

The Study of Implementation of ISO 14001 for Small-and-Medium Sized Manufacturing Industries in Taiwan

Ching-Wen Li, Chairman
Department of Industrial Engineering
National Taipei University of Technology
Taipei, Taiwan, Republic of China

Abstract

This paper describes the reasons for enterprises to implement the ISO 14001 standard, the definition of a small-and-medium sized enterprise in Taiwan, characteristics of the small-and-medium sized enterprises, the problems faced by the enterprises exporting their products and the implementation of ISO 14001 standard for the small-and-medium sized manufacturing industries in Taiwan.

Introduction

Enterprises face strong challenge of fast change of technology, increasing of energy and labor cost, high quality product. Therefore it is getting harder to run business. For those enterprises exporting products, it is necessary to implement ISO 14001 in order to facilitate trade, remove trade barrier, improve environment performance and build a worldwide consensus that there is a need for environmental management and for a common terminology [2]. Enterprises in Taiwan face same problems.

More than 95% of enterprises in Taiwan, Republic of China are small or medium sized enterprises. An enterprise is defined as a small or medium sized enterprise if it meets one of the following criteria [1] :

1. Manufacturing or construction industry with invested capital less than NT\$60,000,000 and total assets less than NT\$120,000,000.
2. Mining industry with invested capital less than NT\$60,000,000.
3. Any commercial or transportation or other service industry with previous annual sales revenue less than NT\$60,000,000.
4. Other industries with annual sales revenues less than NT\$60,000,000.

The Characteristics of Small and Medium Sized Enterprises

Small and medium sized enterprises in the Republic of China can typically be characterized as follows [1]:

1. They are family-managed and family-operated.
2. Owners of enterprises are well educated and have working experience.
3. Most of the newly found enterprises are run by an aggressive new generation.

The Implementation of ISO14001 of Small and Medium Sized Manufacturing Industries

Most products manufactured by small-and-medium sized enterprises are exported. They face strong competition from other countries. Therefore, they should change the way they manage the enterprises and meet customers' needs. Thus, implementing ISO 14001 is required.

This paper studies the implementation of ISO 14001 for small-and-medium sized manufacturing enterprises in Taiwan. ISO 14001, the environmental management system standard, provides a framework to direct the use of organizational resources to the full breath of actual and potential environmental impacts through reliable management process and a base of educated and committed employees [2].

There are 175,978 small-and-medium sized manufacturing enterprises in Taiwan in 1998. Among them, 306 enterprises were registered to ISO 14001. This number accounts for 0.173% of

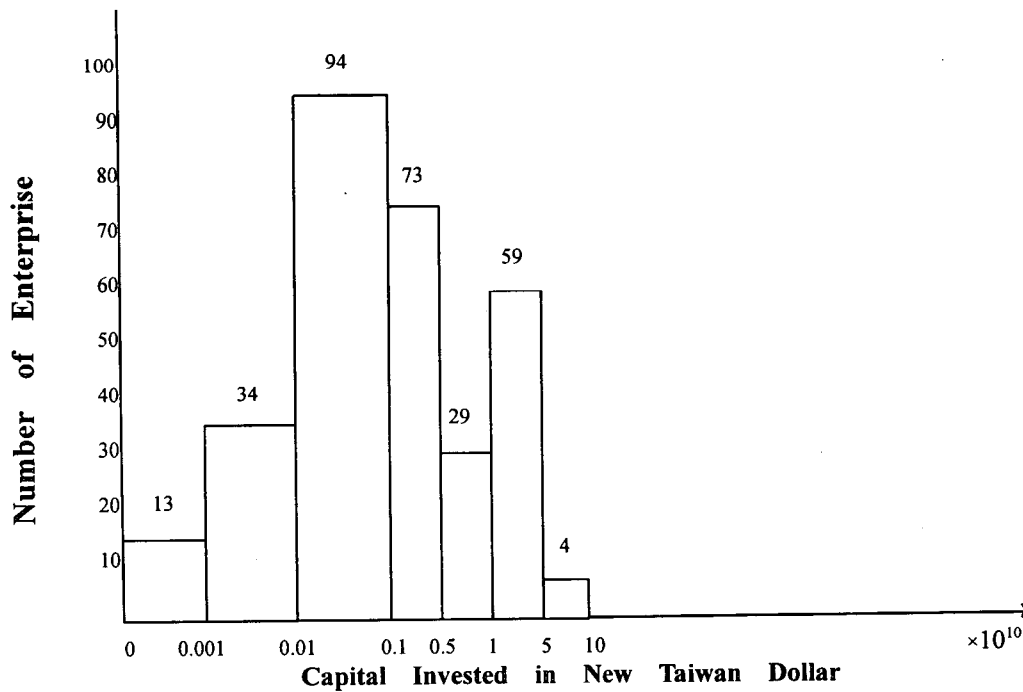
the small-and-medium sized manufacturing enterprises. These include the following major industries[3]:

Electronics	(26.80%)
Electrical and appliance	(13.40%)
Mechanical	(11.43%)
Petroleum	(10.77%)
Plastic	(10.45%)

The capital invested in New Taiwan Dollar by the enterprises registered to the ISO 14001 standard is [4]:

Capital Invested (10^{10})	Number of Firm	Percent of Firm
less than 0.001	13	4.25
0.001 ~ 0.01	34	11.11
0.01 ~ 0.1	94	30.71
0.1 ~ 0.5	73	23.68
0.5 ~ 1	29	9.48
1 ~ 5	59	19.29
over 5	4	1.30

Graphically present as:



The enterprises were registered to the ISO 14001 standard by the following agencies :

- Bureau of Commodity Inspection and Quarantine (87)
- Bureau Veritas Quality International (18)
- BSI Pacific Limited Taiwan Branch (5)
- DNV-Taiwan (65)
- Lloyd's Register Inspection Ltd. (25)
- N.V. KEMA (1)
- RWTUV Far East Ltd. Taiwan Branch. (16)
- SGS Taiwan Ltd. (76)
- TUV Rheinland Taiwan Ltd. (8)
- TUV Product Service Taiwan Ltd. (2)
- UL International Service Ltd. (3)

The number in the parenthesis indicates the number of the enterprises registered.

After surveying 250 small-and-medium sized manufacturing enterprises, we received 56 copies of the questionnaires. This accounts for 22.4% of our survey. The major reason that 194 surveyed did not respond because they do not really understand ISO 14001. Currently, 7 are implementing it now and 26 were registered to the ISO 14001 standard. Among them, 23 enterprises do not intend to implement ISO 14001.

After surveying, and analyzing the questionnaires , we reach the following conclusions:

- Most of the enterprises surveyed do not really understand ISO 14001.
- Small-and-medium sized manufacturing enterprises and petroleum industries are willing to implement ISO 14001.
- The certificates to the ISO 14001 standard were issued to most of the medium-and-large sized enterprises running electronics , electrical , mechanical , petroleum and painting business.
- The motivation of implementing ISO 14001 is to establish or improve an environmental protection system.
- The problem faced in implementing ISO 14001 are :

- 1.Lack of related education and training.
- 2.Heavy workload.
- 3.Lack of manpower.
- 4.High implementing cost.

The Roles of Our Governments in Implementing ISO 14001 [5]

Our governments encourage our enterprises to implement ISO 14001 environmental management system in order to achieve environmental protection and economic development. Thus Industrial Development Bureau at the Ministry of Economic Affairs combines related governmental organizations to perform this task. Namely, the National Bureau of Standard establishes national environmental management standard . The Bureau of Commodity Inspection & Quarantine is responsible for issuing certificate for achieve the requirement of ISO 14001. The National Science Council is responsible of research and development .The Industrial Technology Research Institute is responsible for developing technical tools and data base .The Environmental Protection Administration is in charge of environmental protection regulations.

The Steps of Implementing ISO 14001

The steps of implementing ISO 14001 can be summarized as follows:

- 1.understanding of the importance of implementing ISO 14001.
- 2.commitment and support of the owner of an enterprise
- 3.commitment and involvement of senior management
- 4.creation of the infrastructure to implement ISO 14001
- 5.understanding of the requirement of implementing ISO 14001
- 6.training
- 7.implementing
- 8.auditing

References

1. Bidanda, Bopaya, Cleland, David I., and Dharwadkar, Shiram R., *Shared Manufacturing: A Global Perspective*. New York: McGraw-Hill, 1993.
2. Cuscio, Joseph, Woodside, Gayle, and Mitchell, Philip, *ISO 14000 Guide*, New York: McGraw-Hill Co., 1996.
3. *Environmental Protection Report*, Industrial Development Bureau of the Republic of China, September 1998.
4. *Industrial Reduced Wastes*, Industrial Development Bureau of the Republic of China, September 1998.
5. *Plant Environment Management System Implementing Practice*, Industrial Development Bureau, Ministry of Economic Affairs of the Republic of China, 1997.