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Sustainability and competitiveness in Mexico

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Abstract

Purpose – This paper summarizes the findings of a research project aimed at benchmarking the environmental sustainability practices of the top 500 Mexican companies.

Design/methodology/approach – The paper surveyed the firms with regard to various aspects of their adoption of environmental sustainability practices, including who or what prompted adoption, future adoption plans, decision-making responsibility, and internal/external challenges. The survey also explored how the adoption of environmental sustainability practices relates to the competitiveness of these firms.

Findings – The results suggest that Mexican companies are very active in the various areas of business where environmental sustainability is relevant. Not surprisingly, however, the Mexican companies are seen to be at an early stage of development along the sustainability “learning curve”.

Research limitations/implications – The sample consisted of 103 self-selected firms representing the six primary business sectors in the Mexican economy. Because the manufacturing sector is significantly overrepresented in the sample and because of its importance in addressing issues of environmental sustainability, when appropriate, specific results for this sector are reported and contrasted to the overall sample.

Practical implications – The vast majority of these firms see adopting environmental sustainability practices as being profitable and think this will be even more important in the future.

Originality/value – Improving the environmental performance of business firms through the adoption of sustainability practices is compatible with competitiveness and improved financial performance. In Mexico, one might expect that the same would be true, but only anecdotal evidence was heretofore available.

Keywords Competitiveness, Sustainability, Environmental, Performance, Mexico, Survey

Paper type Research paper



Introduction

Competitiveness is closely related to financial performance. A conventional concept of competitiveness from the field of business strategy is one in which a firm becomes “competitive” when its financial returns over time are above the average returns for its industry. “Sustainability” is a term the business community often uses to characterize a firm that is able to achieve such long-term returns, whereas “environmental sustainability” deals with the proper and efficient use of natural resources over time.

The linkage between competitiveness and sustainability from the environmental perspective is embodied in the literature on financial and environmental performance

(Clarkson *et al.*, 2011; King and Lenox, 2001; Orlitzky *et al.*, 2003). The results suggest that a firm which works actively to improve its environmental performance also achieves positive financial performance over time. Porter and Van der Linde (1995a) posit that since pollution is a form of resource waste, a reduction in pollution should result in higher productivity. Other approaches to competitiveness and sustainability address the issue by strategically exploiting resources and capacities. This is usually embedded in the resource-based notion of the firm (Barney, 1991; Russo and Fouts, 1997; Hart, 1995). Other perspectives such as stakeholder management require companies to act responsibly towards consumers, investors, and government, as well as to manage benefits to motivate, attract, and retain employees that create value for the company (Oligastri, 2003). An aligned business and sustainability strategy reflects the nature and extent of the opportunities associated with sustainable development as it relates to the creation of value for the firm (Gardetti, 2004).

Case studies and small data analysis at the corporate level in Mexico on the topic of environmental and social responsibility suggest that there are internal and external pressures to adopt sustainability and corporate social responsibility initiatives. These studies address issues such as philanthropy or reputation as primary drivers, and yet the rate of adoption and the types of initiatives are largely context-specific (Weyzig, 2007; González-Lara, 2008).

Weyzig (2007) documents how, relative to European nations, Mexican firms have very specific characteristics such as lack of local supply chains that make sustainability initiatives different from the Dutch case that was studied in his analysis. As far as reputation, González-Lara (2008) discusses the traditional view that adopting sustainability practices can enhance reputation, and uses examples of well-known Mexican companies such as CEMEX, Bimbo, and Televisa. González-Lara's (2008) view is more directed towards reputation-building through stakeholder and community involvement.

However, other types of empirical analysis at the plant level suggest that environmental regulation still plays an important role in driving environmental management initiatives within Mexico.

Dasgupta *et al.* (2006) studied the effects of regulation, plant-level management policies, and other factors on the environmental compliance of Mexican firms and concluded that with weak regulation, subsidized environmental management training may provide a useful complement to uncertain conventional enforcement. They argue that in Mexico and other developing countries, many industrial plants avoid complying with regulations because monitoring and enforcement are sporadic. On the other hand, some plants over-comply because their abatement decisions are strongly affected by extralegal (i.e. normative) factors. In their econometric analysis, Dasgupta *et al.* (2006) attempt to capture both weak enforcement and extralegal factors in a model of decision-making under uncertainty. Compliance status is determined by the positive or negative gap between the regulatory standard and the plant's cost-minimizing emissions intensity. Compliance status is measured by a marginal abatement cost function that includes firm and industry characteristics, as well as emissions indices and environmental management initiatives. Among determinants of the extralegal factors are the degree of effort to reduce emissions, and the type of management strategy adopted. Their results suggest that environmental management has a strong, independent effect on compliance, even after we control for simultaneity and take many other determinants of emissions intensity into account. They conclude that in developing countries with weak regulation, programs of subsidized

environmental management training may provide a useful complement to uncertain conventional enforcement. The interesting part of the analysis is the extralegal factor. In the econometric analysis, it is defined by “informal regulation” in two forms, primarily. One is by community pressure, where a wealthier and more educated community influences the firm to adopt pollution prevention programs. The other is by variables such as ISO 14000 and provision of environmental training to managers in the firm. In their findings, extralegal factors once corrected for endogeneity are important for environmental compliance. They conclude that regulators and businesses are still adjusting to the environmental era and there is considerable uncertainty about the relative effectiveness of alternative approaches to regulatory policy and plant-level environmental management. Under these conditions, the speed and magnitude of plant responses to regulatory incentives are not fixed parameters. Plant managers need specific kinds of information to respond effectively, and these are often scarce. A different approach to environmental performance is suggested in the following two papers.

Ruiz-Arredondo *et al.* (2006), analyzed the incentives manufacturing firms have in adopting subsidized programs such as the Clean Industry Program (“Programa Nacional de Auditoría Ambiental”), Mexico’s flagship voluntary regulatory initiative. They sampled 226 firms and concluded that regulatory pressure (enforcement), previous fines or initiated legal processes result in adoption of environmental management practices.

Blackman *et al.* (2010), using a large sample of 60,000 Mexican firms, supports these previous results and concludes that the main driver of participation is the threat of regulatory sanctions. Additionally, they found that firms which sold their goods in overseas markets and/or to government suppliers, used imported inputs, were relatively large, and were in certain sectors and states, were more likely to participate in the program, all other things equal.

Montiel and Husted (2009) found that early adoption of voluntary programs in Mexico is explained by access to international markets and the ability to obtain relevant information from industry associations. The latter is offered as a metric for free resources the firm takes that enables it to take advantage of information-like resources. From this single result, the authors expand to posit an institutional theory on early adoption and institutional entrepreneurship. Their idea that free resources are enabled by trade associations helps explain diffusion of voluntary programs. This paper tries to develop the notion that certain characteristics must exist for a firm to be a first mover in a voluntary program. The authors use this to exposit an institutional theory of the firm in terms of program adoption.

Finally, Perez-Batres *et al.* (2012) also analyze the Clean Industry Program, and ask why some companies are quicker to adjust to the internal and external pressures associated with participation than others. They found that firms in “dirtier” industries and those located near the US border were more likely to participate. They found some support for the idea that firms which have previously participated in a “supranational” sustainability program such as the UN Global Compact were more likely to participate, as well.

While Mexico is not known as being on the cutting edge of environmentalism, nor are many of its firms among the world leaders in implementing environmental practices, as a rapidly developing country in both economic and social terms, Mexico is beginning to grasp the need for environmental and economic development as parallel paths. In a recent survey, for example, 50 percent of Mexican adults expressed the

belief that the business sector has a bigger responsibility toward the environment and 70 percent of consumers said they would be willing to pay more for a green product if it helps the environment[1].

In an effort to determine for the first time ever the orientation of Mexico's business sector towards the environment, researchers from the University of California (UC) and a leading Mexican university, Instituto Tecnológico Autónomo de México (ITAM), conducted extensive survey research during 2010-2011 on the 500 largest firms in Mexico located in and around the two most significant regional centers of business activity, Mexico City and Monterrey. The complete results of this effort are contained in Aigner and Lloret (2011).

The primary goals of the survey effort were:

- to generate a baseline for the implementation of sustainability practices in Mexican companies;
- to understand the drivers of improved environmental performance; and
- to understand the links between environmental performance and competitiveness.

The plan of this paper is as follows: after a brief section on theory development, we proceed to summarize the survey methodology employed and characteristics of the sample. The survey results are presented next, organized around the main topics of environmental sustainability and competitiveness, followed by a concluding section.

Theory development

In the theoretical development of strategic management, the dominant views have been either industry-based or resource-based. A more recent, "third leg" of the strategy triangle has been put forward by Peng *et al.* (2009). It is the institution-based view.

Basically, this view elevates institutions from merely contexts within which business strategy occurs to direct participants in the firm's quest to formulate and implement strategy. The institution-based view of strategic management is particularly relevant when trying to explain why firms adopt sustainability practices that go beyond what they absolutely must do in order to comply with existing environmental regulations.

The main role of institutions in society is to provide a dependable and efficient framework to facilitate economic exchange (DiMaggio and Powell, 1983, 1991). In turn, organizations adapt to the institutional framework, whether codified or not (Meyer and Rowan, 1977). Organizational "legitimacy" rests on one or more of three institutional "pillars": regulative, normative and cognitive (Scott, 2001).

How the regulative pillar works is obvious: firms are presented with a list of environmental and other regulations that apply to their operations, and they are forced to comply by various means. If they do not comply, there are sanctions (fines, prohibitions, etc.). Sanctions can be costly both in monetary and reputational terms.

The cognitive pillar relates to knowledge transfer. That is, institutions such as government, industry associations, and third parties often offer "best practices" information that can assist a firm in developing and refining its business strategy. A case in point is the World Business Council for Sustainable Development (WBCSD), an organization that produces research reports on best practices for a variety of industries and case studies covering a broad range of sustainability topics[2].

The normative pillar is especially relevant for our work. This relates to the moral basis for organizational legitimacy, i.e. the roles, responsibilities, and rights of

individuals and organizations in society. To the extent that they comply, social stability is attained, along with “legitimacy” for the individual or organization (Thomas *et al.*, 2007). Because firms choose to go beyond what is required by applicable laws and regulations, they are responding to the uncodified expectations for business in society. Why do they do this? This is an important research question that is addressed in our survey. Likewise, it is useful to understand who, among the “social actors” that are able to exert pressure on the firm to promote “good behavior”, are the most influential (Slaughter, 2004; Scott, 2001; Zucker, 1987; Meyer and Rowan, 1977). Again, our survey sheds light on this question for Mexican firms.

Survey methodology

The Mexican business magazine, *Expansión*, maintains and regularly reports on a list of the 500 leading Mexican firms. We use a list consisting of those firms that have appeared on the *Expansión* list at least one year in 2008, 2009, or 2010. This list was then reduced by recognizing conglomerates, excluding subsidiaries, and limiting it geographically to focus on firms located in and around Mexico City and Monterrey, where 84 percent of the top 500 firms reside. All-in-all, 446 firms were eventually contacted by phone or e-mail and appointments were set-up to explain the goals of the survey and to obtain a commitment to respond to it. Confidentiality letters were sent to those companies that requested them. Ultimately, 103 companies completed the survey, for a response rate of approximately 23 percent. The main non-response issues were a lack of interest, professed restrictions on the release of company information, and that environmental sustainability is not a company priority. Obviously, this last reason for non-participation presents a problem for the use of the sample results as indicative of the population of firms due to so-called non-response or selection bias, something we shall comment on in the course of presenting our results. The survey instrument and a more detailed discussion of the survey methodology and issues surrounding its implementation are contained in Appendices A and B of the report by Aigner and Lloret (2011).

Characteristics of the sample

The sample of 103 firms is highly skewed toward large firms. 78.9 percent of the sample firms have more than 500 employees. The size distribution of all firms in Mexico is quite different, with approximately 90 percent of firms being small or medium-sized. They are also concentrated in the commerce and transportation, communication and services sectors. But at this stage in the development of environmental “orientation” or implementation of environmental practices among Mexican firms, it is the larger firms which have both the awareness of environmental sustainability as an important issue of competitiveness and the means by which it can be addressed. Indeed, some of Mexico’s largest firms are among the world leaders in their respective industries as regards environmental sustainability[3].

The sample distribution of firms by industry sector is shown in Appendix C of Aigner and Lloret (2011), along with the same sectoral distribution for the entire *Expansión* 500 as of 2010, and the firms listed on the Mexican stock exchange, the Bolsa (BMV). In some respects, our sample distribution of firms resembles more closely the one of the BMV. However, the large percentage of sample firms in the manufacturing sector is unique to the sample, and vastly overrepresents this particular sector. To compensate, the analytical results are weighted to represent the

Expansión 500[4]. Because the manufacturing sector is of particular interest as regards environmental sustainability, some results are presented for it alone and are contrasted to the overall (weighted) sample results.

Another interesting characteristic of the sample relates to firm ownership. 18 percent of sample firms are traded on the BMV[5]. Another 38 percent are traded on other stock exchanges, in the sense that the parent company (e.g. Walmart) is a foreign multinational while the survey is being answered by its Mexican subsidiary. 39 percent of the sample firms are privately held (the predominant ownership structure in Mexico) and 5 percent are state-owned.

Additional sample demographics are contained in Appendix E of Aigner and Lloret (2011). Among the most relevant of these for present purposes are that:

- 85.6 percent of the sample firms have a written code of ethics;
- 68.4 percent include elements of environmental sustainability in their mission or vision statements; and
- 77.1 percent take environmental sustainability into account in forming their business strategies.

While these latter two statistics are undoubtedly biased upward due to self-selection, even using our rough bias estimate of 13-15 percentage points, these numbers are notable.

Main topics of the survey

The majority of survey questions were devoted to the topic of environmental sustainability practices among Mexican firms and their impact on competitiveness. These concepts were defined at the beginning of the survey questionnaire so as to eliminate confusion and to establish a common usage of terms.

Environmental sustainability is defined by the integration of environmental aspects into business operations, strategic planning, and interactions with stakeholders.

Environmental sustainability practices are those technologies, strategies and plans to improve company and supply chain performance relating to resource conservation, waste reduction, environmental risk control, and collaboration with local communities to minimize these impacts, as well as the design and manufacture of environmentally friendly products. Sections A to E in the survey addressed aspects of environmental sustainability practices.

Competitiveness means that the company continues to achieve economic prosperity while attracting and maintaining investment. The competitiveness aspects were included in section CO of the survey.

Some of the questions relating to environmental sustainability practices were specifically designed to facilitate comparison to the results of other surveys. When appropriate, the comparative results are presented and discussed in light of the Mexican experience as revealed in the present survey effort.

Results and discussion

Environmental sustainability, Section A: benchmarking environmental sustainability practices in Mexican firms

A.1. How active is your company in terms of the following areas of environmental sustainability?

Table I displays the results. Summing the responses for “very active” and “regularly active”, at a minimum 56.4 percent of firms were actively engaged in environmental sustainability, with the leading areas being energy resources conservation (78.6 percent) and waste reduction (75.1 percent), followed closely by environmental risk control (74.8 percent) and waste recovery (74.1 percent). With respect to resource conservation in general, 48.9 percent of firms are either “very active” or “regularly active” in all three categories. 60 percent of firms simultaneously pursue waste reduction and waste recovery with the same degree of intensity.

The MIT survey (Q3, p. 49) asks a similar question, but only two categories match: energy resources conservation (64 percent) and waste reduction (62 percent) (Berns *et al.*, 2009)[6]. By that comparison, Mexican firms are more actively engaged. Since 77.1 percent of our sample firms indicated that environmental sustainability is relevant to company strategy, this result is not surprising. However, it must be noted that some firms which did not respond to our survey indicated they did so because they were not involved in environmental sustainability practices, suggesting that self-selection bias may be present. The fact that there is a direct comparison to the MIT survey allows for a rough estimate of the extent of self-selection bias, namely, 13-15 percentage points.

Focusing on the manufacturing sector alone[7], the ordering is slightly different, with environmental risk control, waste reduction, and product manufacturing at the top of the list, but the top six areas are the same as in the overall results. For the top four categories, the percentages of firms “very active” or “regularly active” are considerably higher than in the overall results. This finding is consistent with Perez-Batres *et al.* (2012), where they found that “dirtier” industries were more likely to participate in Mexico’s Clean Industry Program.

A.2. Does your company use metrics to measure environmental performance?

59 percent of our sample firms said that they use metrics to measure environmental performance, the main ones being the Global Reporting Initiative (31 percent), ISO 14001 or 14031 (24 percent), and the Triple Bottom Line (21 percent). A similar question from

How active is your company in terms of the following areas of environmental sustainability?

Answer options	Very active (%)	Regularly active (%)	Sum (%)	Rarely active (%)	Not active (%)	Do not know (%)
Energy resources conservation	41.0	37.6	78.6	14.6	5.6	1.2
Water resources management	45.5	27.2	72.7	14.1	9.1	4.1
Other natural resources conservation and management	32.3	38.5	70.8	21.3	5.2	2.6
Waste reduction	47.5	28.1	75.6	19.3	2.5	2.5
Waste recovery	39.0	35.1	74.1	13.5	9.7	2.8
Environmental risk control	39.7	35.1	74.8	14.2	2.8	8.2
Eco-design products	20.8	43.5	64.3	29.1	4.1	2.4
Product manufacturing	30.8	36.6	67.4	24.9	5.2	2.6
Supply chain reduction						
of environmental impacts	24.8	43.7	68.5	22.3	7.7	1.5
Community collaboration in terms of environmental practices	28.0	28.4	56.4	27.6	13.1	2.8

Table I.
Environmental sustainability

The Economist survey (EIU, 2008) results in only 31 percent of firms saying they use metrics[8]. But here again, self-selection is a factor to consider in interpreting our results.

Our sample is weighted to reflect the *Expansión* distribution of firms, so the manufacturing sector does not have undue influence. Nevertheless, taken alone, in this sector 87.5 percent of firms use some sort of metric, with ISO and GRI being equally prevalent at 37.5 percent of firms each.

A.3. Approximately, what percentage of your company's annual operating budget is invested in the implementation of environmental sustainability practices?

More than half of the sample firms were not able to answer this question. Of those that indicated they did set aside funds in the annual operating budget (31 percent), only two-thirds specified percentages. The vast majority of these were in the 1-5 percent range.

A.4. Does your company have a written business plan or project to address environmental sustainability?

In our sample, 52.9 percent of firms have a sustainability plan or project in place. Only 18.0 percent said that they do not have a plan or project in place. The design of this particular question allowed the firms to select more than one response, hence its interpretation is not straightforward. Thus, while 18.0 percent said they had no plan in place, 35.8 percent said that either they were currently developing a plan/project (22.8 percent), will soon do so (11.2 percent), or have no plans to do so (1.8 percent).

While the percentage of firms in the manufacturing sector that already have a plan/project in place is about the same (54.2 percent), relatively more firms (41.7 percent) are currently developing an environmental sustainability plan/project.

A.5. If your company currently has a written business plan or project that addresses environmental sustainability issues, what does the project consist of?

Among the most frequently cited plans or projects were waste reduction, recovery and management, and energy and water conservation.

Environmental sustainability, Section B: identify who or what prompted the adoption of environmental sustainability practices

B.1. What are the main reasons for your company to adopt environmental sustainability practices?

This question directed the firms to rank the options from most important to least important. To facilitate comparison to other surveys, we report only the results for "most important". The results and comparisons to other surveys are contained in Table II.

By far the leading reason is "environmental protection" (63.6 percent), namely, compliance with environmental regulations. This is followed by "opening new markets" (34.6 percent), "cost savings" (25.2 percent), and "revenue growth" (21.3 percent). Combining the top two ranks, "environmental protection" (74.1 percent) is the leading reason for Mexican firms to adopt environmental sustainability practices, consistent with the findings of Ruiz-Arredondo *et al.* (2006) and Blackman *et al.* (2010), followed by "cost savings" (57.7 percent)[9].

Compared to the MIT survey, the Mexican responses are stronger as regards "opening new markets" (much stronger), "cost savings" (somewhat stronger), and "revenue growth" (somewhat stronger). But "brand/image improvement" is not as important for the Mexican firms. All told, these results are consistent with the notion that Mexican firms are still in an early stage of the learning curve[10]. In the case of

Table II.
Adoption of
environmental
sustainability practices

What are the main reasons for your company to adopt environmental sustainability practices?		
Answer options	Ours (%)	MIT (%)
Revenue growth	21.3	8
Increased profits	14.3	N/A
Cost savings	25.2	10
Public relations	12.0	N/A
Internal pressure (i.e. employees)	4.2	9
Environment protection	63.6	N/A
Brand/image improvement	16.0	35
Recruitment and retention of employees	13.7	9
Opening new markets	34.6	10

“brand/image improvement”, it may be that their customers are less sensitive to environmental issues and hence a firm’s reputation in this regard is less important. Compared to the Manufacturing sector alone[11], while “environmental protection” is still the leading cause (55.6 percent), “cost savings” is much more important (50.0 percent), followed by “opening new markets” (40.0 percent). “Internal pressure (employees)” is also much more important (22.2 percent vs 4.2 percent).

B.2. How does your company perceive environmental organizations (e.g. NGOs or local organizations), as an opportunity or a challenge?

Focusing on the main response categories, 81.5 percent of firms indicated that working with environmental organizations presents a business opportunity, while a slightly higher percentage (86.2 percent) said this presents a challenge. Only 23.0 percent said working with these organizations is a “problem”, so obviously this category is perceived as meaning something significantly different from “challenge”.

In *The Economist* survey (p. 25) a similar question is posed, but the respondents are forced to choose among four mutually exclusive categories: “opportunity” (19 percent), “both equally” (36 percent), and “do not know” (18 percent). That our firms responded the way they did, with roughly equal numbers indicating “opportunity” as “challenge” is probably best understood in terms of the emergence of environmental organizations in Mexico and their attempts to influence the business sector to improve its environmental performance.

NGOs and local organizations, of course, are among the “social actors” that exert pressure on the firm to change its behavior via the normative pillar of institution-based strategic management.

B.3. To what extent are your company’s employees involved in environmental sustainability strategies?

In this question, a distinction is being drawn between voluntary employee involvement in developing environmental sustainability strategies and involvement that is pushed (motivated, “forced”) by the company. 93 percent of our firms indicated that employees are involved at least to some extent on a voluntary basis, while fewer (69.0 percent) are involved when pushed by the company (Table III).

The Economist survey (p. 27) asks the same question about “corporate citizenship” strategies but without the distinction. For comparative purposes, we have calculated a weighted average response, as shown in the table. This comparison is particularly interesting because, upon combining the results for “great extent” and “some extent”,

our results are very similar to those reported in *The Economist* survey, even though this question is subject to selection bias. While the results are similar for “no extent”, for the Manufacturing sector, the results show even more employee involvement, with only 14.9 per cent “no extent.”

B.4. How do the following groups and/or organizations influence the environmental sustainability strategy of your company?

The results are shown in Table IV.

If we look solely at the column headed “greatly affects”, the leading option is “national regulations” but that option (and its companion, “international regulations”) are really inappropriate in a list of options that is intended to capture stakeholder influence. Setting them aside, “shareholders” (40.2 percent), “government” (35.2 percent), and “local community” (31.4 percent) lead the list. Combining the responses with “affects to some extent”, it is “shareholders” (85.3 percent), “government” (82.9 percent), and “employees” (80.4 percent) that head the list, followed closely by “local community” (78.8 percent) and “consumers” (78.5 percent).

To what extent are your company's employees involved in environmental sustainability strategies?			
Answer options	Great extent	Some extent	No extent
Voluntarily	42.3	50.7	7.0
Motivated or forced by the company	24.1	44.9	31.0
Average	33.7	47.9	18.4
Economist	16.0	63.0	21.0

Table III.
Employee involvement in
environmental strategies

How do the following groups and/or organizations influence the environmental sustainability strategy of your company?					
Answer options	Greatly affects %	Affects to some extent %	Sum %	Does not affect %	Response count
Government	35.2	47.7	82.9	17.1	92
Employees	21.7	58.7	80.4	19.6	93
Shareholders	40.2	45.1	85.3	14.6	90
Consumers	32.1	46.4	78.5	21.5	92
Suppliers	12.7	60.4	73.1	26.9	93
Environmental support groups	14.8	48.0	62.8	37.1	91
NGO	10.4	50.1	60.5	39.6	91
Educational institutions	10.6	42.9	53.5	46.4	91
National regulations	50.6	33.1	83.7	16.3	93
International regulations	39.4	34.7	74.1	25.9	91
Media	12.8	57.6	70.4	29.6	92
Competitors	15.8	43.9	59.7	40.3	92
SRI funds	11.6	31.7	43.3	56.7	87
Local community	31.4	47.4	78.8	21.1	92
Industry, trade or business associations	6.5	60.2	66.7	33.3	91
Others	12.6	15.4	28.0	72.0	8

Table IV.
Stakeholder influence

Least influential are “socially responsible investment (SRI) funds” (56.7 percent “does not affect”) and “educational institutions” (46.4 percent “does not affect”), followed by “competitors” (40.3 percent), “NGOs” (39.6 percent), and “environmental support groups” (37.1 percent). This is understandable since Mexican educational institutions have only recently become involved in sustainability studies and there were no SRI funds in Mexico at the time our survey was conducted[12].

Compared to the results of other surveys, “government”, “employees”, and “shareholders” exert the most influence, which is the same top three as in our survey, followed by “consumers” and “educational institutions”[13]. The greater influence attributed to educational institutions in *The Economist* survey reflects their larger (and longer) commitments to sustainability issues in the USA (e.g. training, degree programs, green buildings).

Environmental sustainability, Section C: expansion plans or adoption of new practices

C.1. Does the adoption of environmental sustainability practices improve your company’s financial results?

Almost all (92.5 percent) of our firms say that the adoption of environmental sustainability practices improves the bottom line, quite similar to the results reported in *The Economist* for US firms, albeit for the broader concept of “corporate citizenship”[14]. For the manufacturing sector alone, 96 percent of firms say that adopting environmental sustainability practices improves the bottom line (72.0 percent “greatly improves”).

That sustainability pays back is, of course, the primary theme in such mainstays of the popular literature as Andersen and Zaelke (2002) and Holliday *et al.* (2002), among a host of others, and academic papers dating back to the seminal work of Porter and Van der Linde (1995a, b).

C.2. Five years from now, do you think that environmental sustainability practices will be more or less important to your company’s business strategy?

Compared to the results of *The Economist* survey, in five years environmental sustainability practices are expected to be considerably more important for Mexican firms (91.9 per cent vs 44 percent “more” or “much more” important). This is consistent with the idea that Mexican firms are at an earlier stage of development along the environmental sustainability learning curve than their US counterparts, at present. For the Manufacturing sector alone, 83.3 percent of firms (vs 91.9 percent overall) say that environmental sustainability practices will be more important five years from now.

C.3. How likely is it that your company could increase profits by adopting environmental sustainability strategies in the following areas?

All but one option (“eco-manufacturing products”) elicited a majority of firms indicating that it was “likely” or “very likely” profits could be increased by adopting environmental sustainability practices in each of the ten areas cited (Table V).

“Energy resources conservation” (57.3 percent) and “waste reduction” (56.8 percent) are the most likely to deliver results. When “likely” and “very likely” are combined, these same two areas top the list, followed closely by “other natural resources conservation” (83.0 percent) and “water resources management” (81.6 percent). With regard to resource conservation strategies as a package, 69.6 percent of firms think that it is either “likely” or “very likely” that profits can be increased by pursuing them. These results mesh closely with the discussion and examples on the topic of the “value of sustainability” contained in Blackburn (2006, Ch. 3) and also Ambec and Lanoie (2008).

C.4. Will your company allocate more or less in monetary resources for the implementation of environmental sustainability practices within the next five years?

Almost two-thirds (64.4 percent) of our firms say they will allocate more money for the implementation of environmental sustainability practices over the next five years, compared to 39 percent in *The Economist* survey, which is consistent with the finding that environmental sustainability practices will be considerably more important for Mexican firms (question C.2). In the Manufacturing sector alone, the results are moderated, with 50.0 percent saying they will allocate “more than the current (level of) resources” and 41.7 percent saying they will allocate “about the same resources”. This is consistent with a more mature sector as regards current implementation.

Environmental sustainability, Section D: decision-making responsibility

D.1. In your company, who is primarily responsible for addressing the issue of environmental sustainability?

As shown in Table VI, the most striking difference between our results and those of *The Economist* is the lack of responsibility taken by corporate boards in addressing environmental sustainability issues compared to US firms, and the greater responsibility taken by lower levels of management in Mexican firms.

D.2. To what extent do the following intra-company departments influence the environmental sustainability performance of your company?

Most of the modal responses are in the “strong” or “very strong” categories. Table VII shows the results by combining these response options over the list of departments. In order of influence, the top four departments are “environmental management” (83.0 percent “strong” or “very strong” influence), “corporate strategy” (71.9 percent), “health and safety” (62.1 percent), and “public relations” (53.9 percent).

For comparison purposes, we show results from a similar question in the Delmas survey of eight US industrial sectors (Delmas and Toffel, 2006)[15]. Therein, the legal and regulatory affairs department has relatively more influence, while public relations

How likely is it that your company could increase profits by adopting environmental sustainability practices in the following areas? (Top five categories)

Answer options	Very likely (%)	Very likely + likely (%)
Energy resources conservation	57.3	88.9
Water resources management	49.7	81.6
Other natural resources conservation	44.5	83.0
Waste reduction	56.8	83.9
Supply chain	35.6	70.6

Table V.
Adoption of
environmental
sustainability practices
and profitability

In your company, who is primarily responsible for addressing issues of environmental sustainability?

Answer options	Response percent	Economist (%)
Board of directors	9.6	34
CEO	43.1	37
CFO	1.3	4
Other senior executives	23.7	17
VP manager/director	22.3	6

Table VI.
Addressing issues
of environmental
sustainability

Table VII.
Intra-company influence

To what extent do the following intra-company departments influence the environmental performance improvement of your company? (strong and very strong influence)		
Answer options	Ours	Delmas
Environmental management	83.0	78
Legal and regulatory affairs	46.0	61
Public relations department	53.9	27
Corporate strategy department	71.9	47
Marketing department	43.8	18
Product design department	40.5	18
Health and safety department	62.1	N/A
Others	44.7	N/A

has relatively less. For the Mexican manufacturing sector alone, public relations has somewhat more influence than in the overall results, though the top four departments are the same.

Environmental sustainability, Section E: internal and external challenges

E.1. Within your company, what are the internal challenges that represent the most significant obstacles for addressing issues of environmental sustainability?

Of the seven response options, the top three that ranked no. 1 in the minds of our respondents were “do not know the most effective way to take action” (53.0 percent), “outdated perspectives on issues of environmental sustainability” (51.7 percent), and “too many business propositions that have not been prioritized” (29.8 percent). On a weighted rank basis, the same options are at or near the top of the list.

Compared to results from the MIT survey (Q6), “do not know the most effective way to take action” is much more important, reflecting the immaturity of Mexican firms in addressing issues of environmental sustainability.

Interestingly, the results for the manufacturing sector are also quite different, with “insufficient resources” topping the list, followed by “outdated perspectives [...]” and “inability to assess short and long-term consequences”.

E.2. Within your company, what are the external challenges that represent the most significant obstacles for addressing issues of environmental sustainability?

The highest ranked external challenges, based solely on the percentage of firms specifying them as most significant, are “lack of clear industry standards” (44.1 percent), “lack of customer demand” (40.4 percent), and “insufficient economic incentives” (37.2 percent). The same three appear, though in a different order, when a weighted rank calculation is used.

Compared to the MIT results (Q7), these are also the three most significant external challenges but “lack of customer demand” is the principal challenge.

E.3. How important are the following elements when addressing environmental sustainability in your company?

Table VIII displays the detailed results. The modal responses are all in the “high importance” column, with the three leading options being “vision and commitment towards environmental sustainability” (64.2 percent), “communication between the interested parties” (52.9 percent), and “ability to understand and determine regulatory policies for environmental sustainability” (52.5 percent). Summing over the columns “high importance”, “moderate importance”, and “important”, we see that the top five

Answer options	How important are the following elements when addressing environmental sustainability in your company?					
	High importance (%)	Moderate importance (%)	Important (%)	Sum (%)	Low importance (%)	Not important (%)
Product, services or marketing innovations	48.2	13.9	19.2	81.3	11.5	7.2
Business model or processes innovation	46.5	14.1	22.8	83.4	9.0	7.5
Inner-company departmental collaboration	51.6	6.5	25.0	83.1	11.5	5.4
External supply chain mobilization due to environmental	32.5	22.7	23.3	78.5	13.2	8.2
System perspectives: the ability to understand the conditions beyond	35.1	26.0	19.4	80.5	15.0	4.5
Identification and use of specific frameworks for environmental	39.5	22.7	23.2	85.4	10.1	4.5
Identification and use of developmental measuring tools for	51.8	18.1	17.3	87.2	8.4	4.5
Vision and commitment towards environmental sustainability	64.2	14.7	10.3	89.2	6.2	4.6
Ability to understand and determine regulatory policies for environmental	52.5	11.7	25.5	89.7	8.3	2.1
Communication between the interested parties	52.9	14.4	17.0	84.3	11.4	3.3
Dealing with uncertainty and planning long-term scenarios	32.3	21.0	30.5	83.8	11.0	5.2
Ability to fully experience and accept failure when analyzing external	32.9	24.7	23.1	80.7	13.9	5.2
Learning processes and internal adaptation	41.9	26.0	19.0	86.9	5.3	7.7
Dynamic adaptation to the changing business environment	42.8	23.8	21.2	87.8	7.1	5.4

Table VIII.
Elements for addressing environmental sustainability

options are “ability to understand [...]” (89.7 percent), “vision and commitment [...]” (89.2 percent), “dynamic adaptation to the changing business environment” (87.8 percent), “identification and use of developmental measuring tools for addressing environmental sustainability issues” (87.2 percent), and “learning processes and internal adaptation” (86.9 percent).

Very few of the manufacturing firms regarded any of the options as of “low” or “no” importance (not shown). Using “high importance” only, the top three options (all ≥ 50 percent) are: “vision and commitment [...]” (66.7 percent), “product, services or marketing innovations” (54.2 percent), and “ability to understand [...]” (50.0 percent). On the basis of the sum, “vision and commitment [...]” and “ability to understand [...]”

were at the top of the list, with 100 percent of firms regarding them as at least “important”. Five other options were close behind.

The MIT survey (Q18) has a similar question that contains all of these answer options except “learning processes [...]”. Their eight top-ranked options include five of ours.

Competitiveness

CO.1. How would you rate your company’s position compared to its closest competitors in the following areas?

None of the Mexican companies said they were in “much worse” position than their competitors for any of the response options. Very few even said they were in “worse” positions, as seen in Table IX. The exception is “environmental sustainability investment”, where 9.9 percent said they were behind their competitors. In all categories, a majority of our firms said they were either in “much better” or “better” position than their competitors. This is a major finding. This is also true of the manufacturing sector alone.

Adding these two responses, as shown in the “sum” column, the leading specific areas of competitiveness for Mexican companies are “operational performance (efficiency)” (82.1 percent), “revenue growth” (77.5 percent), “ability to find and exploit new opportunities” (76.4 percent), and “profitability” (74.8 percent)[16].

The results for the manufacturing sector alone are considerably moderated and show “waste management” (72.7 percent) and “awareness about environmental sustainability issues” (72.8 percent) as the leading areas of competitive advantage, followed closely by “environmental sustainability investment” (69.6 percent “much better” or “better”)[17].

The Economist survey (p. 25) has an almost identical question. For them, the modal responses are all in the “same” category. No area received a majority of “much better” or “better” responses and, concomitantly, there were relatively more responses in the “worse” and “much worse” columns. But since these responses relate to the vague notion of “corporate citizenship” for US firms, it is not clear how to interpret the comparative results.

How would you consider your company’s position compared to its closest competitors in the following areas?						
Answer options	Much better (%)	Better (%)	Sum (%)	Same (%)	Worse (%)	Response count
Supply chain information	17.7	47.6	65.3	33.4	1.4	87
Ability to find and exploit new opportunities	38.0	38.4	76.4	21.7	1.9	91
Awareness about environmental sustainability issues	36.5	26.9	63.4	30.1	6.5	89
Environmental sustainability investment	26.4	37.5	63.9	26.3	9.9	90
Profitability	34.5	40.3	74.8	20.7	4.5	86
Revenue growth	35.0	42.5	77.5	19.5	3.0	86
Competitiveness	46.4	38.0	84.4	13.6	2.0	85
Operational performance (efficiency)	34.1	48.0	82.1	15.9	2.0	87
Waste management	16.3	38.8	55.1	39.6	5.4	87
Energy resources management	33.1	25.3	58.4	36.2	5.5	87
Water resources management	32.4	29.7	62.1	31.6	6.2	89
Other natural resources management	15.2	40.3	55.5	41.9	2.6	86

Table IX.
Competitive position

CO.2. The impact environmental sustainability practices have had on your company's profits are:

A majority (59.9 percent) of our firms say that implementation of environmental sustainability practices has had a positive impact on profitability[18]. Only 15.5 percent said the impact was "low" or "very low" and 7.3 percent said there had been no impact at all. Adjusted for the "not applicable" responses, these percentages are 63.7, 16.5 and 7.8, respectively.

This question is essentially the same as C.1, where 56.7 percent of firms said that the adoption of environmental sustainability practices had "greatly improved" company financial results.

CO.3. Has the implementation of environmental sustainability practices enabled your company to have a greater capacity to respond to new market conditions (i.e. opportunities or threats)?

Almost two-thirds (63.5 percent) of our respondents said that the effect on capacity to respond to new markets was positive[19]. Only 6.5 percent said there was "no impact" on capacity.

This question can be compared to the previous question on competitive position, where 76.4 percent of firms said their position was either "much better" or "better" with regard to the "ability to find and exploit new opportunities". If we adjust the 63.5 percent for "not applicable", we get 67.8 percent, which is quite close.

Conclusions

Improving the environmental performance of business firms through the adoption of sustainability practices is compatible with competitiveness and improved financial performance. This is a theme that gained traction in the late 1980s in the USA, and has been supported by a number of theoretical and empirical studies in the academic literature for example, Porter and Van der Linde (1995a, b), Christmann (2000) and Klassen and Whybark (1999), plus numerous volumes of case studies exemplifying how particular companies have succeeded at this effort (Andersen and Zaelke, 2002; Holliday *et al.*, 2002). The vast majority of these success stories come from large firms, and especially those engaged internationally. In Mexico, where about 10 percent of GDP derives from large firms, one might expect that the same would be true, but only anecdotal evidence was heretofore available.

In this paper, we have reported on the results of a survey effort aimed at benchmarking the sustainability practices of the largest 500 Mexican firms. Our sample consists of approximately 100 self-selected firms, and selection bias is an issue in interpreting the results of some questions. Nevertheless, it is clear that Mexican companies are very active in the various areas of business where environmental sustainability is relevant. And, consistent with the idea that "dirtier" industries are more likely to be active in adopting sustainability practices (Perez-Batres *et al.*, 2012), we find that the manufacturing sector alone is much more active than other sectors in the most important areas of energy resources conservation, waste reduction, environmental risk control, and waste recovery. Not surprisingly, however, the Mexican companies are seen to be at an early stage of development along the sustainability "learning curve". The vast majority of these firms see adopting sustainability practices as being profitable and think this will be even more important in the future.

As to competitiveness, a significant majority of Mexican firms recognize that the adoption of sustainability practices has enhanced their competitiveness and their ability to respond to new market conditions. All-in-all, the top Mexican firms are in a strong competitive position. Adoption of environmental sustainability practices has either strengthened or solidified that position.

Finally, reflecting on the relevancy of the institution-based theory of the firm, it is clear that all three pillars, regulative, normative, and cognitive, are important in explaining the results we get for “stakeholder influence” (Question B.4 and Table IV). National and international environmental regulations are primary drivers of a firm’s sustainability strategy. But the influence of “social actors” such as shareholders, the local community, consumers, and environmental groups is strong, as well. The cognitive pillar is relevant too, in the form of significant influence by industry, trade and other business organizations.

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Notes

1. Cited in the business magazine, *Expansión*, February 14-28, 2011, p. 14.
2. www.wbcds.org
3. At present however, only one Mexican company is a member of the leading business organization devoted to environmental sustainability, the WBCSD. That company is CEMEX.
4. The weighting factors used are presented in Appendix D of Aigner and Lloret (2011).
5. The Mexican Bolsa lists approximately 135 publicly-traded firms, half of which are closely held and rarely traded.
6. The MIT survey consisted of a self-selected sample of 1,560 respondents from for-profit companies worldwide. Selection bias is not mentioned as an issue.
7. Detailed results are not shown.

8. It is to be noted that *The Economist* survey is not limited to environmental sustainability, but involves the broader concept of “corporate citizenship”. The sample consisted of 566 US-based executives representing 17 different industries. Self-selection bias is not mentioned as an issue.
9. A very recent survey of 272 global executives and “thought leaders” by Ernst & Young in late 2011 puts “cost reduction” at the top of the list (74 percent), with “government regulation” at the bottom (37 percent) (Ernst & Young, 2012).
10. Upward bias due to self-selection is a factor too. It could account for the stronger results as regards “revenue growth” and “cost savings”.
11. It is to be noted that the manufacturing sector is part of the overall sample and, though its influence is diminished by weighting, it is not gone altogether.
12. In December 2011 the Mexican Bolsa launched a sustainability index patterned after the family of FTSE4Good indices.
13. In the Ernst & Young survey, customers were at the top of the list (37 percent), followed by employees (22 percent), and shareholders (15 percent) (Ernst & Young, 2012).
14. Again for this question, self-selection could influence our results but does not seem to have been a factor.
15. The sample consisted of 562 self-selected responses from 3,255 facilities within eight industrial sectors in 2003.
16. We note that the top response option for the sum of the “much better” and “better” positions was overall “competitiveness”, at 84.4 percent.
17. Again, overall “competitiveness” leads, at 80.9 percent “much better” or “better”.
18. For the manufacturing sector alone, the percentage is lower, at 50.0 percent.
19. For the manufacturing sector only, the percentage was higher, at 70.9 percent.

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