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Evaluation of Sustainability Practices in the United States and Large Corporations

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Abstract A survey-based research study was conducted to analyze sustainability practices of large U.S. corporations in their domestic and international operations. Large U.S. corporations were slow to address global environmental challenges, but a majority of them now demonstrate a clear understanding of their responsibilities. Most large U.S. corporations are proactively involved in sustainability and environmentally friendly measures, and their involvement at home is more intense than abroad. Analyses revealed that U.S. corporations engage in eight activities related to sustainability: investing in energy-efficient methods, generating electricity from solar power, generating electricity from wind power, using biofuels, trading carbon credits, supporting environmental organizations, generating electricity from biomass, and generating electricity from hydropower. Of these, only generating electricity from biomass and hydropower were not significantly different with respect to U.S. corporations' foreign and domestic implementation. This paper represents the first attempt to determine whether and how U.S. corporations' efforts to promote sustainability differ with respect to their operational locus (domestic or overseas).

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Introduction

The United States government has neither ratified the Kyoto Protocol to reduce greenhouse gas (GHG) emissions, nor formulated a domestic GHG emissions reduction policy. At the same time, large U.S. corporations were the founding members of North America's first voluntary climate exchange in Chicago and were the first to make decisions that voluntarily reduced their GHG emissions. However, opposition in the U.S. Senate has stalled further attempts by the U.S. government to promote environmental health.

Given this paradox, the purposes of this study are twofold. First, this paper is meant to discuss the evolution of sustainability definition and related practices in the United States. The United States government and corporations often play an important role in influencing other countries. Second, this paper aims to compare sustainability practices adopted by large U.S. corporations in their domestic and international operations. This paper represents the first attempt to determine whether and how U.S. corporations' efforts to promote sustainability differ with respect to their geographical location.

This study's findings may assist institutional investors, national policymakers, and business leaders within these large American corporations to better understand the importance of sustainability policies and nature of sustainability practices. Furthermore, these findings will allow for a comparison of U.S. corporations with European (and

other international) corporations who have actively promoted sustainability and environmental policies. This research can be replicated to understand the evaluation of sustainability policies and practices in other countries as well.

Literature Review

The 1987 *Brundtland* thesis introduces the de facto definition of sustainability, arguing that sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Tietenberg and Lewis 2009). According to Hart (1997), the road to sustainable enterprise started in the 1950s with pollution denial, which shifted to end-of-pipe regulation in the 1970s, "greening" in the 1980s, and beyond greening by the 1990s. Each of these perspectives contributed to the development of a growing movement toward environmental concern, thus laying the groundwork for modern sustainability theories and their corresponding definitions.

The work of Carroll (1979) provides one of the first models for social responsibility-focused decision making. Carroll argues that managers should be provided with a clear concept of social responsibility and a summary of reasons justifying its existence. Hawken (1993) not only identifies sustainability problems, but also discusses business-related solutions to those problems. He asserts that although the proposed solutions primarily serve to protect the environment, they could also improve a firm's profitability and transform the economy. In arguing for a firm's responsibility to promote social welfare as well as profitability, Elkington (1998) refers to the "triple bottom line" (TBL) to define sustainability. The TBL is comprised of three components: the economic bottom line (profit), the social bottom line (people), and the environmental bottom line (planet).

Christmann and Taylor (2001) explore the possibility that globalization will discourage international corporations from polluting developing countries (or countries with relaxed environmental regulations). In other words, the authors test whether corporations will self-regulate their polluting behavior. In their study, Christmann and Taylor (2001) leverage a sample of 118 Chinese firms to analyze whether international ownership and customer linkages contribute to environmental self-regulation. They found that contrary to common belief, global corporations self-regulate and engage in activities that are environment friendly. Further, they discovered that these behaviors were not adopted by domestic corporations, but the actions of global firms encouraged them to follow environment-friendly behavior. Multinational ownership, multinational customers, and exports to developed countries (which tend to have strict environmental regulations) increase the likelihood of environmental self-regulation. In a similar line of research, Aguilera-Caracuel et al. (2010) surveyed the CEOs of 106 Spanish export firms to explore the influence of the internationalization on the adoption of proactive environmental strategies in small- and medium-sized firms. The study analyzed the degree to which environmental and sustainability policies vary in different countries. The study concluded that each host country adheres to different environmental policies and that Spanish firms benefit from the regulations of different locations where they operate. Consequently, the firms integrate environment-friendly practices and programs into their organizational strategy. This study encourages managers of international firms to be proactive in adopting sound environmental policies. These two studies sampled firms from two different countries. The findings may look contradictory, but in reality the surveyed firms in these two studies are trying to self-regulate and learn from host countries' and other international firms' sustainability practices.

Similarly, research by Drezner (2000) supports the environmental self-regulation hypothesis. Drezner found that while investing in developing countries with relaxed environmental regulations, international corporations often import environment-friendly technology and may face pressure from domestic interest groups to protect the environment in developing countries.

Rask and Lauring (2012) focused on a Danish multinational corporation with more than 30 years of experience in issues related to environmental sustainability. The corporation is one of the world's top manufacturers of renewable energy equipment. This study illustrates the challenge associated with maintaining an organization's core values as it grows and diversifies. It shows that the subsidiaries of multinational corporations are often very diverse in their perceptions about sustainability. Given this finding, Rask and Lauring (2012) provide a new understanding about the patterns of sustainability among international business units of the same corporation.

Birkinshaw and Pedersen (2009) summarized the literature focusing on the theories of multinational enterprises and foreign direct investment as well as the interactions between those enterprises and their global subsidiaries. International subsidiaries have become increasingly important, and their business practices may differ from those of the domestic subsidiaries of the same firm. In light of these differences, no empirical analysis of multinational corporation networks can be conducted without understanding each subsidiary's respective resource base, strategy, and linkages with other subsidiaries.

Sustainability Practices in the United States

In 1971, the Committee for Economic Development in the United States gave the first explicit official support to postulates related to corporate social responsibility (CSR). In doing so, it provided a definition for CSR that is based on three concentric circles (Committee for Economic Development 1971):

- The inner circle, consisting of basic economic functions—growth, products, and jobs.
- The intermediate circle suggests that the economic functions must be exercised with sensitivity toward changing social values and priorities.
- The outer circle outlines emerging responsibilities that businesses should assume to become more actively involved in improving the social environment.

Owing to increasing pressure from global sustainability advocates and institutional investors, large U.S. corporations have recently begun to emphasize sustainability policies. Fleming (2005) discusses shareholders' demands for greater disclosure of risks associated with business practices that affect the climate. Specifically, investors managing $3 trillion in assets released a ten-point action plan for U.S. corporations to assess financial risk related to environmental issues. Supporters of the plan included state treasurers, comptrollers, and pension fund leaders from California, Illinois, New York, and the United Kingdom. As a result of the plan, U.S. and European corporations have been pressured to take a more proactive stance in reducing GHGs. In another study, Hancock (2005) predicts that the U.S. Securities and Exchange Commission would develop and implement a number of environment-focused restrictions on U.S. corporations. This prediction is summarized by a quote from Commissioner Richard Roberts. The commissioner asserts that "[the] era of responsibility free pollution for U.S. corporations is over." Truini (2004) summarizes the findings from a 2004 study of corporations in the *Financial Times* 500 Global Index and concludes that climate change (and corporate practices) can influence shareholder value both positively and negatively. Given this, it is in the best interest of global corporations to be proactive in implementing practices that are environment friendly.

Several large American corporations have volunteered to share their sustainability efforts with the Carbon Disclosure Project (CDP 2012), a multinational cooperative that advocates the disclosure of corporate sustainability policies. As of early 2012, the project comprised 655 institutional investors and managed $78 trillion of global investments. The project periodically surveys companies and publishes the results, which are available to all consumers, financial institutions, and governmental agencies. By publicizing the corporate policies related to carbon emissions reduction, the CDP has encouraged large companies to take greater steps toward reducing the GHG emissions that result from their activities (CDP 2012).

Despite the fact that many companies have voluntarily offered summaries of their sustainability efforts, the CDP has nonetheless made requests to the largest American multinationals to publicly disclose their GHG emissions reduction programs. On the basis of the information obtained from these firms, in 2012, the CDP published GHG reduction activities for the 500 largest global corporations and the 500 largest American corporations (CDP 2012). The striking response rate that resulted from the CDP survey (80 %) suggests that major U.S. and global corporations are experiencing increased pressure from governments and investment groups to (a) find a market-based solution to environmental problems and (b) promote sustainability measures.

Sustainability Practices in Large U.S. Corporations

Snider et al. (2003) investigated the degree to which the 30 largest U.S. corporations and 50 largest global corporations (as listed by *Forbes* magazine) engage in socially responsible behavior. Specifically, they studied the corporations' websites in the framework of stakeholder theory. In their study, they address broader social responsibility issues but do not specifically examine sustainability behavior. White (2006) suggests that the adoption of sustainable business practices is not only environmentally responsible but also economically beneficial for U.S. corporations. Specifically, the growing carbon credit market as well as the proliferation of other programs designed to encourage the adoption of environment-friendly business practices is influencing corporate income statements and balance sheets. White (2006) noted that U.S. financial institutions account for carbon-related legislation and corporate exposure to environmental risk when making decisions related to long-term investments.

Similarly, Davis and Janoff (2005) reported that by 2004, many U.S. corporations had voluntarily implemented practices designed to reduce GHG emissions to achieve economic benefits and increase demand from key stakeholders. For example, BP America reduced its GHG emissions by 10 % relative to their 1990 levels. By doing so, the company gained approximately $650 million in value. At that time, BP committed to maintaining its reduced net emissions for at least a decade. In another example, Alcoa reduced its direct GHG emissions by 25 % relative to its 1990 levels through improvements in energy efficiency. As a result of these changes, the company saved over $16 million per year.

In another study related to U.S. corporate dedication to sustainability, researchers from Duke University surveyed

human resource executives from the largest 250 U.S. corporations and analyzed the websites of only the largest 100 U.S. corporations (Rousseau 2009). Results demonstrate that among major U.S. corporations, there is significant variation in their commitment to sustainability. For example, whereas Berkshire Hathaway Inc. did not satisfactorily integrate sustainability practices into its corporate culture, ATT Inc. and IBM had developed and cultivated corporate cultures that are receptive to business practices that promote sustainability. The literature indicates a general lack of consensus, understanding, and prioritization of issues related to sustainability among leading U.S. corporations, because sustainability is still an evolving concept and may be influenced by corporate culture (Rousseau 2009).

Although the survey portion of this study revealed much about corporate understanding of sustainability issues, the website analyses demonstrated even greater divergence among major U.S. firms. In the analyses of the websites, Rousseau (2009) showed that two-thirds of the top 100 U.S. corporations reported on sustainability issues, but only 43 % chose to emphasize sustainability on their websites. Major U.S. corporations can facilitate the advancement of sustainability by highlighting their dedication to it. For example, corporations may consider modifying their mission statements and core values to reflect a dedication to sustainability and environmental protection. The aforementioned studies show that it is in the best interests of U.S. corporations to not only design long-term strategies for reducing GHG emissions but also highlight their dedication to those strategies. Otherwise, the firms risk being perceived as resistant to positive change by company stakeholders.

Nastu (2008) identified the adoption of energy efficiency and investments in renewable energy as key steps taken by U.S. corporations to reduce their GHG emissions and operating costs. For example, the Office Depot Corporation reported that it has reduced its carbon dioxide emissions from natural gas and electricity by 10 % in its North American retail stores, warehouses, and offices by installing more energy-efficient technology. Citigroup, which owns and operates about 8.5 million square meters of space worldwide, has adopted various power-saving measures. For example, the company turns off escalators in the lobbies of its buildings and has redesigned its bank branches to include more natural lighting and recycled materials. The company reported saving nearly $100 million annually by making its properties more energy efficient.

General Electric (GE) has pledged to invest in environment-friendly technologies as well. In May of 2007, GE announced that it had doubled sales from environment-friendly products to $12 billion over the previous 2 years (Nastu 2008). By 2010, GE allocated $1.5 billion annually to its ambitious ecomagination research and development initiative. As part of this initiative, the company has invested more than $2.5 billion in sustainability-related research and development. In the summer of 2010, GE launched a $200 million contest to attract entrepreneurs working on sustainability-related ideas and designs to encourage innovations geared toward reducing GHG. The contest is focused on renewable energy, power grid efficiency, and eco-homes and buildings (Ecomagination 2011).

Investment in renewable energy is also emphasized by several American corporations. Fthenakis et al. (2009) predicted that solar energy would be widely utilized by U.S. corporations by 2020. They concluded that technological innovation will make corporate expenditures related to solar energy equal to that of fossil fuels by that year.

Sustainability Rankings of Large U.S. Corporations

As a result of their efforts, large global and U.S.-based corporations are interested in earning a high "sustainability rank," a metric indicative of their dedication to green technologies and environmental protection. By securing a high sustainability rank, corporations can attract green investment and satisfy customers who are concerned with environmental issues. The Dow Jones Corporation has launched several indexes that measure the degree to which corporations engage in environment-friendly and sustainable activities. Launched in 1999, the Dow Jones Sustainability Indexes (DJSI) represent the first global indexes that track the financial performances of leading sustainability-driven companies worldwide (DJSI 2011). Currently, more than 70 DJSI licenses are held by asset managers in 16 countries to oversee a variety of financial products. For example, the Dow Jones Sustainability United States Indexes (DJSI, US) are designed to evaluate the market performance of large U.S. corporations, including major companies from all 57 industry sectors. Market capitalization of these large U.S. corporations is about $4.3 trillion. The top holding companies in the DJSI US are Microsoft, Procter & Gamble, Johnson & Johnson, General Electric, and IBM (DJSI US 2011). These indexes allow for the analysis of how sustainability policies affect corporate financial performance.

In an attempt to quantify and rank large U.S and global corporations, the Corporate Knights Research Group, a Toronto-based media company, collected data on 3,000 global public corporations and evaluated them according to 11 different metrics. After preliminary screening, the sample was reduced from 3,000 to 300 global corporations. These 300 global corporations were assessed against 10 equally weighted environments, social and governance key performance indicators, and a transparency indicator. All

corporations were scored relative to their industry peers. Through this analysis, the Corporate Knights Research Group identified the world's top 100 most sustainable corporations; this listing was made publicly available in 2005 (Corporate Knights 2011, 2012).

Of the top 100 sustainable corporations in 2010, 13 were based in the United States. In 2011, however, only eight U.S.-based corporations were listed in the top 100. This suggests that non-U.S. corporations have begun to adopt sustainability practices at a faster pace than their American counterparts. The list of sustainable U.S. corporations and their respective global rankings is presented in Table 1-a, b. Most of the corporations in the list are based in Europe. This is somewhat unsurprising, as European governments have forced their nations' corporations to be efficient with their resources through various administrative measures (e.g., ratification of the Kyoto protocol). In addition to being more environment friendly, European corporations also have more comparable pay rates for employees and CEOs.

Of the top ten most sustainable corporations in 2010, only two were based in the U.S; in 2011, there were no American corporations in the top ten. Despite American corporations' collective failure to be among the top ten most sustainable corporations in the world, Table 1-a, b nonetheless list their global ranks. The purpose of structuring the data in this fashion is to emphasize the relative success of non-American corporations in sustainability-related practices.

Generally, large U.S. corporations did not receive high global sustainability rankings. In 2010, for example, the top three American corporations were, respectively, ranked 2nd, 6th, and 11th in the world. The 13th-ranked American company, Baxter International Inc., was ranked 99th in the world. In 2011, the top three American corporations were, respectively, ranked 15th, 18th, and 59th in the world. Since large U.S. corporations are major players in global business, there is a need to understand their declining sustainability rankings and identify the differences in their foreign and domestic operations.

The overall sustainability ranking scores are useful but do not illustrate the effectiveness of any particular sustainability measure that has been adopted by large American corporations. In addition, although some studies have used non-U.S. firms as data, no study to date has identified differences in the foreign and domestic sustainability practices of large U.S. corporations. According to research by Christmann and Taylor (2001), Birkinshaw and Pedersen (2009), Aguilera-Caracuel et al. (2010), and Rask and Lauring (2012), there is a strong possibility that sustainability measures adopted by large American corporations domestically may differ from those adopted by overseas

Table 1 Most sustainable large U.S. corporations (a) 2010 and (b) 2011

Corporation	Industry	U.S. rank	Global rank
(a) 2010[a]			
Johnson & Johnson	Health-care products	1	2
Intel Corporation	Semiconductors	2	6
General Electric	Capital goods	3	11
Agilent Technologies Inc.	Technology hardware and equipment	4	28
Johnson Controls Inc.	Automobiles and components	5	29
Weyerhaeuser Co.	Pulp and paper	6	31
Prologis	Real estate	7	41
Procter & Gamble Company	Consumer goods	8	44
Kraft Foods Inc.	Food	9	45
PG & E Corp.	Household and personal products	10	50
Hewlett-Packard Co.	Food, beverage, and tobacco	11	75
Coca Cola Company	Beverages and Food	12	78
Baxter International Inc.	Health-care equipment and service	13	99
(b) 2011[b]			
Life Technologies Corp.	Technology	1	15
Intel Corporation	Semiconductors	2	18
Agilent Technologies Inc.	Technology hardware and equipment	3	59
Johnson Controls Inc.	Automobiles and components	4	64
Procter & Gamble Company	Consumer goods	5	66
International Business Machines Corp.	Technology	6	69
Baxter International Inc.	Health-care equipment and service	7	86
Prologis	Real estate	8	90

[a] *Source* Corporate Knights (2011)

[b] *Source* Corporate Knights (2012)

subsidiaries. This may result from differences in regional circumstances. The possibilities described above are explored in this study.

Research Question and Hypothesis

On the basis of the literature pertaining to global corporations and sustainability practices, the following research question and hypothesis are formulated to better understand sustainability-related practices in large U.S. corporations:

RQ1 What are the widely-used sustainability practices adopted by large U.S. corporations?

H1 Large U.S. corporations are not equally involved in adopting sustainability measures at home and abroad.

Research Methods

A questionnaire was mailed to a sample of large U.S. corporations selected from the Fortune 500 list. Fortune 500 corporations are well known around the world and operate in diversified industries. All corporations that operated primarily in the domestic sector (i.e., ratio of foreign sales to domestic sales is less than 5 %) were removed from the sample. This yielded a total of 322 corporations. Questionnaires were mailed to each corporation's Chief Executive Officer, who was best suited to forward the questionnaire to the appropriate person in the organization. A self-addressed stamped envelope was enclosed to improve the response rate. As an incentive to respond, all corporations were guaranteed a summary of the data at the conclusion of the project.

The questionnaire included items related to the environmental protection measures as identified through the literature review and personal interviews with five selected corporations from the sample. These five corporations were willing to discuss their practices, and the interview was helpful in designing the questionnaire. The sustainability measures included in this study are investment in energy-efficient methods, use of biofuels, electricity generated by solar power, electricity-generated wind power, electricity generated by biomass, electricity generated by hydropower, trading carbon credits, and supporting environmental organizations. The respondents were asked to select the sustainability practices from the list of eight practices listed in the questionnaire. The final section of the questionnaire inquired about corporation-specific demographic information. A total of 66 responses were received (response rate: 20.5 %), but the sustainability-related question was completed by only 58 corporations (response rate: 18.1 %). This indicates a non-response bias. This issue is addressed by summarizing population and sample industry affiliation and annual revenue (size) data in Tables 3 and 4 in Appendix. Sample is a good representative of the population within most of the industrial categories of the surveyed corporations, but sample is not proportionally represented in all annual revenue categories (size). Data pertaining to sustainability practices at home and abroad were tabulated to address the research question and test the hypothesis.

The data were analyzed separately for all eight sustainability practices using the McNemar test in SPSS, Version 12.0. For each corporation, adaptation of all sustainability measures was analyzed in their domestic and international operation.

Data Analyses

Table 2 presents results related to large American corporations' sustainability practices at home and abroad to address the research question. Table 2 reveals that the respondents are heavily involved in sustainability practices at home as well as in their international operations, but their participation in activities is much more widespread

Table 2 Number of large U.S. corporations adopting sustainability practices and McNemar test results

Sustainability measures	Domestic operations	Foreign operations	*p* value (two-sided significance)
Investing in energy-efficient methods	44 (76 %)	34 (59 %)	.002
Electricity generated by solar power	40 (69 %)	27 (47 %)	.002
Electricity generated by wind power	36 (62 %)	21 (36 %)	.003
Using biofuels	27 (47 %)	12 (21 %)	.001
Trading carbon credits	22 (37 %)	13 (22 %)	.073
Supporting environmental organizations	15 (26 %)	6 (10 %)	.022
Electricity generated by biomass	12 (21 %)	8 (14 %)	.454
Electricity generated by hydropower	10 (17 %)	6 (10 %)	.289

Note Number of responding corporations is 58

domestically relative to internationally. This may seem contradictory given the United States' failure to ratify the Kyoto Protocol for environmental responsibility, but domestic environmental regulations, financial incentives, voluntary participation, the emergence of regional GHG agreements in the United States, and corporate mission statements may have encouraged these large corporations to engage in environment-friendly and sustainable activities.

The most widely reported sustainability measure used by large corporations is "investing in energy-efficient measures." Seventy-six percent of respondents claimed to be focusing on domestic energy efficiency, and 59 % reported energy efficiency to be a key component of their international operations. Investment in energy efficiency is popular because of rapid financial returns that result from reduced energy costs. The second and third most widely adopted sustainability measures by U.S. corporations, in their domestic operation, are the use of solar and wind energy (69 and 62 %, respectively). This result is unsurprising given that solar and wind energy is subsidized by several U.S. states and many countries of the world. This likely encourages U.S. corporations to generate solar and wind power for their consumption. Any excess production of electricity is typically sold back to the utility companies. Solar and wind energy generation also were ranked second and third as measures employed abroad by U.S. corporations (47 and 36 %, respectively). The use of biofuels is the fourth most widely used sustainability measure that U.S. corporations employ domestically (47 %) and abroad (21 %). Their lower reported usage of biofuels in international operations may be due to limited supplies or financial in host countries. The reduced use of biofuels internationally may also result from the controversial claim that there is a relationship between the use of biofuels and food prices in some parts of the world.

Interestingly, 37 % of respondents reported trading carbon credits generated from their U.S. operations. Since the United States has not ratified the Kyoto Protocol, and there exist no compulsory targets for reducing carbon emissions, it appears as though a large number of firms are engaging in carbon trading largely of their own volition. Despite its ubiquity within the U.S., carbon credit trading is not a widely used practice for U.S. firms' international ventures. Only 22 % of surveyed firms traded carbon credits generated in their overseas operations. A small number of surveyed firms support not-for-profit "environmental organizations" at home (26 %) and abroad (10 %). Finally, electricity generated by biomass and hydropower represents the least popular practices for U.S. corporations, both domestically and internationally.

To test the hypothesis, the corporations' involvement data from Table 2 were analyzed by employing the McNemar test. The McNemar test was used to compare each corporation's decision to adopt all eight sustainability measures in the United States and then comparing the same measures in their international operations. The McNemar test significance results are also presented in Table 2.

The McNemar test indicated that there are significantly more corporations that use the first six sustainability measures in the United States than internationally. These findings provide evidence for rejecting the null hypothesis in favor of alternative hypothesis for the first six sustainability measures. This indicates that there is a statistically significant difference in the ways in which large U.S. corporations engage in sustainability practices domestically and internationally with respect to investing in energy-efficient methods, solar-powered electricity generation, wind-powered electricity generation, biofuels, and the trading of carbon credits. The U.S. corporations' use of biomass and hydropower as sustainable practices do not significantly differ domestically and internationally, despite these corporations' substantial involvement in these sustainability measures at home.

Low response rate of this study has raised the possibility of non-response bias. To validate the sample results, industrial profile and size (based on annual revenue) of sample and population are provided in Tables 3 and 4 in Appendix. Based on the industrial profile data, the sample is a good representative of the population within most of the industrial categories of the surveyed corporations and there is no evidence of non-response bias. The analysis of population and sample data within three revenue categories (size), however, do support non-response bias in the sample data. It seems that sample is overly represented by corporations annually generating over $15 billion and underrepresented by corporations generating less than $5 billion.

Discussion

The United States has not ratified the Kyoto Protocol for mandatory reductions in GHG emissions, but many large U.S. corporations are taking sustainability-related practices seriously. A number of sustainability indexes and rankings are available to help consumers, governments, and financial institutions better understand the degree to which large American corporations engage in these sustainability practices.

The results of this study suggest that several large U.S. corporations focus on sustainability measures in their U.S. and international operations. To illustrate, energy efficiency, use of solar energy, and use of wind energy were the first, second, and third most widely used sustainability practices at home and abroad.

Among the findings produced by this study, it is most interesting to note that U.S. corporations' involvement in domestic sustainability activities is substantial relative to the activities undertaken by these corporations overseas. For six of the eight most popular sustainability-related activities, domestic engagement outpaced international engagement. This difference may be attributable to the establishment of self-imposed goals related to carbon emissions, federal and state tax incentives for sustainability-related investment, or more stringent enforcement of American federal and state governments' environmental regulations. In the absence of federal regulations related to environmental protection, several U.S. states are requiring corporations to invest in sustainability-related measures.

The results of this study also suggest that U.S. corporations are pressured by investors and environmental groups to adopt sustainability measures at home and abroad. American corporations may be closely scrutinized by environmental groups based in the United States, thus motivating the corporations to emphasize sustainability domestically rather than internationally. In addition, financial incentives offered by governments and carbon trading revenue have a potential to make adaptation of sustainability practices not only a socially responsible behavior but also a good business practice. This study has identified a number of sustainability measures that have been adopted by large U.S. corporations in their domestic and international operations.

One of the limitations of this study is the low response rate for the question related to sustainability practices. This may be attributed to the fact that not all respondents were investing in sustainability measures at home and abroad, and thus, these corporations do not have any information to report. It is also possible that many large U.S. corporations are still waiting for the development and implementation of federal sustainability-related policies before they actively engage in environment-friendly behaviors. It is unlikely that these corporations have incorporated sustainability into their business decisions.

This study provides an understanding of evolutionary process of sustainability practices in the United States and adoption of these practices by large U.S. corporations. Low response rate of sample and some evidence of non-response bias prevent this study to make strong conclusions and policy statements. Findings such as these may be still useful for national policy-makers, international subsidiary managers, and industry leaders as they move forward with the development of their respective sustainability agendas.

Appendix

See Tables 3 and 4

Table 3 Industrial Profile of Surveyed Corporations

Industrial group	Number of large corporations in population	Number of large corporations in sample
Aerospace and defense	11	2
Financials and investment service	21	4
Chemicals	12	3
Energy	34	7
Food services	25	5
Computer, software, electronics	20	3
Insurance	27	5
Mining	8	2
Wholesale	16	3
Utilities	19	4
Healthcare and pharmaceuticals	30	4
Retail	22	5
Telecommunications	12	1
Automobile and manufacturing	30	6
Miscellaneous	35	4
Total	322	58

Table 4 Annual revenue (size) of surveyed corporations

Annual revenue of corporations	Number of large corporations in population	Number of large corporations in sample
Less than $5.0 billion	52 (16.16 %)	5 (8.62 %)
$5–15 billion	173 (53.72 %)	23 (39.65 %)
More than $15 billion	97 (30.12 %)	30 (51.72 %)
Total	322	58

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