Costs, Benefits, and Motivations for ISO 14001 Adoption in China and Around the World

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Increasingly, firms in many countries desire greater flexibility in meeting pollution reduction targets in order to improve their environmental impacts, while simultaneously enhancing economic competitiveness through reduced resource use and innovative production methods. ISO 14001 is a relatively new initiative designed to harmonize environmental management systems (EMSs) in order to assist firms in their efforts to meet increasingly stringent national level environmental requirements, while simplifying the process of product export through the evolution of uniform process standards.

Environmental self-regulatory efforts by industry are on the rise both nationally and internationally. Yet is not completely clear why some firms become certified and others do not. Nor is it clear why rates of certification to ISO 14001 or other international voluntary regimes vary so greatly between countries. With these ideas in mind, this study examines three main questions in an attempt to better understand self-regulatory regimes: 1) Are the costs and benefits for ISO 14001 certification the same for Chinese firms as for firms in other countries, even though China’s unique economic and political system influence the market and regulatory incentives of firms; 2) Can self-regulatory measures, such as ISO 14001, really accomplish the public and private goals of improved environmental performance by firms; and a related issue 3) What are the public policy implications of self-regulatory measures such as ISO 14001?

This study presents evidence that ISO 14001 certification appears to be improving the environmental performance of firms, based on more than 159 surveys of firms worldwide. While Chinese firms pursue certification for many of the same reasons as firms in other countries, there are some unique aspects of ISO 14001 certification.

Abstract: In an attempt to overcome barriers to trade posed by numerous and often contradictory national-level environmental requirements, the International Organization for Standardization (ISO) has created a voluntary set of uniform environmental management system guidelines for firms, formally known as ISO 14001. Firms may decide to implement an ISO 14001 environmental management system (EMS) and become third-party certified in order to improve their environmental management and to increase their marketability. This study examines the relative costs, benefits, and motivations for ISO 14001 certification for China compared to other economically developing and developed countries. These comparisons allow us to better understand the ways in which the unique economic and political conditions within China affect the incentives for Chinese firms to join in voluntary self-regulatory measures. Survey results indicate that ISO 14001 certified firms in China are experiencing benefits equal to or greater than their peers in other countries. Benefits to environmental management appear to be significant and they generally outweigh the costs of implementation and certification. However, as with most voluntary standards, the potential for abuse remains. Therefore regulators and policy makers are advised not to grant regulatory relief or reduced inspections except on a case-by-case basis.
in China that make it an interesting case to study.

This study makes contributions to knowledge in the areas of public management theory and practical firm management. At the theoretical level, this study sheds light on the reasons why firms would voluntarily self-regulate. It is not clear from the existing literature which factors most strongly motivate improvements in environmental management by firms: economic forces, regulatory requirements, national variation in culture and litigiousness, or the presence of environmental leaders within firms. This study examines and compares these motivations in the case of ISO 14001, thereby allowing for the relative importance of these factors to be assessed. This is an important contribution to existing knowledge in the fields of public management and policy.

At the practical level this information is important and timely, as many domestic, joint venture, and foreign firms are currently evaluating whether or not ISO 14001 certification is right for them. While ISO 14001 certification is not required, Chinese regulators strongly recommend that foreign firms consider certification. In fact, some of the individuals interviewed were not clear as to whether ISO 14001 was actually required or just “very strongly recommended”. Additionally, the information presented in this study should help Chinese regulators (and regulators worldwide) as they decide what kinds of incentives and/or regulatory relief are justified for ISO certified firms.

What is ISO 14001 and Why is it Important?

ISO 14001 is the dominant international environmental management system standard and certification is rapidly becoming a requirement for international trade. Many large corporations, such as General Motors, Ford, and Home Depot require their sub-contractors to be ISO 14001 certified. Some governments, including the European Union (EU) are giving preference in contracting to ISO 14001 certified companies. For many companies, certification has become a term of trade and many others fear that it will become so. With the recent admission of China to the World Trade Organization (WTO), many firms within China hope to tap new export markets and/or increase their sales to existing markets. ISO 14001 certification may well be a prerequisite for both of these activities.

So what is an environmental management system (EMS)? An EMS is a voluntary and flexible approach to environmental management designed to assist firms in their efforts to improve environmental performance. The environmental management system helps companies to track their environmental impacts and take steps to improve them. It provides the information necessary to make improvements and to chart progress toward environmental goals. One criticism of ISO 14001 is that it can provide the tools necessary for environmental improvements at the firm level, but there is no guarantee that all firms will fully use the information provided by the EMS to actually improve their environmental performance.

Environmental management systems are designed with a focus on process rather than output. Therefore, an EMS is not a product standard. Product standards often conflict with World Trade Organization rules, making them unworkable.

The 14001 standard does not require continual improvements in environmental performance, but it does require continuous improvements in the EMS itself. This is so confusing, that many consultants and auditors are under the false belief that companies must show continual environmental performance improvements in order to become certified and to renew certification. For those who wanted a more stringent standard, this misunderstanding is not necessarily bad. However, it seems logical that if the EMS is getting better and better, there should be related improvements in environmental performance.
Insights from Previous Work

As mentioned above, numerous theories exist which attempt to explain why firms decide to improve their environmental practice and become more “green” or clean. Some of this literature argues that economic or market-based incentives, such as economic savings from reduced waste, are the most important factors driving firm-level decision making (Porter and Van Der Linde, 1995; Porter, 1991). Other observers argue that firms only become cleaner when forced to do so by the specter of looming regulation (Cook, 2000; Lutz, Lyon and Maxwell 2000). Still others argue that differences may be attributable to variation in national cultures and regulatory frameworks (Kollman and Prakash 2001).

And a final vein of research investigates the role of individuals within firms who take up the cause of environmental stewardship and act as leaders to initiate change (Raines and Prakash 2002). While it is relatively clear that all of these factors influence firm-level decision making, it is not yet clear how to weigh these individual factors or how their interdependence influences outcomes. Therefore, the surveys used in this study asked firm leaders to rate the importance of these varying factors on their decision to become ISO 14001 certified. This data provides information about variations between different types of countries (e.g. economically developed and developing), and variations in the importance of these factors in the case of ISO 14001.

At the practical level, one study of ISO 14001 in China has been done previously and its findings deserve examination. As of 1999 there were approximately 120 ISO 14001 certified enterprises in China (Liu, 1999). In April of 1999, the China Center on BMW and the United Nations Centre for Regional Development (UNCRD) conducted a survey of 46 certified enterprises. This study found the majority of firms (78%) took between 7 and 12 months to implement and certify their ISO 14001 EMS. In terms of their motivations, 91% of firms reported that they chose to pursue ISO 14001 in order to “enhance the firm’s image among the public and investors” (1999:1). The vast majority of respondents also stated that certification would enhance environmental awareness among employees (89%), improve environmental management methods (85%), reduce environmental accidents and risks (74%), bring new international marketing opportunities (67%), and help reduce costs (67%). Mohammed Matouq, from the UNCRD also reviews these findings in his 2000 article.

While the respondents in Lee’s report mentioned a number of obstacles to certification, only 10% stated that the fees for registration and consultation were prohibitively high. Instead, firms found difficulties in prioritizing their environmental goals, communicating with relevant stakeholders, and assigning environmental tasks and responsibilities to employees. All of these tasks are required for certification.

The good news is that the certified firms in Lee’s study reported many environmental improvements since ISO 14001 implementation: 26% reduced greenhouse gas emissions, 22% reduced their sulfur emissions, 15% reduced their Nitrous Oxide emissions, and 28% reduced their solid particulate emissions (1999:2). Similar improvements were reported for the reduction of hazardous wastes and water pollutants.

This study builds upon this work by examining the costs, benefits, and motivations for ISO 14001 certification in China compared to those of firms in other countries. Because of China’s unique economic and political system, China cannot readily be grouped with other developing countries, nor is it truly an economically developed country. Therefore, it is interesting to compare findings from China to both of these other groups in order to see potential differences.

Methods and Data

Ideally, the efficacy of an environmental regime would be measured by its direct impacts on environmental performance. To get these measures, it would be necessary to gather data on environmental emissions and resource usage both pre- and post- ISO 14001 implementation, while controlling for other explanatory factors, such as the introduction of new technologies and changes in environmental regulations and/or market prices that encourage or discourage resource conservation and efficiency.

Currently, Dennis Rondinelli at the University of North Carolina (U.S.A.) is working in conjunction with
the U.S. Environmental Protection Agency (USEPA), to conduct exactly this type of study for U.S. firms only. This is a longitudinal study with data collection occurring over a period of three years. It took a number of years to create the data collection protocols and to get firms to agree to participate. As participation is somewhat onerous, the EPA has been a key ally in securing cooperation from individual facilities.

This study cannot be easily replicated at the international level. These measures would need to be comparable across countries and industries. It is very difficult to gain access to this kind of detailed information. In many countries such information simply does not exist, as municipal regulations governing monitoring and reporting vary greatly by country and even within individual states or sub-national units. To get information about ISO 14001’s impact on trade, one would need to gather data about firm trade patterns pre-and post ISO 14001 certification, preferably over the course of five or more years, while controlling for other forces that would affect these measures (e.g. economic growth rates, changes in trade laws and barriers, etc). Clearly this kind of cross-national data is not easily obtainable, if it can be obtained at all.

Therefore, this study asks firm CEOs and managers to share their perceptions about the impact of ISO 14001 on their facility’s environmental performance, on their company’s ability to trade, on profitability, and on relationships with regulators. By analyzing both quantitative (e.g. Likert Scale questions) and qualitative data, it is possible to examine the perceived efficacy of ISO 14001, the costs and benefits, and the motivations for certification.

Both the open-ended and quantitative data will be presented. The qualitative data supply an important source of information that will bolster, enrich, and deepen the study’s quantitative findings.

The Surveys

As mentioned earlier, 26 Chinese firms and 133 firms from 16 other countries completed surveys. Of the non-Chinese respondents, 58 were from developing countries and 75 responses came from economically developed countries. All of these responses came from ISO 14001 certified firms. In the majority of cases, environmental managers completed the questionnaire, although other types of managers and Chief Executive Officers (CEOs) completed approximately 33% of the questionnaires. These surveys included more than 50 questions and took anywhere from 30-60 minutes to complete. The survey included questions about the costs, benefits, and motivations for ISO 14001 implementation and certification; the impact of certification on relationships with regulators; the existence of subsidies or other incentives for certification, and demographic information about the firms themselves. Table 1 shows the number of responses from non-Chinese countries, the response rates for each country, and for the two countries grouped into the categories of developed and developing countries. Chinese firms are not included in this chart, but are discussed below.

Non-Chinese Respondents

For the non-Chinese respondents, the firms responding to the survey varied in size, with most being rela-

<table>
<thead>
<tr>
<th>Country Name</th>
<th>No. of Responses</th>
<th>Response Rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Columbia</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td>Ecuador</td>
<td>2</td>
<td>66</td>
</tr>
<tr>
<td>India</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Malaysia</td>
<td>21</td>
<td>35</td>
</tr>
<tr>
<td>Mexico</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>South Africa</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td>Uruguay</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Developing Nations Combined</td>
<td>58</td>
<td>40</td>
</tr>
<tr>
<td>Canada</td>
<td>19</td>
<td>33</td>
</tr>
<tr>
<td>Spain</td>
<td>1</td>
<td>08</td>
</tr>
<tr>
<td>Sweden</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>U.K.</td>
<td>7</td>
<td>47</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>30</td>
<td>56</td>
</tr>
<tr>
<td>Developed Nations Combined</td>
<td>75</td>
<td>34</td>
</tr>
</tbody>
</table>
tively large. Only one firm had fewer than 20 employees, 5 had between 20 and 49 employees, 12 had between 50 and 99 employees, 36 had between 100 and 299 employees, 42 firms had between 300 and 999 employees and 27 firms had more than 1000 employees. It is not possible to know the size of the distribution of the Chinese firms, because that question was removed from the Chinese survey. Due to concerns about the length of the Chinese survey and the newness of survey research in China, a number of questions were deleted so that it is not possible to compare Chinese responses on all of the original survey questions. However, the Chinese survey remains full of interesting and useful data that will be compared to responses from other countries on all possible points.

Unfortunately, there is no central registry listing the names and contact information for ISO 14001 certified firms worldwide. Contact addresses for the non-Chinese respondents in this survey came primarily from members-only website entitled "Globenet". From this website, firms from the targeted countries were randomly selected (e.g. every third address was chosen). For the Swedish firms, the addresses came from a publicly available list of all certified firms.

The quality of the contact information obtained appears to vary by country. When phone numbers were available (for many firms in the U.S., Canada, Sweden, and Mexico), the author and one Spanish-speaking assistant verified the contact information via telephone. Telephone numbers were not available for most of the firms in South America, South Africa, and Asia. However, phone calls revealed that most of the addresses were confirmed for firms in the U.S., Canada, and Sweden, but phone numbers were less often listed for firms in the developing countries, thus making it difficult to confirm the accuracy of those addresses.

In order to maximize the response rates, the survey was translated into Spanish, French, and Standard Chinese. While many firm managers in Malaysia, Indonesia, and other developing countries may speak English, the fact that the survey was not in their first languages likely reduced response rates for many countries. These many obstacles, combined with the varying quality of mail service, make international survey research difficult at best. While the response rates and breadth of participation is not ideal, it does allow us to reach tentative conclusions on a number of issues.

Chinese Respondents

Unlike the other countries surveyed, survey research in China poses unique obstacles. For example, it has been more difficult to obtain contact information for these firms than it has been for firms in some other countries. Secondly, in China, respondents are highly unlikely to complete a survey that is mailed to them unless they are familiar with the organization or the individuals conducting the survey. Relationships are important and without a pre-existing relationship survey researchers are unlikely to receive a response. For these reasons, the authors obtained the assistance of the Tianjin Environmental Protection Bureau. Without their assistance and commitment this survey would not have been possible.

The Tianjin Environmental Protection Bureau distributed the survey, in standard Chinese. The survey was accompanied by a cover letter explaining the survey and its purposes. The response rate was 100%. While the surveys were not anonymous, respondents did understand that the purpose of the survey was to gather information that would help other firms and the government to develop appropriate responses to ISO 14001. The survey responses were translated back into English by a professional translator and university-level Chinese Language Instructor.

Twenty-six surveys were gathered, with 19 coming from certified firms and 7 coming from uncertified firms. Gathering information from both types of firms allows us to begin to understand why some firms choose to become certified while others do not.

Findings

Motivations

As Table 2 shows, managers of certified firms around the world were asked to check all of the motivations that applied to their decisions to become certified. Overall, we see that Chinese respondents were less likely to check off these categories than were man-
agers in most other countries. It is possible that Chinese firms are feeling less overall motivation to become certified. This might help to explain why so few Chinese companies are becoming certified to ISO 14001.

Why might they be less motivated to become certified? One possible answer may lie in the existence of such a large domestic market. Many Chinese firms can prosper without needing to expand their sales to foreign markets. Since the primary motivations for certification often include a desire to increase exports, pressure from a parent company and/or pressure from trading partners, firms that are not export dependent should feel less overall motivation for certification.

Other possible explanations exist as well. Forces that were not included in the survey’s list may motivate Chinese firms. While respondents were encouraged to write-in additional motivations, none of the Chinese respondents did so. It is also possible that lower levels of awareness about ISO 14001 have resulted in weaker motivations, but this is simply a hypothesis in need of further research, rather than a research finding.

As was the case with their foreign counterparts, the most commonly reported motivation for ISO 14001 certification by Chinese firm managers was the desire to “be an environmental leader and a good neighbor”, with 14 out of 19 firms listing this as a motivation. If companies generally pursued ISO 14001 only to reap financial gains, but without true concern for the environment (although these are not mutually exclusive), then we would expect categories like “economic savings” or “green marketing” to be the most common responses. While these two categories are ranked as important, the respondents more commonly reported a desire to provide environmental leadership and to be a good neighbor.

While some individual firms may pursue an ISO EMS purely for publicity purposes, the most frequent motivation appears to be truly a “green” motive. This should provide some level of reassurance to those who are concerned that ISO 14001 is little more than “greenwashing”. For all three groups of respondents, the second most common motivation was “green marketing”. Interestingly, Chinese firms are less likely to report this as a motivating force than are non-Chinese firms. It may be possible that the environmental awareness of the citizenry in many developing countries, including China, is somewhat lower than that of citizens in other countries, thereby resulting in fewer green marketing opportunities. Or, it is possible that marketers have simply not yet realized the benefits of green marketing. Anecdotal accounts from Chinese firms indicate that they are increasingly concerned with their environmental image, as Chinese consumers are increasingly becoming environmentally conscious.

On the other hand, in Sweden the level of environmental awareness is very high. Swedish respondents stated they were equally motivated by the desire for green marketing and the desire to be environmental leaders/ good neighbors. More work needs to be accomplished before this hypothesis can be tested, but it is likely that the level of environmental awareness among the citizenry is closely tied to green marketing.

Table 2: Comparing Motivations for ISO 14001 for Chinese and Non-Chinese Firms (all numbers in percentages)

<table>
<thead>
<tr>
<th>Country</th>
<th>Environmental Leadership/Good Neighbor</th>
<th>Green Marketing</th>
<th>Parent Company Requirements</th>
<th>Trade Partner Requirements</th>
<th>Economic Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>74</td>
<td>53</td>
<td>47</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Developing Countries</td>
<td>93</td>
<td>83</td>
<td>71</td>
<td>72</td>
<td>71</td>
</tr>
<tr>
<td>Developed Countries</td>
<td>92</td>
<td>81</td>
<td>72</td>
<td>73</td>
<td>79</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country</th>
<th>Pressure/Incentives from Regulators</th>
<th>Regulatory Relief</th>
<th>Understand Regulations</th>
<th>Reduce Liabilities</th>
<th>Increase Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Edited from survey</td>
<td>0</td>
<td>16</td>
<td>21</td>
<td>37</td>
</tr>
<tr>
<td>Developing Countries</td>
<td>83</td>
<td>67</td>
<td>81</td>
<td>78</td>
<td>72</td>
</tr>
<tr>
<td>Developed Countries</td>
<td>64</td>
<td>63</td>
<td>72</td>
<td>68</td>
<td>60</td>
</tr>
</tbody>
</table>
motivations by firms (or lack thereof). The third most common motivation among Chinese firms was "parent company requirements". This is not surprising, since the Chinese government has recommended (but not required) certification for joint venture and foreign firms. Under World Trade Organization (WTO) rules, the Chinese government (and all governments) must treat foreign firms the same as domestic firms. Therefore, the government can recommend ISO 14001 certification but they cannot require it. However, international business people generally understand that it is wise to comply with these types of requests.

Interestingly, Chinese firms report less motivation for regulatory relief, less of a need to use ISO 14001 to improve their understanding of regulatory requirements, and less of a desire to reduce liabilities than do firms in other countries. These findings are interesting, especially in light of interviews with government officials that indicate that certified firms in China may indeed receive regulatory relief in the form of fewer inspections and improved relationships with government regulators.

Previous research has indicated that ISO 14001 certification, in and of itself, may not be sufficient to guarantee compliance with applicable environmental regulations (Morrison et al., 2000). To gain greater insight into this issue, a governmental official was asked: "Could a company become certified, but then fail to really implement their system to make environmental improvements?". She responded that "If one has fancy dancing shoes, one would not think of going dancing without them". As long as a firm truly intends to use ISO 14001 as a tool for improved efficiency and management, this statement makes sense.

Thirty-four (26%) of the non-Chinese respondents believed their relationship with regulators had become more cooperative since they certified their ISO EMS. This makes sense, since certification should mean that a company is taking proactive steps to improve its environmental performance and to improve their compliance records. However, firms become certified for many reasons, as already discussed, and certification may not always indicate substantive environmental improvements. This question was not included in the Chinese survey.

Of the non-Chinese respondents, sixteen stated they felt their facility had experienced fewer inspections since implementing ISO 14001: Columbia (2/3), Malaysia (5/21), Mexico (3/9), South Africa (2/10), Sweden (1/18), United Kingdom (1/7), and the United States (2/30). Since the number of respondents from many of the countries is relatively small, it may be more helpful to again group the responses into the categories of "developed" and "developing" country firms. Using this grouping we find that 12/58 (21%) of respondents from developing countries claimed to have received fewer inspections as a result of ISO 14001 certification, whereas only 4/75 (5%) of the firms in economically developed countries are making the same claim.

For the Chinese respondents, 21% (4/19) stated they experienced reduced inspections since becoming ISO 14001 certified. This percentage is the same as the percentage for developing countries overall. This finding could be interpreted to mean that regulators in developing countries are putting more faith into ISO 14001 certifications than are their counterparts in wealthier countries. This may be related to the perceived need to preserve scarce governmental resources: fewer inspections of ISO 14001 certified firms frees up inspectors for other tasks.

In sum, Chinese firms reported fewer overall motivations to become ISO 14001 certified. However, the rankings of their motivations are fairly similar to those of other countries, with the desire to be an environmental leader/good neighbor being paramount, and the desire for green marketing falling second. Unlike firms in other countries, Chinese respondents do not report strong motivations for regulatory relief or a greater desire to understand environmental regulations through the application of an ISO 14001 EMS.

**Benefits of ISO 14001 Certification**

As Table 3 shows, Chinese firms were even more enthusiastic about the overall benefits of ISO 14001
than were firms in other countries. In open-ended responses, seven Chinese respondents (or 37%) stated that ISO 14001 improved the overall management of their company. In an in-depth interview, one respondent stated that prior to the implementation of ISO 14001 the company was not organized into functional units (e.g. shipping, production, etc). In order to better implement ISO 14001, the company undertook a massive reorganization effort so that the company is now hierarchically structured into organizational units, with individual job descriptions. This is not likely to be a change or a benefit that the (mostly Western) creators of ISO 14001 anticipated.

Table 4 lists some examples of the open-ended comments received concerning the benefits of ISO 14001 in China. The benefits fall into four main categories: management benefits, raised environmental awareness, benefits to trade, and benefits to profits.

The open-ended responses reveal many similarities between Chinese and non-Chinese firms, with one main exception. While firms in all countries are reporting benefits to trade, the environment, profitability, and employee environmental awareness, Chinese firms have specifically noted that the implementation of ISO 14001 helped to change the organizational structure of their firms, resulting in heightened efficiency.

It is not completely clear how some of these firms were organized prior to the implementation of ISO 14001, but there is a pattern of responses among Chinese respondents which indicates that the process of implementing ISO 14001 required significant reorganization within these firms. While this was a painstaking and costly process, the respondents believe that their companies are more organized and responsive as a result. It is possible that the authors of ISO 14001, almost all of whom were from Western countries, had culturally-based assumptions about firm structure that were not universally true. It is likely that they felt that ISO 14001 could be applied equally well to any type of company in any country. But it is possible that the predominant organizational structure of companies may vary across countries, making a harmonized standard easier to implement in some companies than others. More research needs to be accomplished in order to gain greater insight into this phenomenon.

Firms were also asked to rate ISO 14001’s benefits to trade and to profits. Tables 5 and 6 show these results. Firms in all three groupings seem to have roughly equal perceptions about the benefits of ISO 14001 on their ability to trade, with more than half of all respondents stating that it will be “very helpful” to their trade efforts. Few respondents felt that it would be of little or no help to trade.

The results of Table 6 also show great similarities between all three groups of countries, with firms in developed countries somewhat less likely to feel that ISO 14001 is “very beneficial” to profits. This makes sense because firms in these countries are more likely to have had a pre-existing EMS in place, prior to switching to an ISO 14001 EMS. Therefore, these firms most likely had already “picked the low hanging fruit”, so to speak. Even if these firms did not have a pre-existing EMS, the higher levels of environmental regulation in these countries likely produced greater incentives for resource conservation and efficiency. As a result, the initial gains from the implementation of and ISO 14001 EMS may be somewhat smaller.

Unfortunately, the scaled question about ISO 14001’s environmental benefits was not included in the Chinese survey, thereby making comparisons difficult. Table 7 shows these results for developing and developed countries. Interestingly, developing country respondents are more likely to report that they feel that ISO 14001 will be “very helpful” to the environment. These results of a t-test for differences between 2 means reveals that these findings are statistically significant at the .01 level. Again, it is possible that the

Table 3: Comparing Views About Overall Benefits of ISO 14001 (all numbers in percentages)

<table>
<thead>
<tr>
<th>Country</th>
<th>Not Very Beneficial Overall</th>
<th>Somewhat Beneficial Overall</th>
<th>Very Beneficial Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>0</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>Developing Countries</td>
<td>2</td>
<td>5</td>
<td>71</td>
</tr>
<tr>
<td>Developed Countries</td>
<td>4</td>
<td>15</td>
<td>77</td>
</tr>
</tbody>
</table>
Though environmental management is newer in these countries, thereby resulting more immediate gains upon the introduction of an ISO 14001 EMS.

Chinese respondents did supply open-ended comments as to the environmental benefits of ISO 14001. In addition to the recurring issue of overall improved company management, eight respondents (42%) noted that the process of ISO 14001 raised the level of environmental awareness for employees. For the non-Chinese respondents, 14% noted an increase in environmental awareness among employees as a result of implementing ISO 14001. It is heartening to note that the raised awareness has frequently resulted in environmental initiatives in the community beyond the firm gates.

All of the Chinese respondents stated they predicted or had already experienced significant environmental improvements. For the non-Chinese respondents, only 4 stated that they expected to see no significant environmental improvements as a result of ISO 14001 implementation. Of these, two stated they already had pre-existing environmental management systems prior to switching to the ISO 14001 EMS.

Table 4: Comments About ISO 14001's Benefits in China

Comments About Management Improvements
- It is very important if the company will take advantage of the standard of ISO 14001 to improve its management”.
- It has brought the overall management of the company to a higher level”.

Comments About Benefits to Trade
- ISO 14001 certification is the shortcut for a company to enter international trade and it reduces the differences between the companies in one country and their competitors throughout the world”.
- Since becoming certified our company has improved its image with clients and the government. The company has become better known nationally and internationally."
- I believe ISO 14001 certification will soon be a pre-condition for international trade”.
- It [ISO 14001] is helpful in attracting foreign investment and in improving our image with foreign companies”.
- Overall China’s environment is not as good as that of some developed countries. ISO 14001 certification helped my company make our way through international trade barriers and capture a position in the market”.

Comments About Benefits to Profits
- If we keep on working on energy and resource saving in our production, our company will benefit significantly”.
- It will help the company gain more profits through the costs of controlling pollution”.
- We became certified in 1999. In 1998 the average ton of production required 545 tons of water, but it was reduced to 362 tons in 1999 because of ISO 14001. In 2000 we started reusing some water, so now we save an additional 160 tons”.
- ISO 14001 has helped us save more than 2 million Yuan ($241,546 U.S. dollars) in 1999 through reduced water and energy use.

Comments About Enhanced Environmental Consciousness
- The employees have become more environmentally conscious. Some of them even got promoted for planting trees and flowers, saving water and electricity, collecting used batteries, and not using disposable meal boxes and chopsticks”.
- The process of implementing ISO 14001 has made every employee realize that energy saving and waste reduction are very closely related to them, which otherwise would never have been understood and supported”.
- It has made the employees more environmentally conscious and improved management, which improved the quality of our products”.

Overall

Comments

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sample of non-certified firms would be necessary to fully understand whether or not these costs are prohibitive.

For developing country firms, excluding China, implementation took an average of 14.5 months and cost an average of $76,975. Firms in developed countries took an average of 17 months to implement ISO 14001 at an average cost of $82,102. Based on this information it appears that the costs of ISO 14001 implementation are not highly different between developed and developing countries, but they do appear to be lower in the sample of firms in China. It is not yet clear why the costs of implementation and certification are lower, on average, for firms in China than for firms in other countries. It is possibly due to lower labor costs and/or due to the presence of higher levels of technical assistance from government agencies. Additionally, local Chinese third-party auditors are available and the majority of respondents did use them as opposed to foreign auditors, which likely cost more due to the added travel expenses. More research needs to be done before one can definitively account for these cost differences.

**Summary and Discussion**

As mentioned earlier, firms may become greener and cleaner for many reasons: for financial gain through increased efficiency or green marketing, to respond to existing or looming regulations, as a result of environmental leadership within the firm, or due to variations in national cultures or legal frameworks. Data from this study generally support the argument that firm managers wanted to provide environmental leadership and be a “good neighbor”, with the second-strongest motivation coming from a desire to increase green marketing benefits. In no country was concern over regulation stronger than these other two factors, nor was a pure concern for economic savings as a result of increased efficiency. Other survey data indicates that the decision to seek ISO 14001 certification came as a result of the lobbying and leadership of “environmental entrepreneurs” within the firms (see Raines and Prakash 2002). These findings somewhat refute the Porter hypothesis which states that firms will become greener in order to reduce the costs of inefficient resource use. While respondents hoped to save money through improved

| Table 5: Comparing Benefits to Trade [all numbers in percentages] |
|---------------------------------|-----------------|-----------------|
| Country                        | Not Very Beneficial to Trade | Somewhat Beneficial to Trade | Very Beneficial to Trade |
| China                          | 0                | 16              | 57              |
| Developing Countries           | 7                | 21              | 55              |
| Developed Countries            | 12               | 27              | 51              |

| Table 6: Comparing Benefits to Profitability [all numbers in percentages] |
|---------------------------------|-----------------|-----------------|
| Country                        | Not Very Beneficial to Profits | Somewhat Beneficial to Profits | Very Beneficial to Profits |
| China                          | 0                | 26              | 63              |
| Developing Countries           | 9                | 26              | 55              |
| Developed Countries            | 12               | 40              | 44              |

| Table 7: Comparing Benefits to the Environment [all numbers in percentages] |
|---------------------------------|-----------------|-----------------|
| Country                        | Not Very Beneficial to the Environment | Somewhat Beneficial to the Environment | Very Beneficial to the Environment |
| Developing Countries           | 2                | 4               | 86              |
| Developed Countries            | 4                | 15              | 79              |
Some firms in China conducted a reorganization of their company concurrent with their efforts to implement ISO 14001.

Why would ISO 14001 be less costly and more beneficial to firms located in China as compared to most other countries? More research would be necessary to answer this question definitively, but it is possible to hypothesize at this point. First, more Chinese respondents stated that they were more motivated by a desire to raise the environmental awareness of their employees, if employees in China have a lower level of environmental awareness than in other countries, then firms may reap quick gains in employee awareness in the process of implementing ISO 14001 and conducting the required employee trainings that are necessary to use the ISO environmental management system. Similarly, anecdotal evidence from interviews and open-ended questions indicates that some firms in China conducted a reorganization of their company concurrent with their efforts to implement ISO 14001. This reorganization itself might provide benefits not limited to those involving environmental management.

A second question of interest involved the ability of a voluntary regime, created by and for business, to really improve environmental management and, ultimately, to improve environmental performance. This study’s findings indicate that the ISO 14001 EMS has improved environmental performance for many firms worldwide, with the benefits generally outweighing the costs (Raines 2002; Raines and Haumesser, 2002). The Chinese respondents noted improvements in employee environmental awareness, water usage, energy usage, marketing, export growth, reduced wastes, and overall economic savings through resource conservation. It is clear that a comprehensive environmental management system, such as ISO 14001, can be an important tool to improve the environmental performance of firms within and outside of China.

The third and final primary question of this study involves the public policy implications of voluntary regimes such as ISO 14001. Because these voluntary standards have largely been created by and for industry, some observers have argued that they amount to nothing more than the “fox guarding the henhouse” or mere “greenwashing” (Greer and Bruno, 1997). Others have stated that it is too soon to know if these voluntary agreements are more than “hype” (Shoals, 2000). As Shoals writes, “Certification depends not on an organization’s actual environmental performance, but rather on evidence of its conformance with its own internally-developed environmental management system” (2000:291). Still others have argued that voluntary standards provide an important tool through which businesses can increase their level of environmental awareness and become more proactive (Mazza, 1996; Rondinelli et al., 2000; Wellford, 1996; Raines 2002).

Even the strongest critics often admit that while these are imperfect instruments, voluntary agreements are often the most feasible solution in light of current World Trade Organization rules which promote voluntary, but not mandatory standards (Arriaza, 1996), and since environmental legislation at the international level is rare and difficult to achieve. As this discussion points out, experts are enormously divided as to whether or not voluntary measures, such as ISO 14001, will actually improve the environmental performance of firms versus simply creating a false image of “greenness”. Before public policy makers can decide how to respond to these voluntary efforts, they need data as to their impacts on environmental performance.

The data provided by this study indicate that the ISO 14001 environmental management system can provide needed information to track firm-level environmental...
impacts and create strategies for improvements. However, firms must be sincere in their desire to use the information gained for improvements. While the ISO 14001 EMS can provide needed information, there is no guarantee that all firms will use the information to make real improvements. This is an important factor to consider when public policy makers and regulators are considering the issue of regulatory relief for certified firms.

Respondents in the Chinese survey are reporting reduced inspections and regulatory relief at about the same rates as those in other developing countries (21% report fewer inspections). However, none of the Chinese respondents stated that regulatory relief was a motivating factor in their decision to implement ISO 14001.

Before regulators can decide upon the merits of regulatory relief they need to be clear about the reasons behind a firm’s decision to seek certification. If firms are motivated largely by a desire for green marketing and/or regulatory relief, then regulators may have reason to be suspicious of the depth of the impact that ISO 14001 will have on real environmental performance. However, if firms are motivated by a desire to be a “good neighbor” and to improve their employees’ environmental awareness, then it is likely that the EMS will be well implemented and used to improve performance. This can only be determined on a case-by-case basis, although the results look promising for Chinese firms.

Since the potential to abuse the system exists (firms could implement an EMS on “paper only without realizing any environmental performance benefits), reduced inspections or other forms of regulatory relief are not necessarily justified for all certified firms.

Conclusions

It is not completely clear why so few Chinese firms have become ISO 14001 certified. One regulator in Beijing stated that the standards were not translated into Chinese and this has delayed the regime’s adoption. However, it is clear that ISO 14001 certified firms in China generally seem very satisfied with the benefits of certification. It is possible that as Chinese firms increase their exports (as a result of their new WTO status) they may come under increasing pressure from trading partners to become ISO 14001 certified.

These findings are important for firms worldwide, but may be especially crucial to firms operating in China. China has recently been admitted to the World Trade Organization and many firms in China plan to take advantage of this new status in order to expand into new export markets. However, ISO 14001 certification is likely to be a precondition for expansion into some markets and for trade with some potential partners. In fact, one Chinese respondent explicitly stated that his firm had postponed implementing ISO 14001 until China’s WTO status had been changed.

The good news is that the information gained from the survey of firms in China and in other countries, supports the position that ISO 14001 implementation and certification are likely to have both environmental and economic benefits for the majority of certifying firms. While Chinese firm managers reported lower levels of motivation to seek certification, they were also more likely to say they felt ISO 14001 would be very beneficial to their firms.

Lastly, regulators may wish to encourage the implementation and certification of ISO 14001 through the provision of affordable or free training and/or auditing services, since firms are reporting significant environmental improvements as a result of ISO 14001. However, reduced inspections and other forms of regulatory relief should only be granted on a case-by-case basis, since there is always the possibility that a company could implement a “paper” EMS, while not really reaping the benefits intended by the creators of ISO 14001.
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Endnotes

1. The ISO 14001 EMS contains a number of basic elements: firms must develop and declare an environmental policy committed to pollution prevention and continual improvement of the EMS; they must plan ways of meeting those goals by determining the firm’s environmental impacts and ways to address them; they must actually implement their environmental plan; firms must monitor their own performance and take corrective actions when necessary; employees and managers are given the training and responsibility for ensuring compliance with the firm’s own environmental policies; firms must have a system in place to communicate with relevant stakeholders, such as regulators, shareholders, and neighbors. Full disclosure of the firm’s environmental audits is not required.

2. Copies of the surveys are available upon request from the authors.

3. For the purposes of this analysis, developing countries include: Argentina, Columbia, Czech Republic, Dominican Republic, Ecuador, India, Indonesia, Malaysia, Mexico, South Africa, and Uruguay. Economically developed countries include Canada, Spain, Sweden, the United Kingdom, and the United States.

References


