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## Harnessing Creative Destruction: Sustainable Development and Innovation in Practice

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## Abstract

The purpose of this paper is to examine public manifestations of sustainable development through the lens of innovation. Specifically, our research question is: to what extent are firms pursuing sustainable development through innovation along a continuum of building on their existing business (either incremental or radical innovation) to reinventing/destroying a portion, or all, of their business (disruptive innovation)? First, we review the relevant literatures on innovation and sustainable development and describe a conceptual model of sustainable development (Hart & Millstein, 2003). We then analyze the sustainability practices of a matched set of thirty-three firms framed by this sustainable development model, using an innovation lens. Specifically, we found that firms are pursuing sustainable development either in terms of minimizing product life cycle impact (Product Stewardship) or through the creation of products or services which meet the needs of both society and business (Harmonizing Business and Societal Needs). To a lesser extent, firms are introducing new education and healthcare delivery systems in anticipation of changing societal needs (Preparing for the Future) or are advancing transportation, computer and other technologies to develop new sustainable competencies for the future (Disrupting the Status Quo). Based on the fact that an innovation cannot be considered disruptive until after an industry has been disrupted, we were not able to examine sustainable development aimed at disruptive innovation. We suggest a revised model of sustainable development, analysing sustainable innovation on a continuums of innovation (incremental versus radical) and innovation purpose (technical versus social), and offer future directions for research.

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## INTRODUCTION

How firms survive and prosper through the introduction and renewal of products/services and processes is a long-standing seminal question. A more recent, and increasingly seminal question, is how firms can survive and prosper through the introduction and renewal of products/services and processes while simultaneously minimizing harm to the environment and improving social conditions. Innovation theory and research frames answers to the older seminal question and sustainable development theory and research frames answers to the newer seminal question. There is a considerable body of knowledge on innovation and a growing body of knowledge on sustainable development. However, there is little on how the two integrate as firms attempt to survive and prosper through care of planet and people as well as profit.

The purpose of this paper is to examine public manifestations of sustainable development through the lens of innovation. Specifically, our research question is: to what extent are firms pursuing sustainable development through innovation along a continuum of building on the existing business (either incremental or radical innovation) to reinventing/destroying a portion, or all, of their business (disruptive innovation)? First, we review the relevant literatures on innovation and sustainable development and describe a conceptual model of sustainable development (Hart & Millstein, 2003). We then analyze the sustainability practices of a matched set of thirty-three firms framed by this sustainable development model, using an innovation lens. We suggest a revised model of sustainable development and future directions for research based on our findings.

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## LITERATURE REVIEW

### Innovation

Perhaps the best known earlier work on innovation is that of Joseph Schumpeter (1942). According to Schumpeter, innovation was ‘creative destruction’ – a critical component of economic change which made yesterday’s capital equipment and capital investment outdated. He stressed the significance of innovation for the survival of firms through its creation of opportunities for abnormal profits and thus competitive advantage (McCraw,2007; Schumpeter, 1942; Wiggins & Ruefli, 2005). There is increasing attention over the past decade given to Schumpeterian theory in the academic literature in the context of Schumpeter’s emphasis on the role of profit, and the recognized hallmark of the traditional firm and industry behavior – sustained competitive advantage. Schumpeterian theory centers on three main predictions: (1) that firms are increasingly less able to sustain a strategic advantage over their competition; (2) that such behaviour is characteristic of a wide range of industries; and (3) that sustained competitive advantage has become less a matter of finding and sustaining a single competitive advantage and more a case of finding a series of competitive advantages over time and making them into a sustained competitive advantage (Wiggins & Ruefli, 2005). Schumpeterian theory also contains the notion that profit plays a role in motivating innovation as a precursor to creative destruction – (Schumpeter, 1942). This view is ratified by others, including Fine (1998: 30), who states “all competitive advantage is temporary”.

Throughout the years, innovation continues to be a popular research topic in many disciplines. More recent work on innovation by Baregheh, Rowley, & Sambrook (2009: 1334)

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provides an extensive overview of the body of work on innovation and offers this definition of innovation: “the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace.” We use this definition in our study.

There are several forms of innovation. Incremental innovation satisfies current customer needs through the exploitation of existing technology and the building upon of current knowledge bases established by incumbent firms within an industry (Benner & Tushman, 2003; Hill & Rothaermel, 2003). This innovation results in incremental improvements to existing products or processes. Since the customer base and product use are relatively similar to pre-innovation, Christensen refers to this as sustaining innovation (Christensen, 1997; Christensen & Overdorf, 2000). Radical innovation occurs when industry entrants and/or incumbent firms explore new technologies or combine parts of existing technology to develop new products and processes (Benner & Tushman, 2003; Hill & Rothaermel, 2003).

According to Christensen (1997: xv), most innovations foster product/service performance which he classifies as sustaining technologies. These sustaining technologies can be classified on a continuum ranging from incremental to radical to discontinuous in character. The commonality of these types of innovations is that they appeal to current mainstream customers in major markets of historical value. On the other hand, a disruptive innovation occurs when historically mainstream products/services or processes are made obsolete, usually through products/services introduced by new entrants into an industry. These innovations are usually targeted towards non-mainstream customers, are initially seen as inferior by the mainstream, and then rapidly emerge to meet the needs of the mainstream customers. They bring

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to market a very different value proposition aimed at a few, new or fringe customers. “Products based on disruptive technologies are typically cheaper, simpler, smaller, and, frequently, more convenient to use.” (Christensen, 1997: xv). These innovations are considered disruptive because they displace current products and processes and, often times, incumbent firms (Christensen, 1997; Christensen & Overdorf, 2000).

Additionally, innovation can be classified by the purpose of the innovation; there are two main types: technology innovation and social innovation. Technology innovation develops new products/services and processes through the development and transformation of new ideas regarding labor, capital, materials and/or information (Christensen, 1997). Increasingly, technology innovation is taking on an additional meaning which is the development of new products/services aimed at decreasing negative impacts on the environment, for example hybrid cars, or decreasing production pollution (Jorna, 2006). This is known as environmental or eco-innovation. The second type, social innovation, focuses on the development and enactment of new ideas and concepts to address issues such as education, healthcare, and poverty eradication (Howaldt & Schwarz, 2010).

The term “Sustainable Innovation” encompasses eco-innovation and social innovation with the objective to improve planet (eco-innovation) and people (social innovation) in addition to profit (traditional technology innovation). This discussion of sustainable innovation provides a background to discuss sustainable development as these two concepts, while not the same, are closely connected. While there is a great deal of work on technology innovation, research efforts are just beginning on eco-innovation and social innovation. We suggest that sustainable innovation is a way to achieve sustainable development. With this background on innovation in

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general, and sustainable innovation in particular, we turn to a discussion of sustainable development.

## Sustainable Development

The World Commission on Environment and Development (1987:8) described sustainable development as: “Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs.” Just as the creation of shareholder value requires performance on multiple dimensions, the global challenges associated with sustainable development are also multifaceted (Hart & Milstein, 2003). Unfortunately, the results produced by ten years of global capitalism have not been uniformly positive (Stiglitz, 2002). Researchers report that saturation in the developed markets, a widening gap between rich and poor, growing levels of environmental degradation and concern that the developing world may be losing control over its own destiny have combined to create a drag on the global economy (National Research Council, 1999). Increasingly, global capitalism is being challenged to include more of the world in its bounty and to protect the natural systems and cultures upon which the global economy depends (Azapagic & Perdan, 2000; DeSimone, & Popoff, 1997; Nye, 2001).

The upsurge in importance of sustainable development has come to represent these rising expectations for social and environmental performance (Hart & Milstein, 1999; Hart & Milstein, 2003). A sustainable enterprise is therefore regarded as one that contributes to sustainable development by delivering simultaneously economic (profit), social (people) and environmental

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(planet) benefits – the so-called triple bottom line (Hart & Milstein, 2003). TBL's roots are in Stakeholder theory, a theory of organizational management and business ethics. Freeman (1984) posited that not only stockholders, but others impacted by the corporation, were equally important constituents. Such groups represented employees, customers, communities, etc.

The triple bottom line, which is the enactment of a commitment to sustainable development, is designed to encourage businesses to give closer attention to the *whole* impact of their commercial activities, rather than just their financial performance. The TBL implies that business should give parity of treatment to these three dimensions of business impact, *without* giving unique weight to their financial results (Robins, 2006). This framework of economic values, plus social and environmental impacts, is intended to capture the whole set of values, issues, and processes that companies *should* address in order to minimize any harm that results from their activities and to ensure the creation of positive economic, social and environmental value (Elkington, 1997; McCrudden, 2004).

TBL thinking embraces two basic assumptions that are not always explicit. The first is that the company fully abides by the law and meets all the obligations imposed upon it by legislation. This external pressure to embrace sustainable development is consistent with institutional theory which posits that corporations facing similar institutional pressures will eventually adopt similar business models (DiMaggio & Powell, 1983). Thus various stakeholders such as governments through laws, regulations and enforcement, professional societies through standards and norms, NGO (Non-Governmental Organizations) through public pressure and customers through loyalty push organizations to adopt sustainable development (Escobar & Vredenburg, 2011). In addition to the push momentum of external forces, some



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corporations advocate and embrace sustainable development because they accept a higher level of obligation and moral responsibility than that demanded by mere compliance with the law (Michelsen, Fet, & Dahlsrud, 2006; Robins, 2006). It can be argued that in these corporations, sustainable development decisions stem primarily from deontological (duty-based) rather and teleological (goal-based) evaluations. Deontological norms are predetermined guidelines based on independent, moral rights and duties' focusing on what is right rather than the result. In short, evaluation is based on the inherent righteousness of an action (DesJardins, 2006). Teleological evaluations on the other hand stress the end result or consequence of an action and represent another set of justifications for sustainable development. Thus, when organizations make sustainable decisions using a teleological perspective, they do so because of the possibilities of achieving better performance (Artiach, Lee, Nelson, D, & Walker, 2010).

The TBL framework does have some major weaknesses. It offers business no means of prioritising among the requirements of different stakeholder groups. It does not help the company manager to trade off the wishes of one group against those of another when the needs of different stakeholder groups are in conflict. Most centrally, the TBL provides no standard for measuring and comparing outcomes across all three "lines," especially among the noneconomic lines (Robins, 2006). This absence of a credible unit of measurement is a colossal limitation on the value of TBL reporting. Norman and MacDonald (2004) argue that the TBL paradigm cannot be rescued simply by attenuating its claims: the rhetoric is badly misleading, and may in fact provide a smokescreen behind which firms can avoid truly effective social and environmental reporting and performance.

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Despite these weaknesses, the world's largest corporations are fast finding a place for TBL (Desjardins, 2010). Rice (2004) reported that organizational size, political visibility, public scrutiny, and the need for reputation management are strong motivating factors for companies to follow sustainable development. Given this review of the relevant literatures on innovation and sustainable development, we set forth a conceptual model of sustainable development that is the framework for our investigation into the extent to which firms pursue sustainable development.

### CONCEPTUAL MODEL OF SUSTAINABLE DEVELOPMENT

The premise of Hart and Milstein's (2003) Sustainable Value Framework model is that strategies and practices that contribute to a more sustainable world can simultaneously drive shareholder value by creating value for stakeholders. The vertical axis, anchored by today and tomorrow, represents the time dimension managing today's businesses while creating tomorrow's products/services and markets; the need to realize short-term gains while positioning for the future. The horizontal axis, anchored by internal and external, represents a space dimension – efficient internal operations while searching for changes driven by the external environment; thus Hart and Milstein (2003) create four quadrants. In the lower-left (Today-Internal) the focus is on cost and risk reduction and in the lower-right (Today and External) the focus is on reputation and legitimacy. In the upper-left quadrant (Tomorrow and Internal) the emphasis is on innovation and repositioning and in the upper-right (Tomorrow and External) the emphasis is on credible expectations for future growth and the pathway to obtain that growth. The contribution of Hart and Milstein (2003), and what is important to our paper, is the extension

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of this model to sustainable development. Firms need to address sustainability because four sets of forces drive an increased visibility for sustainable development (Hart & Milstein, 2003):

- 1) Increasing industrialization and the associated pollution and waste generation mandate resource efficiency and pollution prevention for continued sustainable development (Fossgard-Moser, T. 2003; Hart & Milstein, 2003; Hawken, Lovins, & Lovins, 1999).
- 2) The proliferation and interconnection of civil stakeholders as enforcers of social and environmental standards challenge firms to operate with transparency and responsiveness to an active stakeholder base (Florini, 2000; Hart & Milstein, 2003; Rheingold, 2002).
- 3) The emergence of technologies that could render today's energy and material intensive industries obsolete oblige firms to embrace innovation and technological change as critical components of sustainable development (Benyus, 1997; Christensen, Craig & Hart, 2001; Coyle, 2001; Dexler, 1986; Hart & Milstein, 2003).
- 4) The increases in population, poverty, and inequity require that social development and wealth creation are important components of sustainable development (Easterly, 2001; Hammond, 1998; Hart & Milstein, 2003; Prahalad & Hart, 2002; World Bank, 2000).

Since global sustainability is a complex, multi-dimensional concept sustainable development by firms requires addressing each of the four broad sets of drivers discussed above. This model extends the stockholder or classical model of the role of businesses in making sustainability decisions to a stakeholder model. The classical model based on the single bottom

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line of profit creation for the shareholder; while the stakeholder model details that others besides stockholders are owed consideration in business decisions (Desjardins, 2006). We suggest that Hart and Milstein's (2003) model moves away from utilitarian ethics (the pursuit of profit as the mechanism serving the utilitarian goal of satisfying consumer demand) to deontological ethics (emphasizing duties and obligations). Figure 1 depicts Hart & Milstein's (2003) conceptualization and relevant extant literature of how firms can accomplish a better balance between stockholder (utilitarian ethics) and stakeholder (deontological ethics).

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In the lower-left quadrant, firms can grow profits and reduce risk through Pollution Prevention. In the lower-right quadrant, firms can enhance reputation and legitimacy through Product Stewardship. In the upper-left quadrant, firms can accelerate innovation and repositioning through Clean Technology. In the upper-right quadrant, firms can crystallize the growth path through a sustainability vision. Hart and Milstein (2003) end their paper with a call to firms to implement this Sustainable Value Framework (SVF).

To our knowledge, research is just beginning to examine how firms might be enacting sustainable development. Thus, the intent of our research is to investigate how sustainable development occurs in practice. We utilize the innovation literature, as well as the Hart and Milstein (2003) framework, to conduct our examination. Specifically, we are researching sustainable development in relation to the type of innovation occurring (incremental, radical, or disruptive) and the purpose of the innovation (pollution prevention, product stewardship, clean technological advancement, and social improvement).

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## METHODOLOGY

For our research, we identified sustainable development efforts through data gathered from selected companies' sustainability reports (also known as corporate social responsibility or citizenship reports). These reports are channels through which many companies capture their sustainability efforts (Etzion & Ferrarro, 2010). We also utilized organizational websites and rankings from Newsweek Inc. (2009), CNN.com (2010) and the Global Reporting Initiative (2010).

### Firm Selection

We selected organizations for the study based on three criteria: 1) companies were selected to provide a representation of U.S.-based and international companies; 2) companies were selected to provide a representation of different levels of corporate sustainability programs; and 3) companies were selected to provide a representation of different industries. We chose firms based on the following:

- We originally selected ten of the highest ranking U.S. "green" companies based on their standing within the Newsweek Inc.'s Green Ranking list (Newsweek Inc., 2009). To maximize the number of industries included in the study, we chose companies based on different industry classifications. As a result, this study includes the ten highest ranking Newsweek Green companies within different industries. We also included an additional U.S. company specializing in cosmetics to provide a comparison for selected international companies.

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- We included eleven Fortune 1000 U.S. companies with industry classifications similar to the already selected companies in the study (CNN.com, 2010). These companies were not included within the Newsweek Green Rankings and, as such, we perceived them to have inferior, or less public, sustainability programs to those in the Newsweek Green Rankings.
- We also selected an additional eleven international companies with industry classifications similar to the Newsweek companies. These companies ranked high (B+ or above) in the quality of their sustainability reporting according to the Global Reporting Initiative (2010), and represented different global regions.

A listing of the companies selected is provided in Table 1.

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Insert Table 1 about here  
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## Data Analysis

We collected data from the sustainability reports and other data sources for each of these companies. The data was coded by multiple coders in the research team and a random sample from each of the three sets was coded by an independent coder. Verbatim sections of the reports referring to innovations or specific changes to products or processes were extracted from the reports. We then analysed these sections as follows:

- Each innovation or change was classified as either a technology innovation – the transformation of labor, capital, materials, and information into products or services of

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greater value – or a social innovation– actions taken to impact education, healthcare or other social issues (Christensen, 1997; Howaldt & Schwarz, 2010).

- Each innovation or change was analysed to determine if it constituted an innovation. To be an innovation, we used Baregheh et al.'s (2009) definition in which a change needed to include a process in which new ideas were generated and acted upon, and these new ideas enabled the company to better compete or differentiate itself in the market place. Social changes were considered to meet these criteria when they provided new products, expanded customer bases, promoted the company's brand image, or satisfied some other business purpose. Changes that did not meet these criteria were not considered for further analysis.
- The innovations were then classified as either incremental or radical. Disruptive classifications were not used based on the difficulty of determining the disruptiveness of an innovation until after the actual disruption has occurred. Furthermore, disruptive innovations are usually introduced by non-incumbent firms and all the firms in the study are considered incumbent (Christensen & Overdorf, 2000).
- Innovations were then classified as pollution prevention, product stewardship, clean technology or sustainable vision based on Hart and Milstein's (2003) Sustainable Value Framework.

While we did limit the scope of our work to innovations, the classifications of the different types of innovation emerged from the data. The process we used was not entirely deductive as we did the following:

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1. Identified sustainable innovation verbiage from within the sustainability reports.
2. Collected verbatim references to innovations and put into a database.
3. Classified the data under pre-existing classifications of: sustaining vs. radical.
4. Social and technology classifications emerged from the data.
5. Classifications of purpose/types of innovation (e.g., energy reduction; health care) emerged from the data. We identified similarities in the data and build classifications based on those.

The findings from our study are provided below.

## RESULTS

Based on our analysis, ranking status had a significant impact on the quality of the material reviewed (see Appendices A, B and C). The companies ranked either through Newsweek or the GRI provided significant information about their sustainability efforts. Nearly all of these companies provided sustainability reports, and all but Estee Lauder and Nike followed GRI guidelines for their reports. As these GRI guidelines provide standards for sustainability reporting, most of the Newsweek ranked and international corporations provided similar categories of information (Etzion & Ferraro, 2010). The content of the material, however, varied by industry and company.

The non-ranked companies tended to provide less information about their sustainability efforts than the ranked companies. None of the non-ranked organizations issued a stand-alone sustainability report, though one organization (NCR) did provide a brochure with sustainability information. Levi Strauss included a substantial amount of information regarding its sustainability initiatives on its website, and another company (Jabil Circuits) embedded its sustainability information into the organization's annual report. Most of the sustainability information for these organizations was collected from company websites, and the quality of the



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companies' sustainability information ranged from weak – little to no sustainability information provided (CenturyLink, CIT, Spectrum Brands, and Watson Pharmaceuticals) to moderate – a limited amount of sustainability information provided (CommScope, Delphi, Jabil Circuits, Jack-in-the-Box, and NCR) to strong – a substantial amount of sustainability information provided (Levi Strauss). Overall, not unexpectedly, the quality of the information provided by these companies was significantly weaker than that of the ranked companies.

All of the thirty-three companies' sustainability reports, company websites and/or other documents were perused to find specific examples of changes or innovations within the companies. As mentioned, these changes were analysed to determine if they constituted an innovation based on Baregheh et al.'s (2009) definition of an innovation. We then used Hart and Milstein's (2003) SVF model to provide a framework for analysing these innovations. We found that, based on our definition of innovation, three of the four quadrants of the SVF were impacted by innovations:

Quadrant 1 - Pollution Prevention: Minimize waste and emissions from operations.

Our data demonstrated that almost all organizations, including the non-ranked organizations, implemented pollution prevention programs. These programs included the promotion of energy conservation through the installation of efficient lighting systems; hazardous and non-hazardous waste reduction through better waste management procedures, and decreased carbon dioxide (CO<sup>2</sup>) emissions through programs such as an increased use of video-conferencing. Although these changes modified the way these companies operated and may have impacted profitability, the changes did not directly impact the companies' ability to compete or

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to differentiate themselves. Therefore, these changes did not satisfy our definition of innovation and were not included in further analysis.

Quadrant 2 - Product Stewardship: Integrate stakeholder views into business process.

From the results of our study, collaboration and interaction with consumers, non-government organizations (NGOs), and other stakeholders impacted all quadrants of the SVF model. The organizations within the study solicited advice from consumers and suppliers. They partnered with educational and research-oriented institutions. They worked with government and regulatory bodies, and they brought in NGOs such as Greenpeace International and the World Wildlife Fund to assist them with their efforts. These interactions impacted efficiencies in operations (Quadrant 1: Pollution Prevention); the development of new products (Quadrant 3: Clean Technologies) and relationships between the company and the community (Quadrant 4: Sustainable Vision). As a result, we did not find the allocation of a quadrant to stakeholder integration to be relevant for our study.

Instead, we found that product stewardship signified efforts by the companies in our sample to reduce the environmental impact of their products. Product stewardship, therefore, is defined in the context of this study as the re-design or re-development of products or processes—including changes in material usage, packaging, and product design – to minimize the product's impact on the environment throughout its life cycle. Based on this definition, innovations impacting product stewardship were found to be incremental technical advances to current products and processes.

The majority of innovations that we identified were product stewardship advances (see TABLE 2 and TABLE 3). These innovations included the development of more energy or fuel

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efficient products; products designed with little or no hazardous materials; or product re-developments to reduce consumer waste. Many of these innovations coalesced based on industry. For example, companies within the automotive industry concentrated their efforts on developing products that improved fuel efficiency and reduced CO<sup>2</sup> emissions. Banks and financial service companies introduced new financial products which provided clients with the ability to invest in environmental and socially responsible entities. These companies and other service providers, such as Infosys Technologies, also introduced new service offerings to help customers address governance, carbon emission and water-related issues. Companies within the household and personal product industries redesigned products to increase the amount of renewable material used, and they retrofitted packaging to improve its recyclable material content and to provide product re-fill opportunities. The remaining companies were primarily high technology companies within the computer, communication, and electronic industries. These companies were primarily driven to reduce the amount of energy needed by their products. One company also developed video-conferencing products to decrease consumers' travel needs, and several companies within the Computers and Office Equipment segment developed products to reduce consumer paper usage. Overall, product stewardship advances were developed through companies utilizing existing knowledge bases to develop more environmental-friendly products for existing clients. These innovations, therefore, were considered to be incremental.

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Insert Tables 2 and 3 about here  
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Quadrant 3 - Clean Technologies: Develop the sustainable competencies of the future.

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According to Hart and Milstein (2003:61-62), “clean technology refers not to the incremental improvement associated with pollution prevention, but to innovations that leapfrog standard routines and knowledge.” Based on this description, clean technology refers to radical, or disruptive, sustainable innovations. While several examples of product stewardship innovations were present within our data, only four examples of radical innovations were present (see TABLE 4).

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Insert Table 4 about here  
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These included two related innovations from the automobile industry – Johnson Control’s development of lithium-ion hybrid vehicle batteries and Kia’s advancements in hybrid and fuel-cell electric vehicles. Both of these innovations promote fuel efficiency and CO<sup>2</sup> reductions, and have the potential to radically change the petroleum-fueled automobile industry. Another innovation included in the data, Hewlett Packard’s CeNSE technology, uses nanotechnology to sense changes to the environment. According to Hewlett Packard Senior Fellow Stan Williams, CeNSE has the potential to “revolutionize human interaction with the Earth as profoundly as the Internet has revolutionized personal and business interactions today” (Wylie, 2009). The final innovation classified as radical was IBM’s development of a solar powered water desalination plant through a collaboration with King Abdulaziz City for Science and Technology of Saudi Arabia. The technology developed through this collaboration provides a cost effective alternative to the current seawater desalination methods of thermal technology and reverse osmosis (Hunter, 2010). All of these innovations, therefore, utilize new knowledge bases and offer products which are likely to replace, or provide alternatives for, existing products.

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Quadrant 4 - Sustainable Vision: Create a shared roadmap for meeting unmet needs.

Hart and Milstein's (2003) sustainability vision primarily addresses social development and wealth creation amongst the world's poor. Many of the organizations included in this study did provide examples of such actions within their reports. These actions included efforts to improve education; to increase accessibility of products such as telecommunication devices, banking products, and medicines; and to improve health care. While a majority of these services did target individuals at the world's poorest people (also known as the Bottom of the Pyramid or BoP), they were not exclusively targeted at the world's poor. NCR and ANZ, for example, created products and services for visually impaired persons. Kia Motors introduced eco- and safe-driving education for the South Korean population. State Street, Intel and Hewlett-Packard each provided educational tools to all levels of society to promote technological learning and workforce preparedness. Cisco donated products to help qualifying community organizations achieve significant gains in productivity, scalability, and cost efficiency through the strategic use of the Internet and related networking technologies.

Some of the social actions taken by these companies can be regarded as innovations as they utilized new ideas to address education, healthcare, and other societal issues (Howaldt & Schwarz, 2010). Furthermore, these actions expanded beyond philanthropic acts by providing companies with opportunities for new product offerings, expanded customer bases, and increased brand recognition. Four of the identified social innovations can even be considered radical – they used new technologies or new ways of thinking to expand products or client bases (see TABLE 5).

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Insert Table 5 about here  
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For example, Johnson & Johnson is working with Gates Foundation to re-formulate heat sensitive therapeutics so that they can be distributed without refrigeration to people in developing countries. These re-formulated medications are designed to reach an underserved market, and the advances in non-refrigerated product development may cause these products to replace the company's current product base. Another radical social innovation was provided by Infosys Technologies. Infosys Technologies worked with the University of New Mexico to develop a network to facilitate information flow between health providers, to educate rural physicians, and to provide greater connectivity between physicians and patients. Similarly, ST Microelectronics worked with the Mayo Clinic to develop a platform to remotely monitor chronically-ill patients' physiological changes and to communicate this information to healthcare providers. Both Infosys Technology's and ST Microelectronics' innovations change the way patients and physicians interact and provide cost effective alternatives to traditional healthcare delivery in the U.S. Finally, Kia Motors built the Kids Auto Park and re-focused its efforts to promote safe driving in South Korea from parents to children – who will be the country's future drivers. Each of these companies developed, or is developing, innovative solutions to societal problems through new technologies or new ways of thinking. Surprisingly, these radical technologies are primarily targeted towards consumers in developed countries as opposed to developing countries.

Most of the social innovations identified, however, were not radical. Instead, they utilized current technology or knowledge bases to educate consumers or to provide greater accessibility

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to products or services. As demonstrated in TABLE 6 and TABLE 7, most of these incremental social innovations provided greater accessibility to healthcare, financial services or communication tools to populations at the Bottom of the Pyramid. Several innovations also targeted farmers in developing countries– providing them with education, communication devices, and access to better seed and fertilizers.

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Insert Tables 6 and 7 about here  
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## **DISCUSSION**

### Sustainable Value Framework and Innovation

While the SVF does provide a framework for analysing sustainable development, we find its use is limited. First, Hart and Milstein's (2003) definitions of the quadrants do not fully represent what we saw reflected in our data. For example, Product Stewardship did not represent the inclusion of stakeholders in organizational decision making; instead, it represented changes to products and processes to make them more environmentally friendly. We also found that innovation is key to nearly all quadrants, not just the upper-left Clean Technology quadrant in the Hart and Milstein (2003) model. Finally, we found that sustainable value did not only represent actions targeted at Bottom of the Pyramid populations. Instead, sustainable value included social innovations that impacted members of developed societies through innovative educational programs and improved healthcare delivery systems.

Based on our research, we suggest the following model better represents sustainable development in practice.

Insert Figure 2 about here

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In this model, innovation is represented in both axes. In the y-axis innovation, innovation is a continuum from incremental to radical, reflecting the incumbent firms' actions from primarily modifying and updating existing product platforms to exploring new technologies to develop new products and processes. The x-axis represents the purpose of the innovation which is the target of sustainable development – either technical or social.

The four quadrants are: Product Stewardship which shifts to lower left; Harmonizing Business and Societal Needs in the lower right; Disrupting Status Quo in the upper left and Preparing for the Future in the upper right. Product Stewardship sustainable development minimizes the life cycle impacts of products/services through greater efficiencies in energy and water usage, reduction of hazardous and non-renewable materials and improved packaging. This is the most common manifestation of sustainable development in our sample. Harmonizing Business and Societal Needs sustainable development is about creating a shared road map for meeting societal and business needs and is driven by the desire to provide for underserved impoverished and disabled populations. This quadrant is similar to Hart & Milstein's (2003) Sustainability Vision. It is a close second in our sample. Disrupting Status Quo sustainable development mirrors Hart & Milstein's (2003) Clean Technology quadrant, and focuses on developing sustainable competencies for the future through technological advancements in areas such as transportation, computing and electronics. Preparing for the Future sustainable development is about generating new ways of thinking and acting to meet anticipated future societal needs, including advancements in healthcare and education. Both Disrupting Status Quo



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and Preparing for the Future require advanced idea generation which extends beyond conventional thinking; the result of which is more radical innovations. We did not find many examples of Disrupting Status Quo or Preparing for the Future in our sample (only four examples each). This may be due to the limited reporting of radical innovations because of their sensitive nature, or it may be the result of limited abilities of incumbent companies to pursue novel products/services which extend beyond their present product offering or customer base. This determination was beyond the scope of the current study.

#### Limitations and Areas for Future Research

Our research was restricted by the number of firms in our sample. While we had representatives from many industries, we studied only a very small number within those industries. We also only examined those that were publically traded. Future research could investigate further privately held, government agencies and NGO's for example (Hawke, 2004; Kaye, Moores, Smith, & Weichard, 2003).

We did not include disruptive innovation as defined by Christensen (1997). Consistent with Christensen's (1997) argument, incumbent firms still appear to be reluctant to redefine or destroy part or their entire business model and disruption is usually driven by companies outside the industry. We only included incumbent firms within our study. Furthermore, disruption might only be identifiable after it has occurred. Therefore, a more longitudinal research methodology may better disclose the disruptive companies and the innovations they introduce. While the limitation of the Hart and Milstein's (2003) model is that it did not allow for future developments, the proposed model has this some of the same limitation which we would expect future work to "correct". Future research would also benefit from gathering additional data that

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is not so closely tied to reporting activities of firms such as their sustainability reports. For example, interviews, participant observation, and in depth case studies could help in refining the model further.

A further extension of our work would be to investigate outcome measures. Hart and Milstein (2003)'s model posits that following a sustainable values framework will enhance shareholder value, and this is a promising area for future work. Connected to creating shareholder value is the notion of competitive advantage. While we did not include this in our paper, we suggest that investigating the relationship between a hypercompetitive business environment and sustainable development would provide insights into how firms seek to balance what might be competing world views. In D'Aveni's seminal book (1994, p.217 - 218), he defines Hypercompetition as "an environment characterised by intense and rapid competitive moves, in which competitors must move quickly to build advantage and erode the advantage of their rivals". The primary goal of this approach to strategy is disruption of the status quo, to seize the initiative through creating a series of temporary advantages". Brown and Eisenhardt (1998) also argue that success can only come from a continuous stream of temporary advantages when the environment is "relentlessly shifting". One could hypothesize that because of the very nature of sustainability, it is at odds with hypercompetitiveness – that is, sustainability is not characterised by intense and rapid competitive moves, in which competitors strike quickly with unexpected unconventional means of competing aiming to annihilate competition to gain profit. Sustainability is by definition long lasting and collaborative. Sustainability redefines the competitive playing field from a single bottom line – firm profitability to a triple bottom line – people, plant, and profit (Elkington, 1994). Sustainability is a wider world view of

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competitiveness. It moves from innovation as competitive advantage of the firm with “us” (winners and losers) to innovation as multi-stakeholder collaboration with “we” (winners and winners) the basis for creating and maintaining value. We find this an intriguing area for future research.

We also did not focus on the role of organizational leaders in sustainable development. Often managers are intent on short term change for short term competitive advantage. The challenge is thus to combine the need for long-term sustainability with continuous flexibility in terms of how organizational and technological change efforts are designed and carried out. Long-term ambitions and short-term actions do not necessarily work well together and it definitely creates a specific set of managerial problems (Biedenbach & Soderholm, 2008). We believe that investigating leaders as catalysts or champions will offer additional insights into how firms enact sustainable development. This information would be helpful for organizations seeking to increase an emphasis on sustainable development in terms of hiring, training, promotion and general resource allocation.

While we illustrated the ties of our research to stakeholder theory, institutional theory, and ethical theory, the work in, and our contribution to, sustainable ethics is in the beginning stages. “Scholars will be called upon to provide conceptual, normative, empirical and critical analyses...” as the importance of sustainability in business ethics intensifies (Desjardins, 2011:724).

In this paper, we examine public manifestations of sustainable development through the lens of innovation. Specifically, we found that firms are pursuing sustainable development in terms of Product Stewardship and Harmonizing Business and Societal Needs and to a lesser

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extent Disrupting Status Quo and Preparing for the Future. We also found that we were not able to examine sustainable development aimed at disruptive innovation. We suggest several avenues for future research, encouraging both academics and practitioners to continue harnessing creative destruction using a sustainable development world view.

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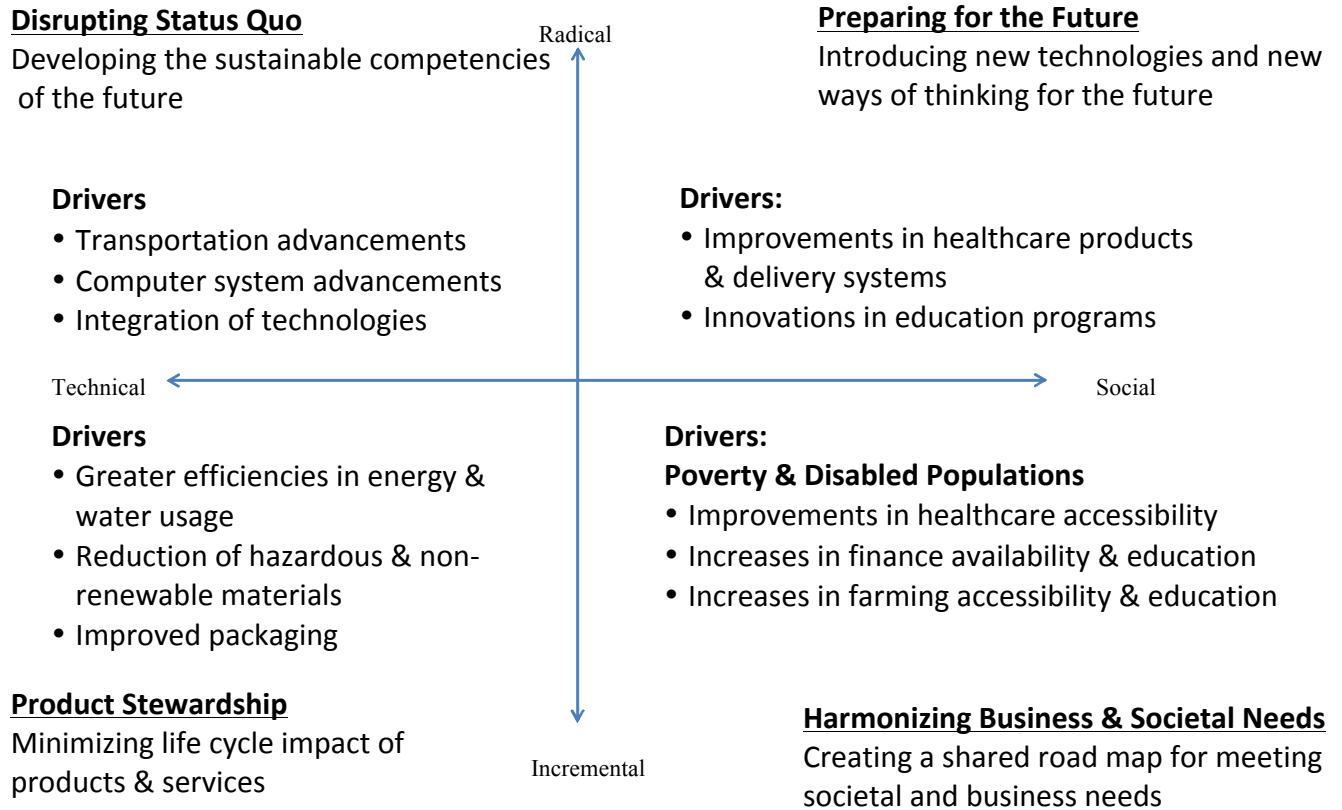
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## APPENDIX A Listing of U.S.-Based Non-Newsweek Ranked Companies

Company Name	Country/ Region	Industry	Source for Sustainability Information	Transparency of Information	GRI Application Level
CenturyLink	USA	Telecommunications	Company website	Weak	n/a
CIT	USA	Commercial Banks	Company website	Weak	n/a
CommScope	USA	Network & other communications equipment	Company website	Moderate	n/a
Delphi	USA	Motor Vehicles & Parts	Company website	Moderate	n/a
Jabil Circuits	USA	Semiconductors, & Other Electronic Components	2009 Annual Report & Company website	Moderate	n/a
Jack in the Box	USA	Food Services	Company website	Moderate	n/a
Levi Strauss	USA	Apparel	Company website	Strong	n/a
NCR	USA	Computers, office equipment	2009 Corporate Citizenship Brochure & Company website	Moderate	n/a
Spectrum Brands	USA	Household & Personal Products	Company website	Weak	n/a
Unisys	USA	Information Technology Services	Company website	Moderate	n/a
Watson Pharmaceuticals	USA	Pharmaceuticals	Company website	Weak	n/a

**FIGURE 2**

**The CADA Model of Sustainable Development**



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**TABLE 1**  
**Companies Selected For Study**

<b>Industry Classification</b>	<b>U.S. Companies Newsweek Green Rank</b>	<b>U.S. Companies; No Newsweek Green Rank</b>	<b>International Companies</b>
Apparel & Textiles	Nike	Levi Strauss	Puma (Europe)
Financial Services	State Street	CIT Group	ANZ (Australia)
Computers; Tech Hardware	Hewlett Packard	NCR	AUO (Asia)
Food & Beverages	Starbucks	Jack-in-the-Box	Pronaca (Latin America)
Household; Personal Product	Estee Lauder	Spectrum Brands	Natura (Latin America)
Information Tech Services	IBM	Unisys	Infosys Technologies (Asia)
Motor Vehicles & Parts	Johnson Controls	Delphi	Kia Motors (Asia)
Network & Other Communication Equip	Cisco	CommScope	ST Microelectronics (Europe)
Pharmaceuticals	Johnson & Johnson	Watson Pharmaceuticals	Novo Nordisk (Europe)
Semiconductors & Other Elec Components	Intel	Jabil Circuits	UMC (Asia)
Telecommunications	Spint/Nextel	CenturyLink	Ericsson (Europe)

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**TABLE 2**

**Product Stewardship: Incremental Innovations**

Company By Industry	Innovation Descriptions	Energy Efficiency	Fuel Reduction	Material Usage	Reduce CO <sub>2</sub> Emiss.	Reduce Packaging	Introduce Product	Waste Reduction	Water Mngmt
<u>Apparel</u>									
Nike									
Levi Strauss									
Puma	Manufactured PVC-free materials							x	
<u>Auto, Motor Veh. &amp; Parts</u>									
Johnson Controls									
Delphi									
Kia Motors	Improved fuel efficiencies; promoted eco-driving	x	X						
<u>Commercial Banks</u>									
State Street Corp.	Launched new environmental, social and governance products						x		
CIT Group	<i>No technical innovations</i>								
ANZ	Created new functional area to provide Carbon & Water services				X		x		x
<u>Computers, Office Equip.</u>									
Hewlett-Packard	Developed new products to reduce energy and paper use; Introduced Sustainable Design Center	x		x				x	
NCR	Developed services to allow for better handling of financial transactions and products to reduce paper usage.	x	X	x				x	x
AUO	Developed more energy-efficient products, reduced use of hazardous materials; and reduced packaging	x		x	X	X		x	
<u>Food Services</u>									
Starbucks	<i>No technical innovations</i>								
Jack-in-the-Box	<i>No technical innovations</i>								

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Pronaca	No technical innovations									
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**TABLE 3**  
**Product Stewardship: Incremental Innovations (continued)**

Company By Industry	Innovation Descriptions	Energy Efficiency	Fuel Reduction	Material Usage	Reduce CO <sub>2</sub> Emiss.	Reduce Packaging	Introduce Product	Waste Reduction	Water Mngmt
<b>Personal Products</b>									
Estee Lauder	No technical innovations								
Spectrum Brands	No technical innovations								
Natura Cosmetica	High use of renewable plant material in products; use recyclable material in packaging; offers refills			x		x		x	
<b>Info. Tech. Services</b>									
IBM	Introduced energy-efficient servers & data centers, and collaboration and Smarter City Tools	x	X		x				
Unisys	No technical innovations								
Infosys Technologies	Developed a framework for sustainability reporting for clients						x		
<b>Network. Equipment</b>									
Cisco									
CommScope									
ST Microelectronics	Developed energy efficient products	x							
<b>Pharmaceuticals</b>									
Johnson & Johnson	No technical innovations								
Watson Pharma.	No technical innovations								
Novo Nordisk	No technical innovations								
<b>Semiconduct/Electronics</b>									
Intel	Developed technology to deliver greater energy efficiency	x							
Jabil Circuits	No technical innovations								
UMC	Developed energy efficient products and processes	x							
<b>Telecommunications</b>									

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 Anne Marie Stoughton; Benedictine U.; [anne.m.stoughton@gmail.com](mailto:anne.m.stoughton@gmail.com)

Sprint/Nextel									
CenturyLink									
Ericsson	Introduced energy efficient products and developed video-conferencing tools	x	X		x				

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**TABLE 4**  
**Radical Technical Innovations**

<b>Company</b>	<b>Radical Innovation</b>	<b>Impact</b>
Hewlett Packard	Developing highly attuned sensors through nanotechnology that mimic human senses to detect minute environmental changes	Detect environmental changes
IBM	Creating a water desalination plant powered by solar electricity	Energy efficiency Water efficiency
Johnson Controls	Developing lithium-ion hybrid vehicle batteries	CO <sup>2</sup> Reduction Fuel efficiency
Kia Motors	Developing hybrid and fuel-cell electric vehicles	CO <sup>2</sup> Reduction Fuel efficiency

**TABLE 5**  
**Radical Social Innovations**

<b>Company</b>	<b>Radical Innovation</b>	<b>Impact</b>
Johnson & Johnson	Working with the Gates Foundation to develop product formulations that will make it possible to distribute heat sensitive therapeutics without refrigeration.	Increased accessibility to medication in developing countries.
Infosys Technologies	Collaborated with the University of New Mexico to design and implement a web-based application to facilitate data flow among participating health providers and to train and educate rural doctors. The tool also provides a platform for greater connectivity between physicians and patients.	Provided new avenues for physician – patient interactions. Improved healthcare delivery in rural areas.
Kia Motors	Built the Kids Auto Park which provides a proactive, dynamic approach to teach children about motor safety and traffic accident prevention.	Changed focus of automobile safety from current generation of drivers to next generation in South Korea.
ST Microelectronics	Collaborated with the Mayo Clinic to develop a platform for remotely monitoring the	Provided a new, cost effective alternative to monitor patient



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physiological conditions of patients with chronic cardiovascular disease. health.

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**TABLE 6**  
**Incremental Social Innovations**

<b>Company By Industry</b>	<b>Social Innovation Description</b>	<b>Education</b>	<b>Accessibility (Poverty/BoP)</b>	<b>Accessibility (Disabled)</b>	<b>Banking</b>	<b>Healthcare</b>	<b>Farming</b>	<b>Other</b>
<u>Apparel</u>		-	-	-	-	-	-	-
Nike								
Levi Strauss								
<u>Auto, Motor Veh. &amp; Parts</u>		-	-	-	-	-	-	-
Johnson Controls								
Delphi								
<u>Commercial Banks</u>								
	Expanded banking services to Cambodians, migrant workers, and to the visually impaired; Provided programs to promote financial skills of low income individuals and farmers in developing countries.	x	x	x	x	-	x	-
ANZ								
<u>Computers, Office Equip.</u>		-	-	-	-	-	-	-
	Developed talking ATMs for use by visually impaired people; incorporated fingerprint recognition technology into ATMs for migrant worker uses		x	x	x			
NCR								
<u>Food Services</u>		-	-	-	-	-	-	-
	Launched the groundbreaking Small Farmer Sustainability Initiative (SFSI) in partnership with TransFair USA and Fairtrade Labelling Organization International						x	
Starbucks								
Jack-in-the-Box								
<u>Personal Products</u>		-	-	-	-	-	-	-

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Spectum Brands									
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**TABLE 7 - Incremental Social Innovations (continued)**

<b>Company By Industry</b>	<b>Social Innovation Description</b>	<b>Education</b>	<b>Accessibility (Poverty/BoP)</b>	<b>Accessibility (Disabled)</b>	<b>Banking</b>	<b>Healthcare</b>	<b>Farming</b>	<b>Other</b>
<u>Info Tech. Services</u>		-	-	-	-	-	-	-
IBM	Assisted city planners, entrepreneurs & NGOs develop a road map for a smarter city in Ho Chi Minh City.	x	-	-	-	-	-	x
Infosys	Developed web access tool for people with visual & hearing impairments and motor & cognitive disabilities	-	-	x	-	-	-	-
<u>Network Equip.</u>		-	-	-	-	-	-	-
Cisco		-	-	-	-	-	-	-
<u>Pharmaceuticals</u>		-	-	-	-	-	-	-
Johnson & Johnson	Launched programs to deliver HIV/AIDs medications in Africa and to distribute donated medicines in Puerto Rico and the U.S.	-	x	-	-	x	-	-
Novo Nordisk	Improved awareness and access to diabetes care; enacted efforts to supply reduced cost insulin to the poorest countries in the world	x	x	-	-	x	-	-
<u>Semiconductors</u>		-	-	-	-	-	-	-
Intel	Launched pilot programs with Grameen Trust to improve maternal health in Bangladesh and to help increase the availability of quality seeds and fertilizers for farmers in India	-	x	-	-	x	x	-
<u>Telecommunications</u>		-	-	-	-	-	-	-
Sprint/Nextel		-	-	-	-	-	-	-
Ericsson	Increased mobile phone in Africa to improve healthcare, education,	x	x	-	-	x	x	x

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	and farming								
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## APPENDIX B - Listing of U.S. Based Newsweek Ranked Companies

Company Name	Country/ Region	Industry	Source for Sustainability Information	Transparency of Information	GRI Application Level
Cisco	USA	Network & other communications equipment	2009 Corporate Social Responsibility Report	Strong	Undeclared
Estee Lauder	USA	Household & Personal Products	2007 Corporate Social Responsibility Report, 2009 Annual Report	Moderate	n/a
Hewlett-Packard	USA	Computers, office equipment	2009 Global Citizenship Report 2009 Accenture Case Study	Strong	B
IBM	USA	Information Technology Services	2009 Corporate Social Responsibility Report	Strong	A
Intel	USA	Semiconductors, & Other Electronic Components	2009 Corporate Social Responsibility Report	Strong	A
Johnson & Johnson	USA	Pharmaceuticals	2008 sustainability Report	Moderate	Undeclared
Johnson Controls	USA	Motor Vehicles & Parts	2009 Business and Sustainability report	Strong	A
Nike	USA	Apparel	2007, 2008, 2009 Corporate Social Responsibility Report	Strong	n/a
Sprint/Nextel	USA	Telecommunications	Company website	Moderate	Undeclared
Starbucks	USA	Food Services	2008 Global Responsibility Report	Strong	B+

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State Street Corp.	USA	Commercial Banks	2008, 2009 Corporate Social Responsibility Report	Strong	B+
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### Appendix C. Listing of International, GRI-Selected Companies.

Company Name	Country/ Region	Industry	Source for Sustainability Information	Transparency of Information	GRI Application Level
ANZ	Australia (Oceania)	Financial Services	2009 Corporate Responsibility Review	Strong	A+
AUO	Taiwan (Asia)	Technology Hardware	2007 Corporate Social Responsibility Report	Strong	A+
Ericsson	Sweden (Europe)	Telecommunications	2009 Sustainability and Corporate Responsibility Report	Strong	A+
Infosys Technologies	India (Asia)	Computers	2008, 2009 Sustainability Report	Strong	A+
Kia Motors	Korea (Asia)	Automotive	2009 Sustainability Magazine	Strong	A+
Natura	Brazil (Latin America)	Household and Personal Products	2009 Annual Report	Strong	A+
Novo Nordisk	Denmark (Europe)	Healthcare Products	2007 Annual Report	Strong	A+
Pronaca	Ecuador (Latin America)	Food & Beverage	2007 Social Responsibility Report	Strong	A+

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Puma	Germany (Europe)	Textiles & Apparel	2007, 2008 Sustainability Report	Strong	A+
ST Microelectronics	Switzerland (Europe)	Technology Hardware	2009 Corporate Responsibility Report	Strong	A+
United Microelectronics Corporation (UMC)	Taiwan (Asia)	Technology Hardware	2009 Social Responsibility Report	Strong	A+



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**FIGURE 1**  
**Sustainable Value Framework with Relevant Research**  
**(Hart & Milstein, 2003)**

