a province that has a lot of factories [5]. However, the study is limited to one factory only. This is due to limited available resources and time. The study is on one lacquer factory in Samutsakhon province. It aimed to study the factors that affect the adoption of ISO14001 EMS in Thai factories. This will help to bring awareness of information, knowledge, attitudes, participation, benefits, the demand for a good corporate environment. It assessed the level of acknowledgement of employees to the ISO14001 EMS and sort to find out the problems or obstacles endured in implementing the EMS. The research aimed to promote the acceptance of ISO14001 EMS in factories for continuous success and improvement.

Objectives

1. To study the level of acceptance of ISO14001 EMS by employees in small lacquer factory in Samutsakhon province.
2. To study the factors that affect the acceptance of ISO14001 EMS by employees in small lacquer factory in Samutsakhon province

2. Methods

This research used theories related to participation [6-10] to guide the design of a study. The following points explain the research methods and associated concepts used in the study as follows:

2.1 Conceptual framework for education

The researcher used both dependent and independent variables for the analysis of the collected data included in the study. These consisted of the following variables:

1. Independent variables - personal factors (gender, age, education level, agencies, employment status, and work period), knowledge of the ISO14001 EMS, information getting, and employee engagement.
2. Dependent variables - the adoption of the ISO14001 EMS.

2.2 Data collection methods

In this study, the researcher collected data in two ways; Documentary research and Survey research.

2.3 Population and samples

The population of the research was Samutsakhon Province in Thailand while the sample was obtained from just only one factory. Simple Random Sampling technique was used for selecting this factory from the total factories in Samutsakhon Industrial Estate. There were 47 employees in the selected factory, so the researcher selected the total population for this study with no sampling by dividing into two groups. (1) Questionnaire and (2) In-depth interviews.

2.4 Tools used in the study

This study used a questionnaire for collecting data related to factors affecting the adoption of ISO14001 EMS. This was developed by Rogers and Shoemaker [11]. The researcher used both closed ended questions and open ended questions, divided into 6 parts.

Table 2 The number and percentage of staff getting information

	Number	Percentage
Employer announces awareness, information and activity about ISO14001		
Yes	35	87.5
No	5	12.5

Table 3 The number and percentage of employee engagement

	Number	Percentage
You are engaged in activities related to the ISO14001 EMS		
Always	29	72.5
Sometime	7	17.5
Never	4	10.0

The researcher obtained valid permission to record the collected data comprising of photos and audio recordings with a one-year storage period. This information would remain confidential, accessed only by researchers, and all the data would be destroyed as soon as the research was completed. Paper documents would be shredded, and the voice recordings and photos would also be destroyed by deleting the audio files.

2.5 Testing Tools

The validity of the questionnaire for this study was pre-tested by presenting the questionnaire to advisors and thesis advisory committees. This was in order to verify whether it is in accordance with the purpose and objectives of this research. After that, it was adjusted, modified, and the process of actual data collection procedure was carried out by the ISO14001 auditors.

2.6 Data Analysis

The collected data was analyzed using the SPSS program (Statistical Package for Social Sciences). The hypothesis and the levels of statistical significance of this study was classified into 3 significant figures. Employees in the company were separated into three categories, as: 'Supervisors', 'Staff', who have a contact with the company, and 'Workers' who work day by day for the company.

3. Results and discussion

3.1 Personal factors

The researcher applied statistics such as frequency, percentage, mean, and standard deviation for the information analysis of personal factors (gender, age, education level, work period and job position). The results were shown in Figure 1 and Table 1.

From Figure 1 and Table 1 the results were interpreted as follows;

- Most respondents included in the samples were male, 27 respondents or 67.5% were males while 32.5% or 13 of them were females with an average of age 34 years.

- Most of the respondents, 19 of them, included in the sample study were in the age group of 21-30 years (47.5%), followed by 13 respondents who were in the age group of 41-50 years, (32.5%), and 31-40 years, 8 respondents (20%), respectively.

- It was found that most respondents, 20 of them (50%) had educational level of Bachelor's degree. This was followed by 11 respondent (27.5%) who had completed secondary school while 8 employees (20%) had completed primary school.

The group that was classified as experienced consisted of people who had been working for 1-30 years with an average experience of 9 years. Most of the experienced group, 11 out of 40 of the respondents or 27.5%, had been working less than one year or only one year. Another 10 respondents or 25%, had 11-20 years experience, 9 or 22.5% of sample group had only 2-5 years' experience, 5 or 12.5% had 6-10 years' experience and. 5 respondents or 12.5% had more than 20 years' experience.

- Regarding occupational position included in the study, most of the experienced group, 18 (45%) out of the total 40 were staff, 12 or 30% of sample were workers and 10 or 25% of sample were supervisors respectively.

3.2 The analyzed results of staff getting information

For the purpose of this research, it is important to analyze data from the employee regarding their awareness, information and activity about ISO14001 EMS

Table 2 shows that 35 people or 87.5% have received information. And 5 people or 12.5% have not received information about ISO14001.

3.3 The analyzed results of participation

From Table 3, it can be seen that 29 people or 72.5% were engaged in all activities related to the ISO14001. 7 people or 17.5% were engaged in activities about

Table 4 Number and percentage of categorization of understanding and knowledge levels on the ISO14001

	Correct		Wrong		\bar{x}	S.D.
	Number	Percentage	Number	Percentage		
1. ISO14001 is the standard of Environment Management System	39	97.5	1	2.5	0.98	0.16
2. ISO14001 which being applied in this factory is the same standard being applied around the world	37	92.5	3	7.5	0.93	0.27
3. ISO14001 is the standard only for manufacturers	29	72.5	11	27.5	0.73	0.45
4. If companies want to get ISO14001's certificate, they must follow all requirements in ISO14001	36	90.0	4	10.0	0.90	0.30
5. All types of factory must have the ISO14001 certificate	24	60.0	16	40.0	0.60	0.50
6. If a company or organization has acquired one of ISO series such as ISO9001, ISO9002, etc., they cannot be certified ISO14001	35	87.5	5	12.5	0.88	0.33
7. ISO14001 is only related to the person who is responsible for ISO14001	35	87.5	5	12.5	0.88	0.33
8. Only staff operating in Production have to follow requirements of ISO14001	37	92.5	3	7.5	0.93	0.27
9. Roles and responsibilities in ISO14001 will be finished when the company is certified	31	77.5	9	22.5	0.78	0.72
10. ISO14001 is optional. Companies are volunteered to implement it	25	62.5	15	37.5	0.63	0.49
11. In ISO14001's requirement, the company's policy has to establish a written environmental policy	39	97.5	1	2.5	0.98	0.16
12. Environmental problems mean the results of activity, product, or service impacting on the environment in past and present, and risking the future	31	77.5	9	22.5	0.98	0.16
13. We have to pay in order to get ISO14001 certification	31	77.5	9	22.5	0.78	0.42
14. The environmental policy is established just for ISO14001's requirements, it is impracticable	36	90.0	4	10.0	0.90	0.30
15. Only manufacturers having extreme problems in safety and environment are following ISO14001's requirements	37	92.5	3	7.5	0.93	0.27
16. Implementing ISO14001 can cause more waste from production	35	87.5	5	12.5	0.88	0.33
17. Environmental policy must be suitable for the business size and type, and environmental effects from activity, product, or service	31	77.5	9	22.5	0.78	0.42
18. The main purpose to implement ISO14001 is to prevent a complaint in safety and environmental issues	15	37.5	25	62.5	0.38	0.49
19. All employees must know the established environmental policy	40	100.0	-	-	1	0
20. A significant environmental issue that affects the internal organization is not required to consider any external effects	35	87.5	5	12.5	0.88	0.33
21. Success of ISO14001 depends on cooperation of all employees at every level	39	97.5	1	2.5	0.98	0.16
22. The identification of environmental problems must cover all activities, processes, and products in "normal", "abnormal" and "emergency" situations	40	100	-	-	1	0
23. In cases of failure or nonconformity the company has to solve the problem immediately	36	90	4	10	0.90	0.30

24. Following ISO14001 requirements is to not use hazardous materials and chemicals in production	29	72.5	11	27.5	0.73	0.45
25. As the company is certified with ISO14001, all employees must follow requirements of ISO14001 strictly	38	95.5	2	5.0	0.95	0.22

Table 5 The mean and standard deviation of the knowledge score levels on the ISO 14001

	Number	Minimum value	Maximum value	Mean	S.D.
Knowledge score levels on the ISO14001	40	13	25	21.20	2.785

Table 6 Number and mean of the knowledge score levels on the ISO14001

Knowledge score levels on the ISO 14001	Number	Percentage
Low (1-8 points)	-	-
Moderate (9-16 points)	3	7.5
High (17-25 points)	37	92.5
Total	40	100.0

ISO14001 for sometimes while 4 people or 10% were never engaged in any activities about ISO14001.

3.4 The analyzed results of knowledge levels on ISO14001

The researcher calculated frequency, percentage, mean and standard deviation for the data that was collected. 25 true or false questions were administered to them regarding ISO14001 in the factory. The overall score on the level of knowledge based on the questions is divided into three categories as shown in Table 4-5.

Table 4-5 shows the number of knowledge levels on the ISO14001. From the table it can be seen that the sample with the lowest score is 13 points while the highest score is 25 points. The arithmetic mean of the knowledge score is 21.2 points. All of the sample answer the question 19 (Every employees must know the established policy in environment.) and 22 (Environmental problem identification must cover all activities, processes, and products in "normal", "abnormal" and "emergency" situations.) correctly. The worst results came in question 18 (The main purpose to implement ISO14001 is to prevent a complaint in safety and environment issues.) where 62.5% or 25 people were incorrect. The second worst response came in question 5 (All types of factory must have the ISO14001 certificate.) where 40% or 16 peoples answered wrongly.

It was found that most of the sample groups (92.5%) or 37 respondent had a high level of knowledge about ISO14001. However, 7.5% or 3 respondents had a moderate level of knowledge. None of the respondents had a low level of knowledge about the ISO14001 EMS.

3.5 The analyzed results of acceptance levels of the ISO14001 EMS

The researcher analyzed the frequency, percentage, mean and standard deviation for the data set. The overall score on the level of knowledge of ISO14001

number 25 was divided as three criteria levels, poor, moderate and good as shown on Table 7-9.

Tables 7-8 show the mean and standard deviation of the acceptance levels on the ISO14001 EMS. It can be seen that the sample with the lowest score is 79 points and the highest score is 109 points. The mean of the acceptance score is 95.13 points. The acceptance level with the highest averages was question 17, (Environmental issues in organization are everybody's responsibilities.), question 10 (ISO14001 is environmental and common benefit) and question 6 (ISO14001 is benefit to employees and organization).

After taking the total scores and arranging the level of acceptance divided by criteria into three levels, high, moderate and low, it was found that 70% of the sample group or 28 respondents had a high level of acceptance of ISO14001. The remaining 30% or 12 respondents had a moderate acceptance level.

3.6 Hypothesis test results

This research used the statistics t-test (Independent t-test) and F-test (One-way Analysis of Variance) to analyze differences in knowledge and the adoption of ISO14001, classified by 5 groups of personal factors. When differences between groups of 3 or more were found, the LSD (Least significant difference test) was used to test the difference. In addition, the Pearson Product Moment Correlation was used to test the relationship between knowledge and acceptance of ISO14001, accepting the hypothesis at the statistical significance level of 0.05.

Hypothesis 1

H1o: Employees with different personal factors including gender, age, education, years of employment, and employment position have no different knowledge of ISO14001.

H1a: Employees with different personal factors, including gender, age, education, years of employment,

Table 7 The means and standard deviations categorized by the levels of acceptance of the ISO 14001 EMS

	Mean	S.D.
1. Operation following ISO14001 makes environment better than traditional operation	4.38	0.63
2. I agree with employer to follow ISO14001	4.33	0.89
3. ISO14001 increases my responsibility or work load	2.95	0.85
4. ISO14001 implementation is complex	2.68	0.89
5. ISO14001 makes employees to realize environment's importance	4.43	0.64
6. ISO14001 is benefit to employees and organization	4.48	0.68
7. Operation following ISO14001 and traditional operation are not different	3.33	10.7
8. ISO14001 is obstructing my work	4.00	0.78
9. I clearly understand how to work conforming to ISO14001's requirements	3.28	1.11
10. ISO14001 is environmental and common benefit	4.50	0.68
11. ISO14001 is needed in order to improve organization	4.23	0.73
12. Employer announces and provides information about ISO14001 implementation continually	2.56	1.31
13. ISO14001 training is required	4.24	0.97
14. ISO14001 has too many steps, and it is not comfortable for real operation	3.61	0.83
15. I get a benefit and knowledge from ISO14001 following	4.37	0.67
16. I will be more healthy and happy in work if I follow ISO14001's requirements	4.08	0.83
17. Environmental issues in organization are everybody's responsibilities	4.58	0.68
18. ISO14001 is needed for only a manufacturer using chemical, releasing hazardous waste, or being risky to operators' safety	2.95	1.20
19. I want my employer to have good image and be acknowledged from society	4.43	0.71
20. I am tired when being provided a ISO14001 training	3.65	0.98
21. I want to join in every activities relating to ISO14001	3.40	0.71
22. Environments Internal Audit is the mistaken finding process	3.73	10.9
23. I am tired to follow the ISO14001's regulation such as "DON'T LITTER"	3.88	0.99
24. ISO14001 can increase productivity and reduce waste or defect in long term	4.03	0.89
25. My work performance will be increased and pollution in company will be decreased if company is certified with ISO14001	4.08	0.94

Table 8 The means and standard deviation of the acceptance levels on the ISO 14001 EMS

	Number	Minimum value	Maximum value	Mean	S.D.
Acceptance levels on the ISO 14001	40	79	109	95.13	7.933

and job position have a different understanding of ISO14001.

Based on a comparative study of personal factors and the knowledge level of ISO 14001 EMS of a small-scale factory, from the t-test, it was found that gender and knowledge about ISO14001 were statistically associated and significant at 0.05 level. The sample group of female employees were shown to have knowledge of ISO 14001 higher than that of the male employees. Personal experience factors including years of employment also showed to be a contributing factor in gaining knowledge of ISO14001 standard EMS. This was observed at statistically significant level of 0.1.

The results of the F-test (one-way ANOVA) showed that the difference in personal factors, such as ages, education level, and position had a different level of knowledge about ISO14001, at a statistically significant level of 0.05. The LSD (Least significant different test) was used to find the differences in pairs as shown in Table 11-13.

From Table 11, it was found that the age group of 21-30 years had a higher average level of knowledge of ISO14001 as compared to the age group of 41-50 years at the 0.01 significance level. For other pairs, there was no statistically significant difference.

Table 12 shows that the employees with the highest education level had an average level of knowledge about ISO14001 higher than the employees who had only completed secondary school at the 0.01 significance level. The employees who completed secondary education had an average level of knowledge about ISO14001 higher than that of the primary education at the 0.01 significance level.

From Table 13, it was found that the samples who worked as supervisors and staff had an average level of knowledge about ISO14001 higher than that of the workers. The statistical significance was at 0.01 and 0.05, respectively, while no difference was found between staff and supervisors with statistically significant difference at 0.05.

Table 9 The numbers and percentage of acceptance levels of the ISO14001 EMS

Knowledge score levels on the ISO 14001	Number	Percentage
Poor (25.00-58.33 points)	-	-
Moderate (58.34-91.66 points)	12	30.0
Good (91.67-125 points)	28	70.0
Total	40	100.0

Table 10 Comparison of the levels of knowledge about ISO14001 categorized by personal characteristics

		Number	Mean	S.D	Statistic	p-value
Gender	Male	27	20.59	2.76	t = -2.070	0.045*
	Female	13	22.46	2.47		
Age	21-30 years	19	22.26	2.26	F = 4.034	0.026*
	31-40 years	8	21.25	2.12		
	41-50 years	13	19.62	3.23		
Education Level	Primary School	8	17.75	2.60	F = 28.822	0.000**
	Secondary School	11	20.09	1.64		
	Bachelor Degree	21	23.10	1.48		
Work period	Less than 5 years	20	21.95	2.19	t = 1.748	0.089***
	More than 5 years	20	20.45	3.15		
Job Position	Worker	12	19.33	1.78	F = 5.540	0.008**
	Staff	18	21.56	3.24		
	Supervisor	10	22.80	1.48		

* statistically significant level of 0.05

** statistically significant level of 0.01

*** statistically significant level of 0.1

Based on the test results, it could be concluded that employees whose personal factors such as gender, age, education, and job position had different knowledge about ISO14001. As a result, the secondary hypothesis (Ha) was accepted as the main hypothesis (Ho) was rejected.

Hypothesis 2

H2o: Employees with different personal factors including gender, age, education, years of employment, and employment position had no difference on their acceptance of the ISO14001 EMS.

H2a: Employees with different personal factors including gender, age, education, years of employment, and job position had differences on their acceptance of the ISO14001 EMS.

It was found that personal factors including gender and years of employment had no difference in their acceptance of the ISO14001 EMS system standard when it was implemented in a small-scale industrial plant at the statistically significance level of 0.05.

The results of F-test (one-way ANOVA) showed that differences in personal factors such as age, educational level, and job position and the knowledge level of ISO14001 made no difference in their acceptance of the ISO14001 EMS standard at a statistical significance level of 0.05.

Based on the test results, it could be concluded that employees with personal factors including gender, age, education, years of employment, and job position had

no difference in their acceptance of the ISO14001 EMS. The main hypothesis (Ho) was therefore accepted whereas the secondary hypothesis (Ha) was rejected.

Hypothesis 3

H3o: Understanding the ISO14001 had no relationship with the acceptance of ISO14001 EMS.

H3a: Understanding the ISO14001 was associated with the acceptance of the ISO14001 EMS.

In accordance with the results of Pearson's correlation test, it was found that the statistical significance level was 0.157, which was higher than the statistical significance at 0.05. Therefore, it could be concluded that the understanding about the ISO14001 had no relationship with the acceptance of ISO14001 EMS, so the main hypothesis (Ho) was accepted as the secondary hypothesis (Ha) was rejected.

Hypothesis 4

H4o: Information getting is not associated with the acknowledgement of ISO14001 EMS.

H4a: Information getting is associated with the acknowledgement of ISO14001 EMS.

In accordance with the results of Pearson's correlation test, it was found that the statistical significance level was 0.015. This is lower than the statistical significance at 0.05. It can therefore be concluded that the information getting in ISO14001 had a relationship with the acceptance of ISO14001 EMS. The secondary hypothesis (Ha) was therefore accepted and the main hypothesis (Ho) was rejected.

Table 11 Comparison of the differences in pairs on the knowledge level of ISO14001 categorized by personal characteristics of age

	Mean	21-30 years 22.26	31-40 years 21.25	41-50 years 19.62
21-30 years	22.26		1.01	2.65**
31-40 years	21.25			1.64
41-50 years	19.62			

** statistically significant level of 0.01

Table 12 Comparison of the differences in pairs on the knowledge level of the ISO14001 categorized by personal characteristics of the highest education

	Mean	Primary School 17.75	Secondary School 20.09	Bachelor Degree 23.10
Primary School	17.75		-2.34**	-5.35**
Secondary School	20.09			-3.00**
Bachelor Degree	23.10			

** statistically significant level of 0.01

Table 13 Comparison of the differences in pairs on the knowledge level of ISO14001 by the characteristics of job position.

	Mean	Worker 19.33	Staff 21.56	Supervisor 22.80
Worker	19.33		-2.22*	-3.47**
Staff	21.56			-1.24
Supervisor	22.80			

* statistically significant level of 0.05

** statistically significant level of 0.01

Hypothesis 5

H5o: Employee engagement is not associated with the acknowledgement of ISO14001 EMS.

H5a: Employee engagement is associated with the acknowledgement of ISO14001 EMS.

In accordance with the results of Pearson's correlation test, it was found that the statistical significance level was 0.018, which was lower than the statistical significance at 0.05. It is therefore concluded that employee engagement had relationship with the acceptance of ISO14001 EMS. The secondary hypothesis (Ha) was accepted and the main hypothesis (Ho) was rejected.

From the results of the hypothesis test, it could be concluded that;

- Employees with different gender had a different level of knowledge on the ISO14001, as most female employees in the organization work on documentation, and they are more interested in learning about ISO14001, so they appeared have a better understanding of ISO14001 than men.

- Employees with different ages had a difference in the level of knowledge on the ISO14001. This may be due to the fact that most of the employees, in the age range of 21-30 years old in the organization, were having a University Degree of undergraduate level. They therefore had a better understanding of ISO14001

than the employees in the organization, aged 31-40 and 41-50 years old, who did not obtain a university degree

- Employees with different educational levels had a difference in the level of knowledge on the ISO14001 standard. This may be due to employees in the organization who have completed undergraduate university degree, obtaining more knowledge and information about ISO14001. The level of experience may have affected the understanding of ISO 14001 as they gained more knowledge and information from the employer causing most employees to have a higher level of understanding of ISO14001.

- It was thought that employees with different working experience would have significant difference in ISO14001 understanding. It was thought that employees with less working experience would understand ISO14001 more because of their higher educational level. The levels of ISO14001 understanding did not appear to relate to working experience.

- Employees with different job positions had a different level of knowledge on the ISO 14001. This may be due to the fact that most of the supervisors and staff graduated at the undergraduate level, so their understanding on the ISO14001 was higher than the workers.

According to the studies, it has been found that employees with different personal factors, such as

Table 14 Comparison of the acceptance level of the ISO14001 EMS with personal characteristics.

		Number	Mean	S.D	Statistic	p-value
Gender	Male	27	96.04	7.96	t = 1.049	0.301
	Female	13	93.23	7.83		
Age	21-30 years	19	96.21	7.07	F = 0.364	0.697
	31-40 years	8	94.75	10.96		
	41-50 years	13	93.77	7.45		
Education Level	Primary School	8	90.13	8.92	F = 2.099	0.137
	Secondary School	11	96.45	5.85		
	Bachelor Degree	21	96.33	8.08		
Work period	Less than 5 years	20	95.00	6.14	t = -0.098	0.922
	More than 5 years	20	95.25	9.56		
Job Position	Worker	12	93.75	7.14	F = 1.386	0.263
	Staff	18	94.06	7.92		
	Supervisor	10	98.70	8.54		

Table 15 The relationship between knowledge and acceptance of the ISO14001 EMS.

	r-value	p-value
The relationship between knowledge and acceptance of the ISO14001 EMS	0.228	0.157

Table 16 The relationship between information getting and acceptance of the ISO14001 EMS.

	r-value	p-value
The relationship between information getting and acceptance of the ISO14001 EMS.	0.381	0.015*

* statistically significant level of 0.05

gender, age, education level, working years, and job position had no statistical significant differences in accepting the ISO14001. This may be because most employees were aware of the need for environmental protection and understand the concept of cost-effective use of resources. Although the level of knowledge in ISO14001 varied, everyone would like to work in a good and pollution-free environment.

The study found that the understanding of ISO14001 was not significantly correlated with the acceptance of ISO14001. This implied that knowledge and understanding of the ISO14001 whether at a high or low level did not affect the level of acceptance of ISO14001.

It was also found that ISO14001 information getting was significantly correlated with the acceptance of ISO14001, which meant that employees would accept ISO14001 more if they got more information or advertisements about ISO14001.

Lastly, the study found that employee engagement was significantly correlated with the acceptance of ISO14001. This meant that employees who wanted to participate in an activity would have higher probabilities to accept ISO14001 than the one who neglected the activity.

Although the sample group had different personal characteristics, any differences in ISO14001 acceptance levels did not have any statistical significance. This is probably because most of staff were aware of

environmental protection and know how to utilize resource efficiently. All staff wish to work in a good environment without pollution even though their ISO14001 understanding was not as high as others. They were aware of the benefits if the company paid attention in ISO14001 certification. The ISO14001 understanding level therefore did not have statistical significance with the ISO14001 acceptance level. According to result, most of the staff wanted to work in a good environment without pollution related to the Victor Vroom's Expectancy Theory [6 and 12]. Vroom [5] said that people were willing to working more if they were motivated by getting more benefit from that work. This theory may be the reason staff are able to accept the implementation of the ISO14001 standard. Ruen-ngen [13] also found that understanding the ISO14001 standard did not have a relation to the acceptance level of the same standard. This is also in conformity with the study done by Inthrawuth [14].

ISO14001 information getting has a relationship with ISO14001 acceptance level because employees need to know or get information about ISO14001 via announcement board, email, or colleagues before they accept or reject it. These communication will make employees feel enthusiastic for the ISO14001 standard. This result confirms the findings from other research. Ruen-ngen [13] explains that employees would accept the ISO14001 standard more if they got more information or advertisements about it. Moreover, the

Table 17 The relationship between employee engagement and acceptance of the ISO14001 EMS.

	r-value	Sig.
The relationship between employee engagement and acceptance of the ISO14001 EMS.	0.372	0.018*

* statistically significant level of 0.05

study found that employee engagement was correlated with the acceptance of ISO14001. This meant that if the amount of employees who wanted to participate in an activity was higher, the ISO14001 acceptance level would also increase. The result agrees with the Kaopong [15] study, which describes that participation in the EMS had relation to its awareness.

3.8 Problems, obstacles, and suggestions for implementation of environmental management

The managers, their opinions on the problems and obstacles of the organization in environmental management in accordance with ISO 14001 could be concluded as follows:

1. Training about the ISO14001 standard should be provided to all employees focusing on both theory and practice. There should be continuous cognitive review by implementing guidelines such as an annual training plan for each department.

2. Activities should be organized for employees to be aware of the importance of the environment and to make employees aware of cost-effective use of resources. Employees should be encouraged to participate in most activities.

3. In implementing the ISO 14001 standard, there should be an environmental responsible person in charge of cooperation in each department. There should also be environmental committees to carry out policies from the executive, and meetings should also be held each quarter or each month to keep discussions about ISO14001 in the organization continuously.

4. There should be a review of the implementation and an environmental issues assessment. These should be followed-up and reports of the results should be presented to the management on a monthly basis.

5. Clear areas for waste and garbage separation should be defined. The amount of waste and the frequency of waste disposal should be monitored each month to analyze the cost-effective use of resources in the organization. This approach should be used to reduce waste and garbage.

3.9 Limitation of the study

Even though Samutsakhon is a province that has a lot of factories, the study is confined to only one factory due to limited resources, budget and time. The researcher aims to continue further research in other factories for a comparative analysis in the future.

4. Summary & Conclusions

A study on factors affecting employee acceptance of ISO14001 in a small lacquer factory (47 employees) in Samutsakhon province.

1. 27 out of 40 staff or 67.5% of sample group were male. Most sample groups, 19 staff or 47.5%, were 21 to 30 years old. Twenty staff or 50% of sample groups had the highest education in the bachelor degrees. Most of the studied group, 11 out of 40 staff or 27.5%, had one or less than one year's experience. Permanent staff were the biggest group of sample with 18 staff or 45%.

2. Most of sample groups, 37 out of 40 staff or 92.5%, had understood ISO14001 - EMS in high level. Only 3 staff or 7.5% of sample had understood ISO14001 in basic level.

3. 28 out of 40 staff or 70% of sample had well accepted ISO14001. The rest of sample group, 28 staff or 30%, had accepted ISO14001 in normal level.

4. ISO14001 EMS information getting was significantly correlated with the acceptance of ISO14001 EMS.

5. The study found that employee engagement was significantly correlated with the acceptance of ISO 14001 EMS.

It can be concluded at the end that in personal factors affected the understanding of ISO 14001. However, personal factors did not affect the understanding of ISO 14001. Therefore ISO 14001 information getting and employee engagement affected the acceptance of ISO 14001.

5. Recommendation

The author makes the following suggestions for implementation of the ISO14001 Environmental Management System as follows:

1. Training for understanding the ISO14001 standard for employees at all levels by focusing on the employees with lower education than the undergraduate level to educate employees. This will make it easier for employees to meet the requirements of the ISO 14001, and in the actual operation, the supervisors can closely monitor the staff and can continuously pass on knowledge to those employees.

2. Creating awareness about ISO14001 is to publicize through the corporate communication channels, public advertisement, providing information through communication, and organizing activities regularly and continuously organizing activities.

3. To motivate employees to engage in ISO14001 by organizing an activities or a project promoting the EMS engagement such as ISO14001 motto contest or environmental improvement suggestion.

References

- [1] Aroonsirmorakot S. **Introduction to Environmental Management Standards ISO 14001: 2004**. Mahidol University. Bangkok. 2006; 329 p.
- [2] ISO Update. **What are the differences between ISO 14001:2015 and ISO 14001:2004** [Internet]; 2018 [cited 28 July 2018]; Available from <http://isoupdate.com/resources/differences-iso-140012015-iso-140012004/>.
- [3] Department of Industrial Works. **Types of Industrial Factory**[Internet]; [cited 28 July 2018]; Available from <http://www.diw.go.th/hawk/content.php?mode=dataservice&tabid=1>.
- [4] Kongcharoenkiat P, Kongcharoenkiat S. **Matal Packaging**. Amorn Products Co., Ltd. Bangkok. 2008; 328 p.
- [5] Samutsakhon Fisheries College. **Basic Information about Samutsakhon province** [Internet]; 2008 [cited 28 July 2018]. Available from: <http://www.skfc.ac.th/fakram/%E0%B8%82%E0%B9%89%E0%B8%AD%E0%B8%A1%E0%B8%B9%E0%B8%A5%E0%B8%AA%E0%B8%96%E0%B8%B2%E0%B8%99%E0%B8%A8%E0%B8%B6%E0%B8%81%E0%B8%A9%E0%B8%B2/%E0%B8%82%E0%B9%89%E0%B8%AD%E0%B8%A1%E0%B8%B9%E0%B8%A5%E0%B8%88%E0%B8%B1%E0%B8%87%E0%B8%AB%E0%B8%A7%E0%B8%B1%E0%B8%94%E0%B8%AA%E0%B8%A1%E0%B8%B8%E0%B8%97%E0%B8%A3%E0%B8%AA%E0%B8%B2%E0%B8%84%E0%B8%A3.html>.
- [6] Vroom V.H. **Work and Motivation**, Published by Wiley. United States. 1964; 331 p.
- [7] Rapeepat A. **Community Participation in Rural Development in Social and Thai Cultural Environment**. Sak Sopa Printing. Bangkok. 1984; 386 p.
- [8] Saengpradub N. **Socio-Economic and Cultural Change As a Result of Tourism Development: Bo Sang Village, San Kamphaeng District, Chiangmai Province** [thesis]. Faculty of Graduate Studies, Mahidol University, 1984.
- [9] Wachirangkul S. **Development of organization under ISO 14001: A Case Study of Lucent Technologies Network (Thailand) Company Limited** [thesis]. Faculty of Graduate Studies Burapa University; 1999.
- [10] Jittangwattana B. **Tourism Industry, Thailand's No-Death Business**. CP Book Standard. Bangkok. 2005; 233 p.
- [11] Rogers EM, Shoemaker FF. **Communication of Innovation: A cross Cultural Approach**. The Free Press. 1971.
- [12] Roob-ngam Y. **Participation of government officials in Bureau of the Budget in Reforming the Bureaucracy System** [term paper]. School of Social, National Institute of Development Administration; 2002.
- [13] Ruen-ngen S. **Factors Affecting the Acceptance of ISO14001 Environmental Management System of Employees at Automobile (Thailand) Co., Ltd. (Seat Belt Factory)** [independent study]. School of Social and Environmental Development, National Institute of Development Administration; 2012.
- [14] Inthrawuth P. **The Acceptance of ISO 14001 by Case Study of Employees at International Queue Footwear Co., Ltd** [thesis]. Faculty of Graduate Studies Kasetsart University; 2000.
- [15] Kaopong W. **Knowledge, Involvement, and Awareness in Environmental Management System of Employees in ISO14001 Certified Companies: Case Study of Chanthaburi Seafoods Co.,Ltd. And Chanthaburi Frozen Food Co., Ltd** [thematic paper]. School of Social and Environmental Development, National Institute of Development Administration; 2008.