



RECOMMENDATIONS FOR IMPROVING THE ISO 14001 CERTIFICATION BASED ON THE COMPANY'S PERCEPTION ANALYSIS OF THE CERTIFICATION OBSTACLES AND BENEFITS

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Introduction: Environmental management systems (EMS) were used commonly by companies to control industrial impacts and support environmental sustainability. In achieving SDG's indicators to focuses on improving sustainable practices in the company environment, the government faces a tough challenge in increasing ISO 14001 certified companies. This study aimed to analyze the barriers and benefits of ISO 14001 certification in the industrial sector and recommend encouraging companies to carry out ISO 14001 certification. **Methods:** This study used a descriptive analysis method to identify the perception of ISO 14001 certified company practitioners of the certification barriers and benefits. Through survey questionnaires, data collection was conducted to 83 ISO-14001 certified companies with a response rate of 49.4%. **Results and Discussion:** The main barrier in performing the ISO 14001 was the cost of implementation and certification. The highest benefit of ISO 14001 certification was to improve the company's image. A total of 83% of the companies believed that the benefits of ISO 14001 certification outweighed the costs incurred. **Conclusion:** The companies did not have significant barriers in conducting the ISO 14001 certification and classified into the medium category. The ISO 14001 certification could provide environmental sustainability, social, market, and economic benefits. The government needs to support the interest of companies in conducting the ISO 14001 implementation by overcoming the obstacles and maximizing the benefits.

INTRODUCTION

The industrial sector provides many benefits in improving the community economy and welfare. For example, industrial manufacturing contributes to an income state of around IDR 6,749 trillion and accommodate 6.1 million workers in Indonesia (1-2). However, industrial activities might also cause environmental degradation such as exploitation of natural resources, loss of biodiversity, environmental pollution, and excessive energy consumption. The industrial sector needs reasonable controlling to be carried out based on the company's environmental aspects (3-4). The results of previous studies showing the percentage of environmental aspects that can arise from the industrial sector including waste, gas emission, energy and water consumption, environmental risk, and noise (5).

The environmental impact of industrial activities is significantly greater in developing countries than in developed countries (6). Companies need to prevent the worse impact by implementing good practices in the environmental management systems (7). A study shows that the EMS implementation could control the significant environmental impacts arising from operational activities and achieve the company's environmental objectives (8). In general, ISO 14001 standard is widely adopted by companies according to their goals in support of environmental sustainability (9). The previous study shows that implementing a comprehensive environmental management system positively correlates with a company's environmental performance, such as resource use, compliance with government regulations, productivity, and stakeholder relations (10). One successful good practice at a textile company is controlling resources and energy consumption (11).

ISO 14001 certification will be carried out after the company implemented the EMS protocols. The certification process will assess the conformity of the requirements of the ISO 14001 standard with the whole procedure in the company. Implementation and certification of ISO 14001 provide many benefits related to environmental, commercial, financial, organisational, and social relations (12). However, in addition to obtaining several benefits, companies also face several obstacles in carrying out ISO 14001 certification (13–15) and determining the outcomes (16). Furthermore, it will affect the company's decision whether to continue with ISO 14001 certification or not (17). Previous research has been conducted to identify the obstacles faced by companies in implementing ISO 14001 in Indonesia (18). Similar research related to ISO 14001 certification mainly was carried out in several developed countries such as

Italy (19-20), Spain (15), UK (21-22), Australia (10). However, studies related to this theme are still rarely done in developing countries (18,23-24). The ISO 14001 certification in developing countries must be improved, especially in Indonesia, as each country has different regulatory and cultural settings. Improvements need to create a possibility that the environmental management system implemented in developing countries is different from developed countries (25).

The ISO 14001 certification indicates one of the SDG's targets, number 12.6, which focuses on improving sustainable practices in the company environment (26). This commitment is stipulated in Regulation of President of Republic Indonesia No. 59 Year 2017 on Implementation of Achievement of Sustainable Development Goals (27). Implementing the ISO 14001 certification in industrial sectors is also one of the priority programs set out in the Medium Term Development Plan Year 2020-2024. The Indonesian government targets additional 5000 companies to have ISO 14001 certification by 2024 (28). This target is a big challenge for the Indonesian government because certified companies are still low at around 133 companies each year (29).

This study aims to analyse companies' points of view regarding the benefits and obstacles of the ISO 14001 certification. Furthermore, this study is expected to increase the interest of companies to carry out the ISO 14001 certification and provide recommendations for the government to help companies overcome these obstacles.

METHODS

The type of this study was a quantitative approach. The data respondents collected through a Google Form Application. The population was amount 83 companies that were still being certified by the PT.X as an ISO 14001 agency. PT.X was one of the ISO 14001 certification bodies accredited by the National Accreditation Committee. The respondents' criteria were people who understood and were responsible for the companies' ISO 14001 certification process. To ensure that criteria, we met directly by contacting the person listed in the company data provided by the PT.X. The authors also reiterated that the questionnaires must be filled out by people who met these criteria during the communication with the company personnel, either by telephone, email, or letter via courier. We guaranteed that the identity of the companies and the respondents were kept confidential from disclosure to the public. The distribution of the questionnaires resulted in responses from 41 company representatives.

Table 1. Environmental Performance Improvement After ISO 14001 Certification

Environmental Performance Indicator	Sub-Indicator	Before Implementation (2014-2015)	After Implementation (2016-2017)
Resource Usage	Water, Chemicals, and Fuel	-1.09%	-7.55%
Energy Usage	Electricity, Fossil fuels, and Renewable Energy	20.06%	5.05 %

Tabel 2. Score Criteria

Score Criteria	Category
1.00 – 1.80	Very low
1.81 – 2.60	Low
2.61 – 3.40	Moderate
3.41 – 4.20	High
4.21 – 5.00	Very High

Table 3. Parameters of ISO 14001 Certification Barriers

Barriers	Reference
Internal Barriers	
Lack of available resources	(11,18,44)
Lack of additional environmental training	(11,18,36,44)
Lack of employee commitment, awareness, and motivation	(14,20,34,44)
Lack of environmental-friendly culture	(18,33)
Time consumption for ISO 14001 implementation	(15,18,32,44)
Lack of top management commitment	(13,14,18,44)
Lack of financial ability	(17,32,36)
External Barriers	
High cost of implementation and certification	(15,17,32,33,36)
Increased volume of administrative work and documentation	(15,32,44)
Difficulty in applying the standard and the complexity of the implementation process	(14,20,32)
Long certification process	(44)

Table 4. Parameters of ISO 14001 Certification Benefits

Benefits	Reference
Environmental Benefits:	
Reduction in the volume of generated waste	(8,32)
Reduction in water, air, and soil pollution	(8,32)
Energy saving	(8,10,32)
Decreased use of raw materials	(8,10,32)
Market and Financial Benefits:	
Increase in market share	(12,33)
Decrease in insurance coverage	(24)
Convenience in seeking for soft loans and investments	(12)
Increased profits	(12,45,46)
Increased competitiveness	(38,45,47)
Convenience in seeking for clients	(24,45)
Improved customer satisfaction	(24,32,33)
Social Benefits:	
Improved corporate image	(24,32,33,46)
Improved compliance with government regulations	(12,32,45)
Improved work climate within the company	(32,33)
Improved relations with the community and other stakeholders	(8,45)

Likert Scale Analysis

The questionnaire used the Likert Scale with a range of 1-5, and the assessment was then analysed the mean, median, and standard deviation. The median value showed the mean value. At the same time, the standard deviation was supposed to show the distribution of data or the average deviation distance of data points. The average result was the primary data used to analyse the obstacle parameters and benefits of ISO 14001 certification. The mean used to categorize the parameter values could indicate the position of the parameter ranking in questions (30). The mean value of the parameters was categorized by using a predetermined criterion score (31). The scores of the criteria used to categorize the mean value of the parameters could be seen in Table 2. The list of obstacles and benefits parameters to ISO 14001 certification was obtained from the literature research. This study used 11 obstacles parameters and 15 benefits parameters of ISO 14001 certification listed in Table 3 and Table 4. The authors also asked about how long the companies have obtained the ISO 14001 certification, perceived difficulty, the costs incurred, the company characteristics and respondent characteristics. The data obtained were processed using SPSS software version 21 and Microsoft Office Excel 2010 and later analysed using descriptive statistical methods.

Validity Test and Reliability Test

The validity of the research instrument was determined by testing the validity and reliability of 30 samples using the Pearson Product-Moment method. The basic formula used to test the validity is as follows:

$$r_{xy} = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{\{n\sum X^2 - (\sum X)^2\}\{n\sum Y^2 - (\sum Y)^2\}}}$$

Information:

- r_{XY} = Correlation coefficient between X and Y
- n = Sample amount
- $\sum XY$ = Total amount of XY data
- $\sum X$ = Total amount of X data variable
- $\sum Y$ = Total amount of Y data variable

The results of the validity test stated that all the research parameters were valid. The reliability test was carried out using the Cronbach Alpha method. The basic formula used is as follows:

$$\alpha = \frac{k}{k-1} \times \left[1 - \frac{\sum S_i^2}{S_r^2} \right]$$

Information:

- α = Reliability coefficient
- k = Number of valid items
- S_r^2 = Total score variant
- S_i^2 = Item score variant

The reliability test showed that the Cronbach Alpha values for the barrier variable and benefit variable were 0.926 and 0.943, respectively. These results stated that all variables were reliable.

RESULTS

Companies Characteristics

The information about company characteristics based on sector and scale could be seen in Tables 5 and 6. The majority were manufacturing companies (65.9%) that produce various products such as medicine, fertilizers, fodder, cables, and electronic goods. Meanwhile, 19.5% engaged in transportation, oil and gas services, and waste treatment services. Moreover, 14.6% of companies were in other sectors (14.6%) such as plantations, trade, and energy.

Table 5. Sample Companies (by sector)

Industrial Sector	Number of responses (per company)	Percentage (%)
Manufacture	27	65.9
Service	8	19.5
Others	6	14.6
Total	41	100

Table 6. Sample Companies (by size)

Number of personnel (per person)	Number of responses (per company)	Percentage (%)
>500	13	31.7
251-500	10	24.4
100-250	11	26.8
<100	7	17.1
Total	41	100

These companies consisted of exporting companies (43.9%) and non-exporting companies (56.1%). The company's market reached the international market (43.9%), national market (46.3%), and regional market (9.8%). Apart from implementing and being certified to ISO 14001, these companies were also certified to other standards such as ISO 9001, ISO 22000, ISO 45001/OHSAS 18001, and ISO 50001 that shown in Table 7.

Table 7. Respondent Characteristics

Variables	Frequency	Percentage (%)
Gender		
Male	30	73.2
Female	11	26.8
Educational Background		
High School	1	2.4
Associate Degree	4	9.8
Bachelors	24	58.5
Masters	12	29.3
Work Experience		
<5 years	6	14.6
5-10 years	18	43.9
10-15 years	9	22.0
>15 years	8	19.5

Obstacles on the ISO 14001 Certification

The cost of implementation and ISO 14001 certification was high-category obstacles for companies (3.61); whereas, another was included in the moderate category that was the lack of available resources (3.29), lack of additional training related to the environment (3.27), difficulties in implementing standards and the complexity of the implementation process (3.24), increasing volume of administrative and documentation work (3.22), lack of environmental-friendly culture (3.22), time consumption for standard application (3.15), lack of commitment (2.71), and lack of financial capacity (2.66). The frequency distribution of ISO 14001 certification obstacles shown in Table 8.

Table 8. ISO 14001 Certification Barriers

Barriers	Average	Median	Deviation Standard
High cost of implementation and certification	3.61	4.00	0.833
Lack of available resources	3.29	4.00	0.929
Lack of additional environmental training	3.27	3.00	0.895
Difficulty in applying the standard and complexity of the process	3.24	4.00	1.090
Increased volume of administrative work and documentation	3.22	3.00	0.936
Lack of environmental-friendly culture	3.22	3.00	0.852
Time consumption for ISO 14001 standard implementation	3.15	3.00	0.937
Lack of employee commitment, awareness, and motivation	3.02	3.00	0.961
Long certification process	2.90	3.00	0.800
Lack of management commitment	2.71	3.00	0.981
Lack of financial capacity	2.66	3.00	0.938

One of the obstacles in carried out ISO 14001 certification was the long-time duration of the certification process. Each company took different times to carry out the certification process, from official registration to certification bodies until to obtain the certificates. Most companies needed about 4-7 months to complete the certification process (59%). Figure 1 showed the average percentage of the ISO 14001 certification duration.

Most of the companies (63%) stated that getting an ISO 14001 certificate was still slightly difficult. Figure 2 showed the information regarding the level of difficulty in obtaining an ISO 14001 certificate.

Benefits on the ISO 14001 Certification

Based on the frequency distribution of ISO 14001 certification in Table 9, it concluded that almost all the benefits of ISO 14001 certification were obtained in the high category. The most dominant benefits of ISO 14001 certification included the improved corporate

image, increased compliance/adherence to government regulations, increased customer satisfaction, and increased competitiveness. Based on the data obtained, the companies thought that the market and social benefits outweighed the environmental benefits.

Table 9. ISO 14001 Certification Benefits

Benefits	Average	Median	Deviation Standard
Improved corporate image	4.20	4.00	0.782
Improved compliance to government regulations	4.17	4.00	0.667
Improved customer satisfaction	4.12	4.00	0.714
Increased competitiveness	4.05	4.00	0.835
Improved work climate within the company	3.95	4.00	0.740
Improved relations with the community and other stakeholders	3.93	4.00	0.818
Convenience in seeking for clients	3.78	4.00	0.909
Reduction in water, air, and soil pollution	3.78	4.00	0.725
Increased profits	3.76	4.00	0.767
Increased market share	3.76	4.00	0.767
Energy saving	3.63	4.00	0.767
Decrease in raw materials	3.61	4.00	0.833
Reduction in the volume of generated waste	3.46	4.00	0.897
Convenience in seeking for soft loans and investments	3.39	4.00	0.919
Decrease in insurance coverage	3.32	3.00	0.820

Financial benefits in easy access to loans and reduced insurance coverage had the lowest score and fell into the relatively moderate category. Therefore, the benefits of ISO 14001 certification were considered to outweigh the costs. This conclusion can be drawn from Figure 3, which informs that most companies (83%) thought so. In general, it can be concluded that ISO 14001 certification can provide benefits for companies.

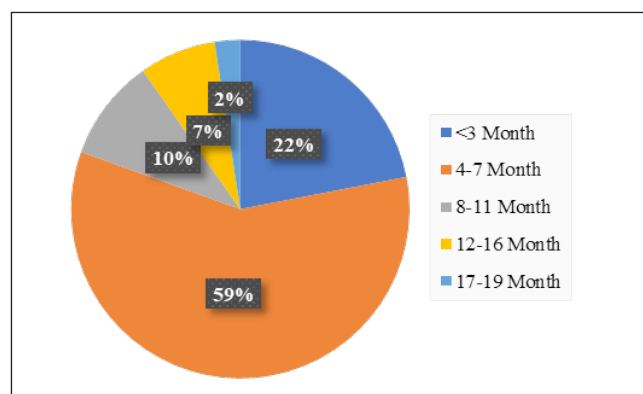


Figure 1. Duration of ISO 14001 Certification

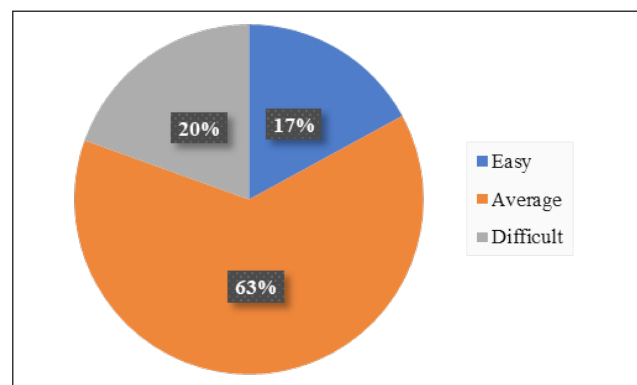


Figure 2. Difficulty Levels in Obtaining ISO 14001 Certificate

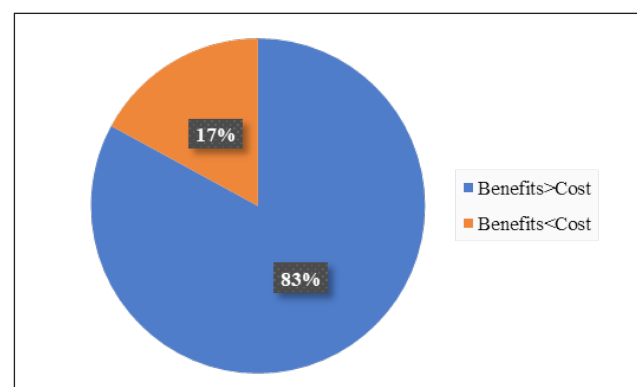


Figure 3. Comparison of Benefits and Costs of ISO 14001 Certification

DISCUSSION

ISO 14001 Certification Obstacles Analysis

Based on the respondents' answers, the most critical obstacles were the cost of implementing and certifying with ISO 14001. Furthermore, many studies also said that cost to implemented and certified ISO 14001 was a significant external constraint (11,13,15,18,32). The companies considered that the costs were relatively expensive to carry out ISO 14001 certification. Most of the ISO 14001 certification agency in Indonesia were private with profit-oriented. Certification costs also vary significantly between certification agencies. There is no standard cost of ISO 14001 certification at this time. The amount of the certification fee depends on the contract agreement between the company and the certification agencies.

At the initial implementation, the costs incurred were generally considered to outweigh the benefits and gains (33).

The incurred costs usually covered training fees, consulting fees, processing fees, certification registration fees, and certification maintenance (34). Companies also require high costs for environmental technology investment and maintenance (18). This cost factor determines the sustainability of ISO 14001 certification, especially at small companies (32). Findings in this study showed that companies considered the long term benefits of this certification was greater than the costs incurred. They could still overcome the cost and would continue their certifications. Otherwise, companies would not continue their certification even though they could pay the certification fee. Furthermore, this was evidenced that almost all companies planned to re-certify when the due date.

Another obstacle that needs to be considered is the lack of resources, including personnel, facilities, and technology. Without sufficient resources, it difficult to implemented ISO 14001 properly, primarily to fulfil the clause requirements. Sufficient resources are essential to successfully ensuring the sustainability of the environmental management system implementation (35). Companies also face difficulties in procuring additional training related to the environment, even though it is one of the efforts to support the EMS. Staff training is sometimes not a priority for company management, especially at small companies (36). Although many companies have been able to create training programs, they have not been able to identify training needs correctly. Properly training can lead the employee competence to implement EMS. These competencies in conducting environmental audits, identification and measuring environmental aspects, and controlling the environmental impacts (37).

Other obstacles that need to be considered are difficulties in implementing administrative and documentation work. A previous study at Italian companies showed that the difficulties companies experience experienced an increase in the complexity of procedures due to the implementation of clauses (20). Furthermore, increasing workload occurs because a large amount of documentation must be produced regularly requiring people with special soft skills, this obstacle is directly related to personnel work hours in the company (15).

The lack of an environmentally friendly culture was also a barrier for companies to carry out ISO 14001 certification. The employees and management behaviour would affect the level of contamination and energy consumption (37). Some study mention that low employee involvement and awareness were of the

main obstacles in carried out the ISO 14001 certification (14,20). Our study findings, can be concluded that the commitment of top management and employees went synergistically. Therefore, it can increase the company's chances of obtaining more optimal benefits of ISO 14001 certification.

Our study showed that 67% of the companies obtained certificates within 4-7 months after submitting an official application. Obtaining the certificate within 4-7 months is categorized as a relatively brief time and still within reasonable limits. The companies may resolve the obstacles more efficiently and thus can complete the certification process quickly. However, getting certificates faster did not mean that the companies have a better system than to a longer certification process.

In this study, a company's financial capacity was not a significant obstacle. Despite the fact, this is the main barrier faced by a company (23,32). Most of the companies in this study were large companies (82.9%) and thus were possible to have better financial capabilities than small companies (17.1%).

Analysis of ISO 14001 Certification Benefits

This section discusses the benefits obtained by companies after carrying out ISO 14001 certification. These results proved that ISO 14001 certification could significantly benefit the companies in terms of environmental, social, market, and financial benefits. The company image is significant to get a good impression from the public, both regarding its concern for the environment and its product quality. In addition, it will increase the trust of customers and external stakeholders. Companies certified with ISO 14001 widely believed to be environmental-friendly companies.

The benefits of increasing conformity/obedience to government regulations are not significantly different from improving corporate image. The ISO 14001 standards encourage companies to follow government environmental regulations. A company will try to minimize the amount of industrial and domestic waste also the levels of contamination to do not exceed the environmental threshold limit value. This requirement is set out in clause 6.1.3 of ISO 14001, which states that the company must determine how compliance obligations apply (35).

Customer satisfaction increases as a benefit would reach by the company that ISO 14001 certified. A report from Europe showed that European public awareness of environmental issues requires companies to certify ISO 14001 correlated consumer satisfaction with the company (13). Moreover, companies with

international markets must be ISO 14001 certified to be accepted by consumers from developed countries with high environmental awareness.

Another benefit is increasing competitiveness between certified and uncertified ISO 14001. A certifying company appeared more superior and more substantial competitiveness than uncertified companies in the markets (38-39). However, this competitiveness also depends on competing companies. If there are already many competitors certified with ISO 14001, the competitiveness can be insignificant (38).

Implementation of ISO 14001 also improvement the company work culture as good cooperation between employees, communication between management and employees runs smoothly, and increase the responsibilities. The good involvement of company leaders may improve employee participation and motivation. Good cooperation within the company impacted in increasing the productivity indirectly (11,37,40). Besides in improving the company's internal relations, the ISO 14001 certification also improve good relations with the community and regulators to minimize the complaint.

The next benefit is obtaining tenders more easily. Possession of ISO 14001 certification is sometimes required to get offers or compete to get tenders from the government or company partners. Certifying companies with ISO-14001 already usually will choose suppliers who also certified have done. The government provide opportunities to company to participating tenders if they fulfil environmental obligations, which can be proven by possession of ISO 14001 certificate. This benefit was not much different in score from increasing market share and increasing profits from sales. These three benefits can provide financial opportunities for the companies directly. Besides that, the company could easily access soft loans, reduce insurance coverage, investment funds, especially from the financial industry that concern encouraging environmental sustainability.

Some benefits directly correlated to the environment is consisting of decrease pollution, save the energy, use of raw materials, and volume of generated waste. The ISO 14001 implementation encourages companies to strive for cleaner production, for example, by using eco raw materials and reducing the generated waste (41-42). The companies also monitored the environmental parameters by applying the Life Cycle Assessment principles regularly.

The results showed that the perception of corporate respondents on the social benefits of ISO 14001 certification was greater than other benefits. The environmental benefits of ISO 14001 certification were

primarily determined by how the companies internalized the requirements of the ISO 14001 standard. Social benefits are obtained from increasing reputation, which is more symbolic, while market and financial benefits are obtained indirectly after the companies obtain environmental and social benefits. Companies can adopt the ISO 14001 implementation policies for representational purposes, although they will not implement operational activities. The actual operation might be different from the policies. The company's decision to adopt the strategy of implementing ISO 14001 symbolically or substantively can affect the outcomes (43). The companies in the manufacturing sector agreed that ISO 14001 certification increased profits from sales locally and broadly. The manufacturing companies were more benefited significantly from increasing market share than service companies. Based on the benefit analysis, it can be seen that the benefits obtained by the companies were primarily non-cashable.

Recommended Efforts to Promote ISO 14001 Certification

The government might stimulate the company to carry out ISO 14001 certification by overcoming the barriers and optimizing the potential benefits. Cost of implementation and certification was the highest barrier in ISO 14001 certification. The government might overcome the barrier by encouraging more certification bodies from government institutions; in turn, companies can obtain relatively cheaper ISO 14001 certification costs.

The government can also determine the standard cost of ISO 14001 certification for government ISO-14001 certification bodies. Currently, only three certification bodies from government institutions have been accredited by the National Accreditation Committee for a specific scope. Barriers related to difficulties in implementing the ISO 14001 standard, which is considered complex, and to inadequate environmental training, can be overcome by increasing incentives through training and technical guidance related to the ISO 14001 standard for companies. This effort can also improve the competence of company personnel to internalize the certification requirements to obtain optimal environmental benefits.

In optimizing financial benefits i.e., easy access to soft loans as business capital, the government can increase green financing to encourage companies to take the ISO 14001 certification. Green financing is a financial-related policy that encourages financial industry players to provide convenience for those who seek for minimizing possible environmental impacts from their activities. Green financing has been widely carried out in developed countries such as in America and Europe.

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CONCLUSION

This study recommends encouraging the companies to take the ISO 14001 certification by overcoming cost of certification and understanding the implementation. The government needs to optimize financial benefits for certified companies by providing easy loans and investors. The government also establish more certification bodies and set the affordable cost standards for ISO 14001 certification. Besides, they can provide workshops and technical guidance to facilitate companies that want to apply ISO 14001 standard and develop green financing programs.

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