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# Stages of Corporate Sustainability: Integrating the Strong Sustainability Worldview

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## Introduction

Sustainability has moved into the board room of corporations worldwide. Many businesses are pursuing sustainability for a variety of reasons. The business case for corporate sustainability is based upon such benefits as higher stock value, cost savings, and enhanced competitiveness, image, and reputation (Lovins, Lovins, & Hawken, 1999; Lovins, 2010). The scientific case for sustainability is based upon the fact that human impact is leading to environmental degradation, biodiversity loss, changes in biogeochemical flows, changes in biosphere integrity, and climate change (Röckstrom et al., 2009; Steffen et al., 2015). And the moral case for corporate sustainability is based upon impacts to the poor and future generations (Pope Francis, 2015).

The evidence for adopting corporate sustainability is compelling yet company approaches toward sustainability are quite varied. Businesses implement sustainability practices differently based upon worldviews of what sustainability means and how that worldview guides corporate decisions and actions. On one end are businesses that see sustainability as incremental improvements over business-as-usual and on the other end are businesses that see sustainability as a paradigm shift in thoughts and actions. Consider, for example, Columbia's (2016) efforts to make products that are more environmentally friendly versus Patagonia's "Worn Wear" program to encourage customers to buy less stuff and instead to keep and repair what they've got (Patagonia, 2016).

While businesses have increasingly adopted sustainability, the environment continues to rapidly decline (Borowy, 2014; Dyllick & Muff, 2016; Visser, 2010). This paradox is the impetus for the current study which seeks to understand how it is possible that companies are

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reportedly more engaged in sustainability yet environmental conditions continue to disintegrate and, even more specifically, why there exists such a large variance in business' understanding and approach toward sustainability. Dyllick and Muff (2016) refer to the paradox between a simultaneous increase in corporate adoption of sustainability and an increase in environmental degradation as "the big disconnect" and postulate three reasons for the seeming contradiction. First, they suggest that business' sustainability understanding and emphasis has been misguided. Reducing unsustainability and creating sustainability are not the same thing and, in fact, it has been argued that everything business has done to this point would be classified as reducing unsustainability (Ehrenfeld, 2012; Málovics, Csigéné, & Kraus, 2008). This inadequate approach toward sustainability is primarily due to a constricted understanding of the meaning of corporate sustainability (Gladwin, Kennelly, & Krause, 2009; Shrivastava, 1994) that has narrowly focused on the business case as the motivation for and measurement of sustainability (Dyllick & Muff, 2016; Ehrenfeld, 2012) and has ignored larger human, social, and global concerns (Banerjee, 2008; Ehrenfeld, 2012). Second, Dyllick and Muff (2016) argue that there are multiple constructs and streams of literature that have not been well integrated, such as corporate sustainability, corporate social responsibility, and environmental management. Third, Dyllick and Muff (2016) note that there has not been integration of the micro- and macro-level understandings of sustainability; although some efforts have been made, for the most part, each literature stream has taken its own path and focus (Dyllick & Muff, 2016).

In following Dyllick and Muff's (2016) reasoning, this research asks the question: "Can we craft a better approach toward strong corporate sustainability that would resolve the paradox?" This research answers that question by responding to Dyllick and Muff's (2016) three purported causes of the paradox and developing a new model of corporate sustainability that (1)

extends the understanding of the meaning of corporate sustainability beyond the business case through (2) integration of constructs and streams of literature from 22 developmental models in corporate sustainability, corporate social responsibility, environmental management, and sustainable development taken from both (3) micro- and macro-level understandings of sustainability. To achieve this outcome, the new model draws heavily from ecological economics and ecological science to (1) broaden the definition of sustainability, (2) illustrate that different interpretations exist along a spectrum and all represent varying degrees of sustainability, and (3) reveal that the current focus on weak sustainability is contributing to environmental degradation. Thus, the contribution of this research is to present a new model that will enlighten corporate understanding of what is needed to achieve sustainability and reduce environmental degradation.

This paper begins by defining the concepts of corporate sustainability, related concepts from other streams of literature, and sustainable development. The paper then moves to a description of the sustainability spectrum which defines various worldviews toward sustainability. Next, the paper discusses developmental stage models of micro-level firm corporate sustainability and macro-level societal sustainable development, each of which demonstrates various worldviews of sustainability found along the sustainability spectrum. This research then integrates the models with the sustainability spectrum to make its contribution of a unified stage model of corporate sustainability that broadens our understanding of sustainability and sheds light on why the paradox exists between corporate sustainability and environmental decline.

## Corporate Sustainability

Visser (2011, p. 1) defines corporate sustainability and responsibility (CSR; also corporate social responsibility) as "an integrated, systemic approach by business that builds, rather than erodes or destroys, economic, social, human and natural capital." Other researchers may refer to the concept as corporate sustainability. In fact, the lexicon has grown to include corporate responsibility, corporate social responsibility, CSR, corporate citizenship, corporate social performance, corporate sustainability, and environmental management. The difference between these concepts is a topic of debate (e.g., Montiel, 2008; Montiel & Delgado-Ceballos, 2014) and each has developed its own stream of literature. Nonetheless, the terms continue to be used interchangeably (e.g., Ainsbury & Grayson, 2014; Baden & Harwood, 2013; Ormazabel, Rick, Sarriegi, & Viles, 2016; Winn & Angell, 2000). This paper uses the term corporate sustainability.

Schwartz and Carroll (2008) observe that all the constructs share three common core concepts: the generation of both company and societal value, balance of competing interests, and accountability for corporate activities. These authors suggest that, taken together, these three core concepts (value, balance, and accountability) reflect the normative role of business in society. Corporate sustainability and its related terms are micro- or firm-level constructs.

Sustainable development is a macro- or societal-level construct. The most well-known definition of sustainable development comes from the Brundtland Commission's report which states that "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, para. 1). Sustainable development generally refers to economic development policies and approaches of governments and their interaction with the natural environment. As governments adopt policies and regulations in support of sustainable

development, corporations operate within these political and regulatory boundaries. Thus, corporate sustainability is business' contribution toward the achievement of sustainable development.

## Sustainability Spectrum

Since there are a variety of interpretations of what sustainability and sustainable development mean, it is helpful to map them based upon the ideologies or worldviews they represent. O'Riordan (1989) identified four worldviews on environmentalism: Gaianism, Communalism, Accommodation, and Intervention. Gaianism and Communalism were categorized as the "nurturing mode" of Ecocentrism in which humans are part of nature. Accommodation and Intervention were categorized as the "manipulative mode" of Technocentrism in which humans control nature. He points out that all four worldviews can identify as environmentalists, it is the methods that distinguish each ideology.

Pearce and Turner (1990) note that O'Riordan's (1989) worldviews on environmentalism were crystallized in the emerging sub-discipline of environmental economics and they renamed two of the four worldviews, Intervention became Extreme Cornucopian and Gaianism became Deep Ecology.

Pearce (1993) notes that these four worldviews correspond to the sustainable development literature positions known as weak and strong sustainability. Specifically, the Intervention/Extreme Cornucopian worldview corresponds to very weak sustainability, the Accommodating worldview corresponds to weak sustainability, the Communalist worldview corresponds to strong sustainability, and the Gaianism/Deep Ecology worldview corresponds to very strong sustainability. Outside the field of business and economics, the opposing positions of weak and strong sustainability are debated in sociology as the dominant social paradigm

versus the new ecological paradigm (Dunlap & van Liere, 1978) and in theology as dominion versus stewardship or partnership (Rasmussen, 1991). While no person, company, or society fits a pure typology, patterns will reflect a particular worldview.

Strong and weak sustainability provide a normative theory of sustainability in that it identifies criteria for distinguishing sustainable from non-sustainable action (Ott, Muraca, & Baatz, 2011); the theory represents worldviews on the interaction between the economy and the environment, between humans and nature. "Weak and strong sustainability are differentiated by their approach to integration, the ambition of the vision of change, the complexity of the innovation and the extent of collaboration among social, political, and economic actors" (Roome, 2012, p. 626). Throughout the evolution of these worldviews, the basic division between worldviews that hold that humans control nature versus worldviews that hold that humans are part of nature has long framed the sustainability debate (Shrivastava, 1995) and is still an active point of debate today, thus, the theory continues to be relevant. Strong and weak sustainability have subsequently served as the foundation for many contemporary theories and models (Ehrenfeld, 2000; Gladwin et al., 1995; Laszlo et al., 2014; Upward & Jones, 2016; Willard et al., 2014) and serve as a useful organizing template to understand different worldviews, or the mindsets which define one's understanding of sustainability and which, presumably, lead to a selection of behaviors and actions in accordance with those mindsets. Furthermore, since the macro level models in this study (and one micro-level model) were already aligned with the sustainability spectrum, the spectrum served as the natural choice of an organizing template to examine various interpretations of sustainability.

**Weak sustainability**

On the Technocentric side of the sustainability spectrum (weak and very weak sustainability), weak sustainability is based upon neoclassical economic value principles that require production to remain intact so as to enable consumption (Hediger, 1999). In weak sustainability, manufactured capital includes things which are human-made (within the economic and built environment); this can also be referred to as manufactured capital. In the weak sustainability worldview, manufactured or human-made capital can become a substitute for natural capital (Hartwick, 1977, 1978; Solow, 1974, 1993). One example would be the development of human-made flood walls (manufactured or human-made capital) as a substitute for wetlands and floodplains (natural capital). Thus, the weak sustainability worldview allows substitution based upon two beliefs: (1) humans' wants must be satisfied (Daly, 1974), and (2) humans control nature and have the ability to develop technology solutions, justified through economic concepts (Ott, Muraca, & Baatz, 2011), that work as well as or better than natural solutions.

Another point within the weak sustainability paradigm is transfer of resources between generations. In weak sustainability, natural capital can be used and even exhausted as long as it can be offset by an equal gain or balance through human-made capital. That is, the intergenerational transfer of total capital should be cumulatively equivalent; technology (human-made capital) can balance natural resource deficiencies (natural capital) (Hartwick, 1977, 1978; Solow, 1986).

The position of weak sustainability is a modest position, adjusting and accommodating to the demands of environmentalists, while striving to maintain the status quo (O'Riordan, 1989). This is the "safe" position that accommodates but does not give away power or control (O'Riordan, 1989). This is the "heartland of conventional cost-benefit analysis and the ethically

loaded variations of that technique" (O'Riordan, 1989, p. 88), such as project appraisal, pollution abatement, and mediation-compensation strategies. This position creates "superficially attractive reforms" (O'Riordan, 1989, p. 88).

**Very weak sustainability**

The more extreme position of very weak sustainability allows for more radical resource exploitation, unfettered free markets that seek to maximize gross domestic product (GDP), continued technological progress to ensure a source of capital substitution possibilities, and a view of nature related to its instrumental value to humans (Pearce, 1993). This position supports the belief of humans' limitless capacity to exploit the environment to serve human purposes (O'Riordan, 1989).

The positions of weak and very weak sustainability are embodied in environmental economics. Environmental economists reject the idea of changes to the current economic system or restrictions on consumption, support monetization and market forces to achieve sustainability, advocate for technological solutions to address resource depletion, and advocate the use of objective economic science (Illge & Schwarze, 2009) or profit-maximizing criteria (Harris & Roach, 2014) in decisions. Both weak and very weak sustainability represent economic value principles (Hediger, 1999) and attempt to integrate the environment into business (Roome, 2012).

**Strong sustainability**

On the Ecocentric side of the sustainability spectrum (strong and very strong sustainability), strong sustainability is based upon ecological economics physical principles and the scientific laws of thermodynamics that recognizes economic activity is bounded by environmental limits (Hediger, 1999); this approach toward sustainability combines insights

from economics with the science of ecological principles (Harris & Roach, 2014). Within this worldview, manufactured resources cannot substitute for natural resources (Daly, 1973, 1991; Pearce, 1993). Therefore, natural resources must be preserved and must not be used faster than they can be replaced (thus keeping the *physical* stock constant) (Daly, 1991; Pearce, 1993). Strong sustainability proponents suggest the need to preserve the actual "stuff" of the environment and not just its "economic value" (Barry, 2011). Simply put, there is no substitute for the natural environment.

In strong sustainability, the intergenerational transfer of capital is a priority and natural capital stock must remain intact (Daly, 1973, 1991). This promotes intergenerational equity since each generation is granted equal rights to equal resources, particularly natural resources. Therefore, proponents of strong sustainability support the preservation of natural resources in the same quantities for current and future generations. Strong sustainability also advocates zero population and economic growth (Daly, 1991).

Furthermore, strong sustainability views economic and social relationships as intimately connected where principles of sharing and caring are highly valued (O'Riordan, 1989). This position is more idealistic and values cooperation, social wellbeing, economic opportunity, and economic and political reform (O'Riordan, 1989).

**Very strong sustainability**

The more extreme position of very strong sustainability advocates for a preservationist position that heavily regulates resource usage, encourages a reduction in scale of the economy and population, and views nature for its intrinsic value (Pearce, 1993). This position views humans as an integral part of nature, realizing that humans must live in solidarity and balance with the natural world (O'Riordan, 1989).

The positions of strong and very strong sustainability are embodied in ecological economics. Ecological economics considers both the natural and social sciences (Spash, 1999); it is "the only heterodox school of economics consistently focusing on the human economy as both a social system, and as one constrained by the biophysical world" (Gowdy & Erickson, 2005, p. 208). Ecological economics is interdisciplinary in that it integrates economic, ecological, and social concepts, sees the economy as dependent upon the ecosystem, rejects the policy position of continuous growth, believes the ability to substitute natural capital by human-made capital is limited, advances that natural capital cannot be monetized, believes changes are required in our economic system and consumption, and encourages ethical dimensions to be considered in sustainability (Illge & Schwarze, 2009). Both strong and very strong sustainability represent ecologically-based scientific physical principles (Hediger, 1999) and attempt to integrate business into the environment (Roome, 2012). This discussion can be summarized in Table 1.

[insert Table 1 about here]

**Critiques**

The opposing worldviews of weak/very weak sustainability (technocentrism) and strong/very strong sustainability (ecocentrism) have been criticized on a number of points. For example, strong and weak sustainability are seen as failing to integrate culture and nature and it has been argued that neither can achieve sustainable development because one fails to promote development while the other fails to conserve nature (Gladwin et al., 1995). It has also been suggested that debate over strong and weak sustainability is itself too restrictive and needs extended beyond debates on the differences between the positions (Hediger, 2004) or the focus

on capital stocks and flows (Ang & van Passel, 2012). Despite these and other critiques, the theory of weak and strong sustainability continues to be relevant in current theory and debate.

## Developmental Stages

The theory of weak and strong sustainability and the sustainability spectrum serve as the basis for developmental stage models of sustainability. The spectrum has already been applied to macro-level models of sustainable development and to one micro-level model of corporate sustainability. This allows us to examine the varying understandings of sustainability at different levels of analysis. The stages in these models span the full spectrum and all refer to different degrees of sustainability, it is the methods that distinguish them (O'Riordan, 1989); that is, they are differentiated by their approach to integration, ambition of the vision, complexity of innovation, and extent of collaboration (Roome, 2012).

The literature on stages of sustainable development provides a macro-level view of orientations toward sustainability from the perspective of governments, societies, and economies. The literature on stages of development in corporate sustainability, corporate social responsibility, and environmental management provides a micro-level view of orientations toward sustainability from the perspective of the organization. All the stage models are abstractions that represent ideal types (Dunphy, Griffiths, & Benn, 2003) or interpretations, worldviews, or mindsets of sustainability. The majority of a societies' or corporations' ideals are often aligned with one stage even when some of their ideals may align with other stages. These macro- and micro-level models represent a long-term perspective that suggests societies and organizations display different levels of understanding and sustainability integration at different points in time and can demonstrate a progressive integration of environmental and societal concerns.

At the macro-level, the literature is sparse on stages of sustainable development; there are only four models (Hopwood, Mellor, & O'Brien, 2005; Meyerson & Rydin, 1996; Pearce & Turner, 1990; Pearce, 1991, 1993; Yanarella & Levine, 2011; Yanarella, Levine, & Lancaster, 2009. These models identify stages, worldviews, mindsets, or orientations through which societies or economies interpret and enact sustainability. It has been suggested that perhaps sustainable development is simply the next stage in Rostow's (1960) existing economic growth model (Vivien, 2008), however, this research takes the perspective that sustainable development is more nuanced and complex than a single stage of Rostow's (1960) economic growth model and, as shown in the models reviewed here, sustainable development reflects a variety of interpretations. The four sustainable development models are conceptual mappings built upon existing literature and all are based upon the work of O'Riordan (1989) which was the foundation for Pearce and Turner's (1990) and Pearce's (1993) subsequent work on the sustainability spectrum. Because all four models share a common literature base, they are similar in their descriptions of the relationship between growth and resource usage. As points of distinction between the models, 3 of the 4 stage models in this study (Meyerson & Rydin, 1996; Pearce & Turner, 1990; Pearce, 1991, 1993; Yanarella & Levine, 2011; Yanarella, Levine, & Lancaster, 2009) already explicitly link the model's stages to the sustainability spectrum demonstrating that sustainable development can be placed along a continuum allowing us to determine if the stage represents very weak, weak, strong, or very strong sustainability.

At the micro- or firm-level, the literature is abundant. Kolk and Mauser (2000) identified 50 environmental management models alone and there is an equivalent profusion of corporate sustainability and corporate social responsibility models, therefore I have restricted this review to micro-level models published since 2000 (18 models). These models identify stages,

worldviews, mindsets, or orientations through which companies interpret and enact sustainability. Some of the micro-level models are academic conceptualizations developed from an analysis of existing literature (Ainsbury & Grayson, 2014; Darabaris, 2008; Dyllick & Muff, 2016; Maon, Lindgreen, & Swaen, 2010; van Marrewijk & Werre, 2003). However, the majority of the micro-level models reflect corporate behavior as determined through observations or information gathered from companies (Aggerholm & Trapp, 2014; Carlisle & Faulkner, 2004; Dunphy, Griffiths, & Benn, 2003; Mirvis & Googins, 2006; Nidumolu, Prahalad, & Rangaswami, 2009; Ormazabal, Rich, Sarriegi, & Viles, 2016; Roome, 2004, 2012; Senge, Smith, Kruschwitz, Laur, & Schley, 2008; Visser, 2010; Winn & Angell, 2000; Zadek, 2004).

The micro-level models are observed to have varying starting points. Some models start at a point of rejection, lack of integration, or indifference toward sustainability (e.g., Dunphy, Griffiths, & Benn, 2003) while other models start at a point of compliance with environmental and social regulations (e.g., Ainsbury & Grayson, 2014). It is also noted that there is variety in the number of stages in the models, ranging from three (e.g., Aggerholm & Trapp, 2014) to seven stages (e.g., Maon, Lindgreen, & Swaen, 2010). Additionally, the models come from different subfields including sustainability, corporate social responsibility, and environmental management. Roome (2012) offers the only micro-level model aligned with the sustainability spectrum. This study integrates the remaining micro-level models from different streams of literature with the macro-level models to broaden our understanding of sustainability and understand the paradox that exists between increased corporate sustainability and further environmental degradation.

## Methodology

Prior work has achieved the challenging task of clarifying diverse perspectives related to environmental thought. For example, Dryzek (2013) used a discourse analysis approach to classify environmental rhetoric according to themes of shared meaning. Hannigan (1995) used a social constructivist approach to show how this theoretical lens defined a variety of environmental problems. Dobson (2000) reviewed political ideologies of environmentalism and identified how each theory is distinct. The focus of the current research is to integrate diverse perspectives on sustainability from different streams of literature and from different levels of analysis to expand the parameters of interpretation and understand the paradox that exists.

This study began with a collection of 22 development stage models: 4 models of societal sustainable development, 8 models of corporate sustainability, 5 models of corporate social responsibility, and 5 models of corporate environmental management (listed in Table 2). Due to the large number of micro-level models available, the study boundaries of micro-level models were restricted to those published since 2000. Of the 22 models in this study, twelve of the respective authors used the terms "stages" to identify the different placements in the model (which assumes progressive movement between placements), two used the term "positions", two used the term "typology" (which does not assume movement between placements), while the remaining six each used a unique term (phases, levels, ideologies and worldviews, views, profile, category). Thus, this study adopts the term "stages" (which is consistent with the majority of models in the data set) to denote the various positions. Table 2 lists the 22 models and their stages.

[insert Table 2 about here]

First, the four sustainable development models were placed along the sustainability spectrum. Three of the sustainable development models (Meyerson & Rydin, 1996; Pearce &

Turner, 1990; Pearce, 1991, 1993; Yanarella & Levine, 2011; Yanarella, Levine, & Lancaster, 2009) were already aligned with the sustainability spectrum and stage descriptions in the fourth model (Hopwood, Mellor, & O'Brien, 2005) allowed easy placement along the sustainability spectrum since it was built upon the same foundational literature. While some of Hopwood et al.'s (2005) stage descriptions were clearly aligned with weak or strong sustainability, the description of the Reform stage exceeded the characteristics of weak sustainability but did not match the characteristics of strong sustainability and, therefore, the Reform stage was placed in the middle to create a new intermediate position along the sustainability spectrum.

Second, the 18 micro-level models were placed along the sustainability spectrum. Roome's (2012) model was already aligned with the sustainability spectrum and served as the entry point for aligning the remaining models to achieve the goal of one unified model that extends beyond the business case, integrates different streams of literature, and integrates both micro- and macro-level models in order that we expand our understanding of sustainability and gain insight into the paradox.

A card sort approach (Cataldo, Johnson, Kellstedt, & Milbrath, 1970; Nielsen, 1995; Spencer, 2004, 2009) was used to place the stages of the 18 corporate models along the sustainability spectrum. The card sort approach is a tool for categorizing information or adding new information to an existing structure; it helps organize and define relationships between concepts or pieces of information. Card sorting is a methodology widely used in information architecture for website design, science for the creation of taxonomies, and social sciences research.

This study used both open and closed card sort approaches (Spencer, 2004, 2009). In an open card sort, items are sorted into categories that share common characteristics. In a closed

card sort, existing categories already exist (the positions along the sustainability spectrum) and new information (taken from the corporate models) is integrated into the existing structure.

The card sort began by placing the authors' description (and key concepts) of each individual stage of micro-level corporate sustainability, corporate social responsibility, or environmental management (Table 2) on a separate index card. For example, Carlisle and Faulkner's (2004) model had four stages (Table 2) and each stage description was placed on a separate index card. This was repeated for each of the 18 micro-level models and resulted in 83 index cards, each with a description of one stage from one corporate model.

Next, the 83 cards were sorted by themes using an open card approach where items are sorted into categories. The descriptions on each index card were reviewed to identify common elements. The cards that shared common elements were placed together to create a themed pile. Stage descriptions on the cards that included characteristics of more than one pile were matched to the pile where they had the most characteristics in common, however, in some instances there was a near balance of characteristics between two stages and, as such, the stage description was assigned to both matching piles. This open sorting task resulted in six piles. The six piles were labeled by the following themes:

(1) Non-participatory. The cards in this pile shared a common characteristic of non-compliance and/or non-adoption of sustainability practices. For example, in Zadek's (2004) Defensive stage, companies reject or deny responsibility and resist demands to become more responsible.

(2) Compliance. The cards in this pile shared a common characteristic of engaging in environmental or social practices for the primary purpose of regulatory compliance. For example, in Van Marrewijk and Werre's (2003) Compliance stage, companies

provide welfare to society but only within the limits of regulation since this is viewed as a duty or obligation.

(3) Business-Centered. The cards in this pile shared a common characteristic of pursuing sustainability for gaining business benefits ("the business case"). Most of the models in the data set had multiple stages that fit into this themed pile. For example, Nidumolu et al. (2009) had four stages that fit this theme (the most of any of the models in the data set): Compliance as Opportunity is focused on opportunities for innovation, Making Value Chains Sustainable is focused on value chain efficiencies, Designing Sustainable Products and Services is focused on eco-friendly product and service development, and Developing New Business Models is focused on novel ways to capture value and increase company competitiveness.

(4) Systemic. The cards in this pile shared a common characteristic of practices that moved beyond the business case and which sought cooperative efforts with others with the goal of systemic change. For example, in Dyllick and Muff's (2016) Business Sustainability 3.0 True Sustainability stage, the focus is turned toward addressing societal challenges and working for the common good by engaging with others in collaborative partnerships yet there is no mention of environmental or ecological science, planetary boundaries, or carrying capacity as a motivation or consideration.

(5) Regenerative. The cards in this pile shared a common characteristic of practices that sought to repair, restore, and regenerate the environment. For example, Roome's (2004, 2012) Sustainable Enterprise stage placed much emphasis on working with others to initiate systemic change and, as such, was placed in the Systemic pile. But

Roome's (2012) Sustainable Enterprise stage also discussed strong sustainability and the need for the company to maintain production and consumption patterns within the carrying capacity of the planet. Senge et al.'s (2008) Purpose/Mission also mentioned the necessity to operate in ways that do not harm the biosphere while contributing to a regenerative society and environment. These are the only two micro-level model stages in the data set that extended into the realm of environmental or ecological science and strong sustainability.

(6) Coevolutionary. The cards in this pile shared a common characteristic of practices that moved beyond managing the environment and instead sought to engage in practices that are in harmony with nature. There were no micro-level models with stages that fit into this category, but within the macro-level models, Hopwood et al.'s (2005) Transformation stage argues that reform is not enough and instead a transformation in the human-environment relationship is necessary, particularly with regard toward economic and power structures.

Following the creation of these six themes, a closed sort approach was used as the themed piles were placed along the already existing sustainability spectrum categories by matching the stage descriptions found on the index cards (Table 2) to the sustainability spectrum stages discussed earlier (Table 1). For example, the Non-participatory pile was excluded as it was not a stage, per se, in corporate sustainability although it could be considered a pre-adoption pile. The Compliance pile was matched to the "very weak" position on the sustainability spectrum because this position on the sustainability spectrum describes the minimum efforts toward sustainability activities. The Business-Centered pile was matched to the "weak" position because this position on the sustainability spectrum describes incremental improvements to business-as-usual and

continued pursuit of the business goals of increased growth, production, and consumption. The Systemic card descriptions described activities that exceeded the description of weak sustainability yet they did not match the description of strong sustainability and, as such, were placed in the middle, thus falling into the newly created "intermediate" position along the sustainability spectrum. The Regenerative pile was matched to the "strong" position because this position on the sustainability spectrum describes efforts to regulate growth, take a systems perspective, conserve resources, and prioritize the interests of the collective. The Coevolutionary pile was matched to the "very strong" position because this position on the sustainability spectrum describes notions of being a partner with nature, our moral obligations to nature, and a need to co-evolve with nature. The result of this matching process can be seen in Table 3.

[Insert Table 3 about here]

Finally, to provide rich descriptions of each stage in the new consolidated model, literature was drawn from the 22 authors' original stage descriptors and the literature reviewed in this paper. The stage descriptions were further supplemented with additional literature related to the sustainability spectrum, particularly in stage 5: Coevolutionary, since information was not readily available through existing stage models (e.g., Ang & van Passel, 2012; Barr, 2008; Davies, 2013; Dedeurwaerdere, 2013; Neumayer, 2003; O'Riordan, 1989). The stage descriptions were also supplemented with literature consistent with the proposed stages, again with particular emphasis on stage 5: Coevolutionary since this information was sparse in our data set (e.g., Fullerton, 2013; Hawken, 1993; Hawken, Lovins, & Lovins, 1999; Jørgensen et al., 2015; Landrum, Dzybski, Smajlovic, & Ohsowski, 2015; Reed, 2006a, 2006b, 2007; Swimme & Berry, 1992).

## Results

This study used authors' stage descriptions to integrate 4 macro-level societal sustainable developmental models with 18 micro-level firm sustainability models. By integrating 22 developmental models of corporate social responsibility, corporate sustainability, environmental management, and sustainable development, a new consolidative model (Table 3) was created that aligns with the sustainability spectrum (Table 1) and broadens our understanding of sustainability while shedding light on the paradox between corporate sustainability and environmental degradation. Corporate models have heretofore never been aligned with the sustainability spectrum presumably due to challenges in bridging micro- and macro-level models, however, with the macro-level models (and one micro-level model) already aligned to the sustainability spectrum, the task of integrating micro-level models was possible. The value of this approach and resultant consolidative model is to identify the compatibility of micro-level and macro-level understanding of sustainability that can help us further understand the "big disconnect" (Myllick & Duff, 2016) between increased adoption of corporate sustainability and continuing decline of the environment. Additionally, the model now provides insight into new realms of sustainability that have never been incorporated into prior micro-level models and which offer the opportunity to broaden the paradigm of corporate sustainability. Through this broader understanding of corporate sustainability, it is hoped that we can begin to adopt the concepts and actions of strong and very strong sustainability into stages or typologies and resolve the paradox. The new model and stages are described here.

### Stages of Corporate Sustainability: A Unified Model

**Stage 1: Compliance** is a stage in which firms are defensive and sustainability activities are externally enforced. This stage continues business-as-usual and the only sustainability activities are those that are regulated (labor, environmental, etc.).

**Stage 2: Business-Centered** sustainability is a firm-centric proactive stance characterized by the adoption and internal enforcement of sustainability initiatives for the business case (self-benefit, profit, image, reputation, employee recruitment and retention, risk management) to increase strategic competitiveness. While this stage may engage one or more realms of sustainability (environmental, economic, social), this stage is growth- and consumption-oriented, continues business-as-usual with incremental improvements, and sustainability is understood to mean "do less bad." In this stage, corporations adopt an internal systems perspective, exploit nature for industrial gain, and turn to technological fixes, such as biotechnology, geoengineering, and eco-efficiency.

**Stage 3: Systemic** sustainability adopts an external perspective generally integrating all three realms (environmental, economic, and social) of sustainability for the improvement of humanity. The understanding of sustainability is to "do more good" but the company continues to advocate a managerial control (anthropocentric) position in relation to nature and business solutions. This stage strengthens the systems view that business is part of larger industry and community and systemic change is pursued. In this stage, businesses collaborate with other human systems but there continues to be an increased growth, production, and consumption orientation with limited integration of environmental or ecological science.

**Stage 4: Regenerative** sustainability looks beyond growth and consumption, integrates environmental and ecological science, and adopts practices to repair the damage of the industrial consumer economy. Many activities are oriented toward restoring and regenerating nature yet

this stage continues its managerial control position in relation to nature. Activities seen in this stage may relate to reconciliation of species, repair of the commons, healing, planting, or creating diversity. This stage begins to pursue qualitative development without quantitative growth, seeks no increase in scale, and acknowledges the realities of carrying capacity, limits to growth, and planetary boundaries.

**Stage 5: Coevolutionary** sustainability moves beyond restoration of damage and avoids "managing" the human-nature relationship but rather adopts a view of "participating" cooperatively in the symbiosis and self-management of consumption and use of resources (Fullerton, 2013; Reed, 2006a, 2006b, 2007). The focus is on developing a mutually enhancing and beneficial relationship of balance, harmony, and synergy as an equal and contributing part of nature. As one example, consider that plants inhale carbon dioxide and exhale oxygen while humans and animals inhale oxygen and exhale carbon dioxide creating a synergy and balance necessary for sustaining life (Benyus, 1997, pp. 271-272); Coevolutionary sustainability is an elaborate extension of this relationship. This stage is also reminiscent of lifestyles of indigenous cultures that lived in harmony with the natural world without efforts to control, manage, or manipulate the environment. In Mark Twain's *Letters to the Earth*

> he says that claiming we are superior to the rest of creation is like saying that the Eiffel Tower was built so that the scrap of paint at the top would have somewhere to sit. It's absurd, but it's still the way we think (Benyus, 1997, p. 8).

Because the Coevolutionary stage is so critical in achieving corporate sustainability, this is its first introduction to micro-level models, and it is paramount to addressing the paradox, it bears further explanation. Benyus (1997, pp. 249-254) helps us understand the necessary transition to this stage in her discussion of Type I and Type III systems in nature. We currently

operate business, industry, and the economy as a Type I (developing) system: one that is opportunistic, consumes all resources in sight, and is eager for growth but fails to give much thought to long-term survival (i.e., exhausting the resources needed for life). Rather, we need to adopt characteristics of a Type III (mature) system in which we focus on efficiency, resilience, and long-term survival. Type III systems progress toward "a state of relative equilibrium [with nature], taking out no more than they put in…[living] in elaborate synergy with the species around them…, [and putting energy toward] optimizing these relationships" (Benyus, 1997, p. 250).

> Once we see nature as a mentor, our relationship with the living world changes…we come not to learn about nature so that we might circumvent or control her, but to learn from nature, so that we might fit in, at last and for good, on the Earth from which we sprang (Benyus, 1997, p. 9).

For business and industry, this requires a reintegration with the natural world and the adoption of an ecological science-based view in which the planet has boundaries, all systems (including business and industry) are interdependent and require equity and balance, and pursuit of a steady state with limited or no quantitative growth is required while intensifying pursuit of qualitative growth. As in the cycles of nature, the business becomes a fertilizer for life, creating conditions that allow employees, communities, societies, and humanity to flourish. Businesses adopt ecology-inspired practices and principles (such as The Natural Step, biomimicry, industrial ecology, and the circular economy). In short, businesses adopt Type III system characteristics for long-term survival. This stage of corporate sustainability could, in fact, represent the blue ocean (Kim & Mauborgne, 2005) of sustainability strategy, an uncontested market space to be

seized for competitive advantage. The complete model of stages of corporate sustainability is summarized in Table 4.

[insert Table 4 about here]

In reviewing the literature on the sustainability spectrum and weak and strong sustainability (O'Riordan, 1989; Pearce, 1993; Pearce & Turner, 1990), the points that more clearly distinguish between these five corporate stages of sustainability center around adoption of a broad systems view that considers the following:

(1) A new economic model must be created that is embedded within natural boundaries and recognizes that there are limits on growth, production and consumption, and resource usage. Does the business adopt strategies to adapt to physical limitations? Does the business adopt strategies that support the creation of an economy and social systems that are embedded within natural ecological boundaries, respects those natural boundaries, and that works ecologically?

(2) A redistribution of wealth, resources, and power is required. Does the business adopt strategies to redistribute wealth, resources, and power among both humans and non-humans in a cooperative and synergetic approach rather than exploitative or controlling approach?

(3) New measures of success are required that go beyond the GDP and short-term measures. Does the business adopt strategies that move beyond profit and GDP as a measure of progress? Does the business adopt strategies that move beyond quarterly, annual, or even 5- or 10-year forecasts? Does the business adopt strategies that consider next generation impacts?

## Discussion

The paradox of increased adoption of corporate sustainability and continued destruction of natural and social systems is of concern (Borowy, 2014; Dyllick & Muff, 2016; Visser, 2010). This study set out to address three presumed causes for this disconnect as stated by Dyllick and Muff (2016): (1) a restricted understanding of corporate sustainability in both academic literature and corporate practice, (2) lack of incorporation of understanding from different streams of relevant literature, and (3) lack of integration of macro- and micro-levels of understanding. This study integrated 22 micro- and macro-level models of stages of development from literature in corporate sustainability, corporate social responsibility, environmental management, and sustainable development. This integration resulted in a model for stages of corporate sustainability (Table 4) that broadens the current narrowly constricted understanding of corporate sustainability, extending it beyond the business case, and sheds light on the reason for the paradox that exists.

Examination of the model presented in Table 4 reveals several important discoveries. First, the most disheartening discovery regarding the integration of the various stage models is that current corporate sustainability developmental models (developed from academic literature and the field of practice) are framed around weak sustainability (Table 3). Gladwin et al. (1995) note that worldviews on the weak (or technocentric) end of the sustainability spectrum perform poorly on tests of sustainability which helps us understand why the paradox exists. The fact that current models are framed around weak sustainability reveals collective assumptions and beliefs about what constitutes sustainability: incremental improvements that continue the pursuit of profit and growth (Banerjee, 2008; Delmas & Burbano, 2011; Jacobs, 1993; Kallio, 2007; Roome, 1998; Russo & Minto, 2012; Schnaiberg, Pellow, & Weinberg, 2000; Sexton, Marcus, Easter, & Burkhardt, 1999; Shrivastava, 1995; Stead & Stead, 1995). This finding offers further

support for claims that weak sustainability is the dominant paradigm (Davies, 2013; Gladwin et al., 1995; Spash, 2013). Critics have argued that corporate sustainability has become merely a label for strategies driven by standard economic and institutional mechanisms (Delmas & Burbano, 2011; Jacobs, 1993). This is our own fault – we have continued to push the business case for sustainability; the business case is profit and growth. The consequence is that "business, not societal or ecological, interests define the parameters of sustainability" (Banerjee, 2008, p. 67). This finding supports the concerns raised by many that the current understanding of corporate sustainability is constricted (Gladwin, Kennelly, & Krause, 2009; Shrivastava, 1994), focused on the business case (Dyllick & Muff, 2016; Ehrenfeld, 2012), and ignores larger global concerns (Banerjee, 2008; Ehrenfeld, 2012). Thus, current weak sustainability approaches that utilize incremental improvements over business-as-usual do not lead to sustainability and, in fact, continue to contribute to environmental degradation; this is the paradox.

Second, when integrated with the sustainability spectrum, the highest level of sustainability in the existing corporate models included in this study are aligned with intermediate sustainability (Table 3). Sadly, this means that adopting the most advanced stages of corporate sustainability within current micro-level developmental models only moves businesses to the mid-range of sustainability. The exemplars cited in texts and the media are, at best, at an intermediate level of sustainability adoption. This allows corporations to continue practicing business-as-usual with incremental improvements while avoiding the necessary fundamental changes that strong sustainability requires. As Hawken (1993) has noted, "If every company on the planet were to adopt the best environmental practices of the 'leading' companies…the world would still be moving toward sure degradation and collapse" (p. xiii). This adds further support to the claims of a constricted understanding of corporate sustainability (Gladwin, Kennelly, & Krause,

2009; Shrivastava, 1994) that is focused on weak sustainability which continues environmental degradation and does not lead to sustainability, further illuminating the reason for the paradox.

Third, as further evidence of a narrow understanding of corporate sustainability, current micro-level conceptual frames and models don't extend into the realm of strong sustainability. Strong sustainability is outside current frames of reference for business and industry and is not part of the understanding or reality in defining sustainability; that is, strong sustainability is not part of the conceptual sustainability frame in firm-level models. These restricted parameters defining sustainability confine the array of corporate actions and behaviors necessary to achieve sustainability. In fact, the environmental management models revealed the most restrictive understanding; one completely focused inward on the business case and failing to consider partnerships or the intrinsic value of the environment. The very term "environmental management" implies controlling (managing) nature (the environment) which is a technocentric worldview (weak and very weak sustainability). Therefore, "current pathways to sustainability do not offer the speed or scale required to meet the challenge. Instead, a more transformation approach is necessary" (Krantz, Nayyar, Shellaby, & Davis, 2011, p. 5). The consolidative model proposed here offers an understanding of corporate sustainability that is well beyond mid-range sustainability that is the apex of current models.

Fourth, it is noted that the first three stages of the consolidative model are economic science-oriented (or business-oriented) stages that reflect an inward focus and motivation for sustainability activities; this includes the bulk of the corporate sustainability models to date (Table 3). The last two stages of the consolidative model are ecological science-oriented (or ecology-oriented) stages that reflect an integration of environmental and ecological science into corporate sustainability planning; these stages of corporate sustainability have received scant

attention in current models (Table 3) due to of our unrelenting emphasis on the business case for sustainability. The distinction between corporate sustainability being business-oriented versus ecology-oriented is critical because moving beyond the business case and toward integration of the ecological scientific context into strategic planning is necessary for addressing our global environmental crisis, opening our understanding of the environmental science behind sustainability, and aiding the paradigm shift necessary to progress in the direction of strong sustainability. In a review of over 40,000 CSR reports from around the world, fewer than 5% referenced planetary limits and only 31 organizations (fewer than 1%) set science-based sustainability goals (Bjørn, Bey, Georg, Røpke, & Hauschild, 2016) revealing limited evidence that corporations realize the importance of science-based sustainability planning (Bjørn et al., 2016; Gunther, 2014; ScienceBasedTargets.org; Westervelt, 2014). It is necessary to extend the understanding of corporate sustainability into the realm of strong sustainability, which includes environmental and ecological science; this is the paradigm shift.

The discoveries of this research confirm similar observations in industry. In a review of corporate sustainability reports, Ihlen and Roper (2014) found that most approaches toward corporate sustainability were very firm-centric, used discourse to support the weak sustainability paradigm, and few corporations addressed the real problems and dilemmas that a sustainability strategy would require. Ihlen and Roper (2014) also found that most corporations no longer adopted the "journey" metaphor but instead see sustainability as a destination to which they have already arrived (Ihlen & Roper, 2014). These authors conclude with the thought that if corporations believe they have already arrived at sustainability, the "sustainability discourse…(is) shut down…(and) impetus for further action is removed" (Ihlen & Roper, 2014, p. 49).

The practical implication of this study is based on the discovery that the existing micro-level corporate sustainability frame is immature and incomplete. The boundaries of the corporate sustainability frame are now expanded in the proposed model to include strong sustainability, adopting the wider parameters that frame sustainable development. This is a direct response to Dyllick and Muff's (2016) observation of the lack of integration between micro- and macro-levels of understanding. The macro-level sustainable development models can inform and extend the micro-level corporate sustainability models in three critical ways that have heretofore been absent in the corporate sustainability models: (1) economic models embedded in natural boundaries that recognize limits on growth, production and consumption, and resource usage, (2) redistribution of wealth, resources, and power and (3) new measures of success beyond the GDP and short-term measures. The corporate sustainability models require a broader view of sustainability by extending the stages of development to allow for inclusion of strong sustainability and very strong sustainability, as presented in the proposed model.

Frame expansion of stages of corporate sustainability that include the aforementioned three critical elements can offer important implications for business, industry, and government. It allows business and industry to realize that current performance is, in fact, not the end destination (Ihlen & Roper, 2014) but rather one point on a journey that is to be continued. In other words, business and industry can realize there is much more to be done. As businesses move into the ecology-science based stages, it is expected that the paradox between corporate sustainability and environmental degradation will be resolved.

This frame expansion can also offer important implications for government. Prior corporate sustainability models are absent any consideration of the sustainability spectrum, thus prior sustainable development and corporate sustainability were not equivalent in their

understanding of sustainability; this is one of the problems leading to the disconnect referenced by Dyllick and Muff (2016). The proposed model allows for congruence in understanding between government policy reflecting sustainable development and business practice reflecting corporate sustainability. That is, because firms are embedded in governments and economies, firms should adopt context-based sustainability practices (Gunther, 2014; Westervelt, 2014) consistent with government sustainability indicators to make a meaningful impact toward sustainability. Governments adopt climate action plans and pledge to reduce carbon emissions, but businesses are not aware of the science which suggests that we need emissions reductions of 80% by 2050 (Westervelt, 2014).

In sum, Dyllick and Muff (2016) note that corporations are increasingly adopting sustainability yet the environment continues rapid decline. Their thesis is that this "big disconnect" exists because the various streams of literature are not integrated, particularly between micro- and macro-levels, and therefore, we operate with a very restricted understanding of sustainability. This study integrated the various streams of literature at both the micro- and macro-levels and created a model with a much wider breadth of understanding of sustainability. Note that what the macro-level models present as strong and very strong sustainability is relatively absent within the realm of the micro-level models, therefore, indeed, corporations have been operating under a very restricted understanding of sustainability. The model proposed here addresses this concern and moves corporate sustainability into the ecology-science stages of strong and very strong sustainability to broaden our understanding and resolve the paradox.

## Limitations/Future Research

As with all work on developmental stages, it is argued that stages are not discreet, i.e., companies often have practices or activities in two (or more) stages simultaneously (Aggerholm & Trapp, 2014; Carlisle & Faulkner, 2004; Dunphy, Griffiths, & Benn, 2003). Therefore, it is argued that models need to be less linear and more fluid (Aggerholm & Trapp, 2014).

Another limitation of this study is that the study relied upon developmental stages as an indicator of a corporation's adoption of sustainability. Stages may denote only one element of a corporation's progression through sustainability activities.

Third, it is acknowledged that mindsets and subsequent actions can evolve and change over time. The proposed model does not suggest a permanent position, but rather a fluid range of positions.

Fourth, placement of stages along the sustainability spectrum is subjective based upon stage descriptions of corporate sustainability, sustainable development, and the sustainability spectrum. Whether the reader agrees with the precise placement of various prior models into the consolidative model presented here could be a matter of debate, but it is believed that the stages would likely fall in broadly similar placements as the model presented here, with most stages clustered around the three business-oriented stages and few clustered around the two ecology-oriented stages.

Fifth, the ecology-based stages of the proposed model could be considered aspirational or overly ambitious. Is it possible to change the course of business, the economy, and societies? Research has shown that mental models can be changed (Werhane, 1999; Werhane et al., 2009; Werhane et al., 2011), but the change required for sustainability is a radical shift from business-as-usual.

Sixth, Dyllick and Muff (2016) contend that the "big disconnect" between corporate sustainability and environmental degradation exists due to the restricted understanding of sustainability caused, in part, by failure to integrate knowledge from various literature streams, including micro- and macro-levels of knowledge. While the current study accomplishes this integration and produces a broader understanding of sustainability, there is no evidence that the proposed model will resolve the paradox. That is, in asking the research question, "Can we craft a better approach toward strong corporate sustainability that would resolve the paradox?", we have addressed Dyllick and Muff's reasoning for the paradox, but it remains unproven if our new model can achieve this purpose.

Finally, Mirvis and Googins (2006) acknowledge that the final evolutionary stage in their (and presumably others') model is not the final stage of development, but rather a place-marker because the many patterns of possible future transformation have not yet been developed. This author also adopts the same perspective with the proposed model.

This analysis also brings to light areas for future study. If corporate sustainability models are to be integrated with societal sustainable development models (as demonstrated here), it is reasonable to expect that individual models of sustainability leadership would also be integrated; allowing flow and coordination from societal goals, to organizational goals, to individual goals. This represents an opportunity for further research.

Another direction for future research could be the development of indicators and motivators for each stage. How can it be discerned when a corporation has shifted from one stage to another? What conditions must exist for organizations to develop beyond business-centered approaches? Furthermore, what motivates a firm to more earnestly adopt sustainability and advance to the next stage?

Lastly, there is a need to better understand how ecological economics and strong sustainability applies at the level of the firm and the manager. As discussed here, current models are deeply entrenched in weak sustainability. What are the precise sustainability activities required for a firm to advance to strong sustainability? How can this also be applied to the individual level of analysis for sustainability leadership? Further work in operationalizing this conceptual model is warranted.

## Conclusion

This research integrated micro-level developmental stage models of corporate sustainability and responsibility with macro-level developmental stage models of societal sustainable development. This study sought to create a unified model of corporate sustainability that could provide insight into the understanding of corporate sustainability and the actions required to contribute to societal sustainable development and avoid further environmental degradation.

In the process of integrating corporate sustainability and sustainable development stage models, a new unified model of corporate sustainability was created. The proposed model includes 5 stages of corporate sustainability that are aligned with the sustainability spectrum: Compliance (very weak sustainability), Business-Centered (weak sustainability), Systemic (intermediate sustainability), Regenerative (strong sustainability), and Coevolutionary (very strong sustainability).

It was discovered that current corporate sustainability developmental models have a very narrow understanding of corporate sustainability and are framed around weak sustainability. Weak sustainability promotes incremental improvements in the continuation of business-as-usual. It was also noted that the most advanced stages of existing models only promote an

intermediate level of sustainability in the new unified model. Furthermore, the sustainable development stage models extended into the range of strong sustainability, but existing corporate models had no equivalent. Thus the new model extends the range of definition and possibility for corporate sustainability into the realm of strong sustainability, a nonexistent position in prior corporate sustainability stage models. This new model can help corporations understand the paradigm shift necessary to achieve a sustainable society. As noted by Málovics et al. (2008, p. 916), "reaching the goal of sustainability requires…the active participation and cooperation of governments, businesses, and citizens…"

The concerns of Shrivastava (1994), Dyllick and Muff (2016), and many others are echoed and confirmed in this study. To date, there has been a narrow definition of the environment which marginalizes nature (Shrivastava, 1994) and there has been poor integration of subfields, lack of integration between macro- and micro-level perspectives, and an exclusive focus on the business case as a measure of performance (Dyllick and Muff, 2016). This research incorporated various perspectives from corporate sustainability, corporate social responsibility, environmental management, and sustainable development, thus integrating micro- and macro-level perspectives, and giving nature a more central position through the ecologically-oriented strong and very strong sustainability worldviews. This paradigm shift can move us away from economically-oriented worldviews based upon the business case for sustainability and move us toward a worldview that allows for a sustainable future.

## References

Aggerholm, H. & Trapp, N. (2014). Three tiers of CSR: An instructive means of understanding and guiding contemporary company approaches to CSR? *Business Ethics: A European Review*, 23(3), 235-247.

Ainsbury, R. & Grayson, D. (2014). *Business critical: Understanding a company's current and desired stages of corporate responsibility maturity*. Retrieved from http://www.som.cranfield.ac.uk/som/dinamic-content/media/Doughty/SOMAT%201505%202014%20final.pdf

Ang, F. & van Passel, S. (2012). Beyond the environmentalist's paradox and the debate on weak versus strong sustainability. *BioScience*, *62*(3), 251-259.

Baden, D. & Harwood, I. (2013). Terminology matters: A critical exploration of corporate responsibility terms. *Journal of Business Ethics*, *116*(3), 615-627.

Banerjee, S. (2008). Corporate social responsibility: The good, the bad and the ugly. *Critical Sociology*, *34*(1), 51-79.

Barr, S. (2008). *Environment and Society: Sustainability, Policy and the Citizen*. NY: Routledge.

Barry, J. (2011). Weak and strong sustainability. In J. Newman (Ed.), *Green ethics and philosophy: An A-Z guide*, pp. 376-379. Thousand Oaks CA: Sage Publications, Inc.

Benyus, J. (1997). *Biomimicry: Innovation Inspired by Nature*. NY: HarperCollins Publishers.

Bjørn, A., Bey, N., Georg, S., Røpke, I., & Hauschild, M. (2016). Is Earth recognized as a finite system in corporate responsibility reporting? *Journal of Cleaner Production.* doi:10.1016/j.jclepro.2015.12.095

Borowy, I. (2014). *Defining sustainable development for our common future: A history of the World Commission on Environment and Development* (Brundtland Commission). NY: Routledge.

Carlisle, Y. & Faulkner, D. (2004). Corporate social responsibility: a stages framework. *European Business Journal*, *16*(4), 143–151.

Cataldo, E., Johnson, R., Kellstedt, L., & Milbrath, L. (1970). Card sorting as a technique for survey interviewing. *Public Opinion Quarterly*, *34*(2), 202-215.

Cohen, S. (2011). *Sustainability management: Lessons from and for New York City, America, and the planet*. NY: Columbia University Press.

Columbia (2016). *Environmental Responsibility*. Retrieved from http://www.columbia.com/About-Us_Corporate-Responsibility_Environmental-Responsibility.html

Daly, H. (1973). *Toward a steady-state economy*. San Francisco: W.H. Freeman & Co. Ltd.

Daly, H. (1974). Steady-state economics versus growthmania: A critique of the orthodox conceptions of growth, wants, scarcity, and efficiency. *Policy Sciences*, *5*, 149-167.

Daly, H. (1991). *Steady-state economics*, 2nd edition. Island Press, Washington, DC.

Darabaris, J. (2008). *Corporate environmental management*. Boca Raton: CRC Press

Davies, G. (2013). Appraising weak and strong sustainability: Searching for a middle ground. *Consilience: The Journal of Sustainable Development*, *10*(1), 111-124.

Dedeurwaerdere, T. (2014). *Sustainability Science for Strong Sustainability*. Cheltenham, UK: Edward Elgar.

Delmas, M., & Burbano, V. (2011). The drivers of greenwashing. *California Management Review*, *54*, 64-87.

Dobson, A. (2000). *Green political thought* (3rd ed.). New York: Routledge.

Dryzek, J. (2013). *The politics of the Earth: Environmental discourses* (3rd ed.). Oxford, UK: Oxford University Press.

Dunlap, R. & van Liere, K. (1978). The "new environmental paradigm." *The Journal of Environmental Education*, 9, 10-19.

Dunphy, D., Griffiths, A. & Benn, S. (2003). *Organizational change for corporate sustainability*, NY: Routledge.

Dyllick, T. & Muff, K. (2016). Clarifying the meaning of sustainable business: Introducing a typology from business-as-usual to true business sustainability. *Organization & Environment, 29*(2), 156-174.

Ehrenfeld, J. (2000). Colorless green ideas sleep furiously: Is the emergence of "sustainable" practices meaningful? *Reflections, 1*(4), 34-47.

Ehrenfeld, J. (2012). Beyond the brave new world: Business for sustainability. In P. Bansal & A. Hoffman (Eds.), *The Oxford handbook of business and the natural environment* (pp. 611-619). NY: Oxford University Press.

Fullerton, J. (2013). Regenerative capitalism. Retrieved from http://harvardworkshop.thenextsystem.org/RegenCap.pdf

Gladwin, T., Kennelly, J., & Krause, T. (1995). Shifting paradigms for sustainable development: Implications for management theory and research. *The Academy of Management Review*, 29(4), 874-907.

Gowdy, J. & Erickson, J. (2005). The approach of ecological economics. *Cambridge Journal of Economics, 29,* 207-222.

Gunther, M. (2014, February 18). Carbon counting: Why emissions targets must be based on science. *The Guardian*. Retrieved from https://www.theguardian.com/sustainable-business/blog/counting-carbon-emissions-targets-science

Hannigan, J. (1995). *Environmental sociology: A social constructionist perspective*. New York: Routledge.

Harris, J. & Roach, B. (2014). Chapter 7: Ecological Economics: Basic Concepts (p. 151-167). In *Environmental & Natural Resource Economics* (3rd ed.). NY: Routledge.

Hartwick, J. (1977). Intergenerational equity and the investing of rents from exhaustible resources. *American Economic Review, 67*, 972-974.

Hartwick, J. (1978). Substitution among exhaustible resources and intergenerational equity. *Review of Economic Studies, 45*, 291-304.

Hawken, P. (1993). *The ecology of commerce: A declaration of sustainability*. New York: HarperCollins Publishers.

Hawken, P., Lovins, A. & Lovins, L. (1999). *Natural capitalism: Creating the next industrial revolution*. New York: Little, Brown and Company.

Hediger, W. (1999). Reconciling "weak" and "strong" sustainability. *International Journal of Social Economics, 26*(7/8/9), 1120-1143.

Hediger, W. (2004). Weak and strong sustainability, environmental conservation and economic growth. Retrieved from https://www.ethz.ch/content/dam/ethz/special-interest/mtec/cer-eth/resource-econ-dam/documents/research/sured/sured-2004/sured_hediger.pdf

Hopwood, B., Mellor, M., & O'Brien, G. (2005). Sustainable development: mapping different approaches. *Sustainable Development, 13*(1), 38-52.

Ihlen, O. & Roper, J. (2014). Corporate reports on sustainability and sustainable development: 'We have arrived'. *Sustainable Development*, *22*(1), 42-51.

Illge, L. & Schwarze, R. (2009). A matter of opinion – How ecological and neoclassical environmental economists think about sustainability and economics. *Ecological Economics*, *68*, 594-604.

Jabbour, C. (2006). The evolution of environmental management within organizations: Toward a common taxonomy. *Environmental Quality Management*, *16*(2), 43-59.

Jabbour, C. (2010). Non-linear pathways of corporate environmental management: A survey of ISO 14001-certified companies in Brazil. *Journal of Cleaner Production*, 18, 1222-1225.

Jacobs, M. (1993). *The green economy: Environment, sustainable development and the politics of the future*. Vancouver, Canada: University of British Columbia Press.

Jørgensen, S., Fath, B., Nielsen, S., Pulselli, F., Fiscus, D., & Bastianoni, S. (2015). *Flourishing within limits to growth: Following nature's way*. NY: Routledge.

Kallio, T. (2007). Taboos in corporate social responsibility discourse. *Journal of Business Ethics*, *74*, 165-175.

Kim, W. & Mauborgne, R. (2005). *Blue Ocean Strategy: How to Create Uncontested Market Space and Make the Competition Irrelevant*. Boston: Harvard Business School Publishing.

Kolk, A. & Mauser, A. (2002). The evolution of environmental management: From stage models to performance evaluation. *Business Strategy and the Environment*, *11*, 14-31.

Krantz, R., Nayyar, S., Shellaby, J. & Davis, N. (2011). *The consumption dilemma: Leverage points for accelerating sustainable growth.* Geneva, Switzerland: World Economic Forum.

Landrum, N., Dzybski, R., Smajlovic, A., & Ohsowski, B. (2015). Managing for resilience: Lessons from ecology. *Journal of Management for Global Sustainability*, *3*(1), 75-99.

Laszlo, C., Brown, J., Ehrenfeld, J., Gorham, M., Barros-Pose, I., Robson, L., Saillant, R., Sherman, D., & Werder, P. (2014). *Flourishing enterprise: The new spirit of business*. Stanford, CA: Stanford University Press.

Lovins, L. (2010). Climate capitalism: The business case for climate protection. *Pace Environmental Law Review, 27*(3), 735-779.

Lovins, A., Lovins, L., & Hawken, P. (1999). A road map for natural capitalism. *Harvard Business Review, 77*(3), 145-158.

Málovics, G., Csigéné, N., & Kraus, S. (2008). The role of corporate social responsibility in strong sustainability. *The Journal of Socio-Economics, 37*, 907-918.

Maon, F., Lindgreen, A., & Swaen, V. (2010). Organizational stages and cultural phases: A critical review and a consolidative model of corporate social responsibility development. *International Journal of Management Reviews, 12*(1), 20-38.

Meyerson, G. & Rydin, Y. (1996). *The language of environment: A new rhetoric.* London: UCL Press Limited.

Mirvis, P. & Googins, B. (2006). Stages of corporate citizenship. *California Management Review, 48*(2), 104-126.

Montiel, I. (2008). Corporate social responsibility and corporate sustainability: Separate pasts, common futures. *Organization & Environment, 21*(3), 245-269.

Montiel, I. & Delgado-Ceballos, J. (2014). Defining and measuring corporate sustainability: Are we there yet? *Organization & Environment, 27*(2), 113-139.

Neumayer, E. (2003). *Weak versus Strong Sustainability: Exploring the Limits of Two Opposing Paradigms.* London: Elgar

Nidumolu, R., Prahalad, C.K., & Rangaswami, M. (2009). Why sustainability is now the key driver of innovation. *Harvard Business Review, 87*(9), 56-64.

Nielsen, J. (1995). Usability testing for the 1995 Sun Microsystem's website. Retrieved from https://www.nngroup.com/articles/usability-testing-1995-sun-microsystems-website/

O'Riordan, T. (1989). "The Challenge for Environmentalism". In Peet, R. and Thrift, N. (Eds.) *New Models in Geography: The Political Economy Perspective, Vol. I*, Unwin Hyman, London, pp 77–102.

Ormazabal, M., Rich, E., Sarriegi, J., & Viles, E. (2016). Environmental management evolution framework: Maturity stages and causal loops. *Organization & Environment*, doi:10.1177/1086026615623060.

Ott, K., Muraca, B., & Baatz, C., (2011). Strong sustainability as a frame for sustainability communication. In J. Godemann and G. Michelsen (Eds.), *Sustainability communication: Interdisciplinary perspectives and theoretical foundations* (pp. 13-25), NY: Springer.

Patagonia (2016). *Worn Wear*. Retrieved from https://www.patagonia.com/worn-wear.html

Pearce, D. (1991). *Blueprint 2: Greening the world economy*. Earthscan Publications Limited, London, UK.

Pearce, D. (1993). *Blueprint 3: Measuring sustainable development*. Earthscan Publications Limited, London, UK.

Pearce, D. & Turner, R. (1990). *Economics of natural resources and the environment*. Baltimore, MD: The Johns Hopkins University Press.

Pope Francis (2015). *Laudato si': On care for our common home*. Retrieved from http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_enciclica-laudato-si.html

Rasmussen, L. (1991). Toward an Earth charter. *The Christian Century*, 108(30), 964-967.

Reed, B. (2006a). Shifting our mental model – "sustainability" to regeneration. Retrieved from http://www.integrativedesign.net/images/ShiftingOurMentalModel.pdf

Reed, B. (2006b). The trajectory of environmental design. Retrieved from http://www.integrativedesign.net/images/Trajectory_EnvironmentallyResponsibleDesign.pdf

Reed, B. (2007). Forum: Shifting from 'sustainability' to regeneration. *Building Research & Information*, *35*(6), 674-680.

Röckstrom, J., Steffen, W., Noone, K., Persson, A., Chapin, F., Lambin, E., …. Foley, J. (2009). A safe operating space for humanity. *Nature*, *461*(24), 472-475.

Roome, N. (1998). *Sustainability strategies for industry: The future of corporate strategy*. Washington DC: Island Press.

Roome, N. (2004). Innovation, global change and new capitalism: A fuzzy context for business and the environment. *Human Ecology Review*, 11(3), 277-279.

Roome, N. (2012). Looking back, thinking forward: Distinguishing between weak and strong sustainability. In P. Bansal & A. Hoffman (Eds.), *The Oxford handbook of business and the natural environment* (pp. 620-629). NY: Oxford University Press.

Rostow, W. (1960). *The stages of economic growth: A nonCommunist manifesto*. Cambridge: Cambridge University Press.

Russo, M., & Minto, A. (2012). Competitive strategy and the environment: A field of inquiry emerges. In P. Bansal & A. Hoffman (Eds.), *The Oxford handbook of business and the environment* (pp. 29-49). Oxford, England: Oxford University Press.

Schnaiberg, A., Pellow, D., & Weinberg, A. (2000). The treadmill of production and the environmental state. Retrieved from

http://www.ipr.northwestern.edu/publications/papers/urban-policy-and-community-development/docs/schnaiberg/treadmill-of-production.pdf

Schwartz, M. & Carroll, A. (2008). Integrating and unifying competing and complementary frameworks: The search for a common core in the business and society field. *Business & Society*, *47*(2), 148-186.

Senge, P., Smith, B., Kruschwitz, N., Laur, J., & Schley, S. (2008). *The necessary revolution: How individuals and organizations are working together to create a sustainable world*. NY: Doubleday.

Sexton, K., Marcus, A., Easter, W., & Burkhardt, T. (Eds.). (1999). *Better environmental decisions: Strategies for governments, businesses and communities*. Washington, DC: Island Press.

Shrivastava, P. (1994). CASTRATED environment: Greening organizational studies. *Organization Studies*, *15*(5), 705-726.

Shrivastava, P. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review, 20*, 936-960.

Solow, R. (1986). On the intergenerational allocation of natural resources. *Scandinavian Journal of Economics*, 88(1), 141-149.

Solow, R. (1974). Intergenerational equity and exhaustible resources. *The Review of Economic Studies, 41*, 29–45.

Solow, R. (1993). An almost practical step toward sustainability. *Resource Policy, 19*(3), 162–172.

Spash, C. (1999). The development of environmental thinking in economics. *Environmental Values*, *8*(4), 413-435.

Spash, C. (2013). The shallow or the deep ecological economics movement? *Ecological Economics, 93,* 351-362.

Spencer, D. (2004, April 7). *Card sorting: A definitive guide*. Retrieved from http://boxesandarrows.com/card-sorting-a-definitive-guide/

Spencer, D. (2009). *Card sorting: Designing usable categories*. Brooklyn: Rosenfeld Media.

Stead, E. & Stead, J. (1995). *Management for a small planet*. London: Sage.

Steffen, W., Richardson, K., Rockstrom, J., Cornell, S., Fetzer, I., Bennett, E., …Sorlin, S. (2015). Planetary Boundaries: Guiding human development on a changing planet. *Science, 347*(6223), 736.

Swimme, B. & Berry, T. (1992). *The universe story: From the primordial flaring forth to the ecozoic era – A celebration of the unfolding of the cosmos.* NY: HarperCollins Publishers.

Upward, A. & Jones, P. (2016). An ontology for strongly sustainable business models. *Organization & Environment, 29*(1), 97-123.

Van Marrewijk, M. & Werre, M. (2003). Multiple levels of corporate sustainability. *Journal of Business Ethics, 44* (2/3), 107-119.

Visser, W. (2010). The age of responsibility: CSR 2.0 and the new DNA of business. *Journal of Business Systems, Governance & Ethics*, *5*(3), 7-22.

Vivien, F. (2008). Sustainable development: An overview of economic proposals. *Surveys and Perspectives Integrating Environment & Society*, 1(2), accessed March 23, 2015 http://sapiens.revues.org/227

Werhane, P. (1999). *Moral imagination and management decision-making*. NY: Oxford University Press.

Werhane, P., Hartman, L., Moberg, D., Englehardt, E., Pritchard, M., & Parmar, B. (2011). Social constructivism, mental models, and problems of obedience. *Journal of Business Ethics*, 100(1), 103-119.

Werhane, P., Kelley, S., Hartman, L. & Moberg, D. (2009). *Profitable partnerships for poverty alleviation*. NY: Routledge/Taylor and Francis.

Westervelt, A. (2014, August 29). Science and sustainability goals: What researchers want businesses to know. *The Guardian*. Retrieved from http://www.theguardian.com/sustainable-business/2014/aug/29/environment-climate-data-science-sustainability-goals-business-targets

Willard, B., Kendall, G., Leung, P., Park, C., Rich, M., & Upward, A. (2014). *Future fit business benchmark.* London: The Natural Step Canada and 3D Investment Foundation.

Winn, M. & Angell, L. (2000). Towards a process model of corporate greening. *Organization Studies*, 21(6), 1119-1147.

World Commission on Environment and Development (1987). *Our common future: The world commission on environment and development*. Oxford: Oxford University Press. Retrieved from http://www.un-documents.net/ocf-02.htm

Yanarella, E. & Levine, R. (2011). *The city as fulcrum of global sustainability*. NY: Anthem Press.

Yanarella, E., Levine, R., & Lancaster, R. (2009). Green versus sustainability: From semantics to enlightenment. *Sustainability: The Journal of Record*, *2*(5), 296-302.

Zadek, S. (2004). The path to corporate responsibility. *Harvard Business Review*, *82*(12), 125-132.

Table 1

*Sustainability Spectrum*

| | **Technocentrism** | | **Ecocentrism** | |
|---|---|---|---|---|
| | **Very Weak Sustainability** (Intervention; Extreme Cornucopian) | **Weak Sustainability** (Accommodation; Accommodating) | **Strong Sustainability** (Communalism; Communalist) | **Very Strong Sustainability** (Gaianism; Deep Ecology) |
| **Green labels** | Resource exploitative, growth orientated position | Resource conservationist and 'managerial' position | Resource preservationist position | Extreme preservationist position |
| **Type of economy** | Anti-green economy, unfettered free markets | Green economy, green markets guided by economic incentive instruments | Deep green economy, steady-state economy regulated by macro-environmental standards and supplemented by EIs because of physical and social limits<br><br>Decentralized socio-economic system is necessary | Very deep green economy, heavily regulated to minimize 'resource-take'; socio-economic system (e.g. based on organic agriculture and de-industrialization) |
| **Management strategies** | Primary economic policy objective, maximize economic growth (GDP)<br><br>Taken as axiomatic that unfettered free markets in conjunction with technical progress will ensure infinite substitution possibilities capable of mitigating all 'scarcity/limits' constraints (environmental sources and sinks) | Modified economic growth (GDP)<br><br>Decoupling important but infinite substitution rejected. Sustainability rules: constant capital rule.<br><br>Sustainable growth is a practicable option as long as certain resource management rules (e.g. for renewable resource sustainable yield management) are followed | Zero economic growth; zero population growth<br><br>Decoupling plus no increase in scale. 'Systems' perspective – 'health' of whole ecosystems very important; Gaia hypothesis and implications<br><br>Emphasis on small scale & community identity | Reduced scale of economy and population<br><br>Scale reduction imperative; at the extreme for some there is a literal interpretation of Gaia as a personalized agent to which moral obligations are owed |
| **Ethics** | Support for traditional ethical reasoning; rights and interests of contemporary individual humans; instrumental value (i.e. of recognized value to humans) in nature | Extension of ethical reasoning: 'caring for others' motive – intragenerational and intergenerational equity (ie contemporary poor and future people); instrumental value in nature | Further extension of ethical reasoning: interests of the collective take precedence over those of the individual; primary value of ecosystems and secondary value of component functions and services | Acceptance of bioethics (ie moral rights/interests conferred on all non-human species and even the abiotic parts of the environment); intrinsic value in nature (ie valuable in its own right regardless of human experience) |
| **Source of change** | Faith in the application of science, market forces, and managerial ingenuity | Faith in the adaptability of institutions and approaches to assessment and evaluation to accommodate to environmental demands | Faith in the co-operative capabilities of societies to establish self-reliant communities based on renewable resource use and appropriate technologies. | Faith in the rights of nature and of the essential need for co-evolution of human and natural ethics |
| **Identity** | Business and finance managers; skilled workers; self-employed; right-wing politicians; career-focused youth; Control political and economic power in all countries | Middle-ranking executive; environmental scientists; white-collar trade unions; liberal-socialist politicians | Radical socialists; committed youth; radical-liberal politicians; intellectual environmentalists | 'Green' supporters; radical philosophers |
| **Power** | Belief in the retention of the status quo in the existing structure of political power, but a demand for more responsiveness and accountability in political, | | Demand for redistribution of power towards a decentralized, federated economy with more emphasis on informal economic and social transactions and the | |

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| regulatory, planning, and educational institutions. | pursuit of participatory justice |

Adapted from O’Riordan (1989); Pearce (1993); Pearce & Turner (1990)

Table 2

*Micro and Macro Models in Data Set*

| Literature Stream | Authors | Stages | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Corporate Social Responsibility models** | Carlisle & Faulkner (2004) | Developing Awareness | Promoting Awareneness | Initial Implementation | Mainstreaming | | | |
| | Zadek (2004) | Defensive | Compliance | Managerial | Strategic | Civil | | |
| | Mirvis & Googins (2006) | Elementary | Engaged | Innovative | Integrated | Transformative | | |
| | Maon, Lindgreen, & Swaen (2010) | Dismissing | Self-protecting | Compliance-seeking | Capability-seeking | Caring | Strategizing | Transforming |
| | Visser (2010) | Defensive | Charitable | Promotional | Strategic | Systemic | | |
| **Corporate Sustainability models** | Dunphy, Griffiths, & Benn (2003) | Rejection | Non-responsiveness | Compliance | Efficiency | Strategic Proactivity | Sustaining Organization | |
| | Van Marrewijk & Werre (2003) | Pre-CS | Compliance | Profit | Caring | Synergistic | Holistic | |
| | Roome (2004, 2012) | Compliance | Proactive Companies | Sustainable Enterprise | | | | |
| | Senge et al. (2008) | Noncompliance | Compliance | Beyond Compliance | Integrated Strategy | Purpose/Mission | | |
| | Nidumolu et al. (2009) | Compliance as Opportunity | Value Chain Efficiencies & Sustainability | Design Sustainable Products & Services | Develop New Business Models | Next Practice Platforms | | |
| | Aggerholm & Trapp (2014) | First Generation | Second Generation | Third Generation | | | | |
| | Ainsbury & Grayson (2014) | Denier | Complier | Risk Mitigator | Opportunity Maximizer | Champion (or Leader) | | |
| | Dyllick & Muff (2016) | Business-as-usual the current economic paradigm | Business Sustainability 1.0 Refined Shareholder Value Management | Business Sustainability 2.0 Managing for the Triple Bottom Line | Business Sustainability 3.0 True Sustainability | | | |
| **Environmental** | Winn & Angell (2000) | Deliberate Reactive | Unrealized | Emergent Active | Deliberate Proactive | | | |

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|---|---|---|---|---|---|---|---|---|
| **Management models** | Darabaris (2008) | Firefighter | Controller | Innovator | Best of the Best | | | |
| | Jabbour (2006) | Functional specialization | Internal integration | External (strategic) integration | | | | |
| | Jabbour (2010) | Reactive | Preventive | Proactive | | | | |
| | Ormazabal et al. (2016) | Legal Requirements | Responsibility Assignment & Training | Systemization | $ECO^2$ | Eco-Innovative Products & Services | Leading Green Company | |
| **Sustainable Development models** | Pearce & Turner, (1990); Pearce (1993) | Cornucopian | Accommodating | Communalist | Deep Ecology | | | |
| | Meyerson & Rydin (1996) | Quasi-Cornucopian | Social Choice | New Economics | Limits to Growth | | | |
| | Hopwood, Mellor, & O'Brien (2005) | Status Quo | Reform | Transformation | | | | |
| | Yanarella, Levine, & Lancaster (2009); Yanarella & Levine (2011) | Level 0: Environmentalism | Level 1: Smart Growth | Level 2: Green Products, Techniques, Practices, Policies | Level 3: Weak Sustainability | Level 4: Transitional Sustainability | Level 5: Strong Sustainability | Level 6: Existentially Realized Strong Sustainability |

Table 3

*Integration of Micro and Macro Models*

| **Sustainability Spectrum** | | | **Very Weak** | **Weak** | **Intermediate** | **Strong** | **Very strong** |
|---|---|---|---|---|---|---|---|
| **Stages** | | **Non-participatory** | **Compliance** | **Business-Centered** | **Systemic** | **Regenerative** | **Coevolutionary** |
| **Micro models** | Carlisle & Faulkner (2004) | | Awareness | Promote Awareness, Initial Implementation, Mainstreaming | | | |
| | Zadek (2004) | Defensive | Compliance | Managerial, Strategic & Civil | | | |
| | Mirvis & Googins (2006) | | Elementary | Engaged, Innovative, Integrated | Transformative | | |
| | Maon, Lindgreen, & Swaon (2010) | Dismissing | Self-protecting, Compliance-seeking | Capability-seeking, Caring, Strategizing | Transforming | | |
| | Visser (2010) | Defensive | Charitable | Promotional, Strategic | Systemic | | |
| | Dunphy, Griffiths, & Benn (2003) | Rejection & Nonresponsiveness | Compliance | Efficiency, Strategic Proactivity | Sustaining Organization | | |
| | Van Merrewijk & Werre (2003) | Pre-CS | Compliance | Profit, Caring, Synergistic | Holistic | | |
| | Roome (2004, 2012) | | Compliance | Proactive | Sustainable Enterprise | Sustainable Enterprise | |
| | Senge et al., 2008 | Noncompliance | Compliance | Beyond Compliance, Integrated Strategy | | Purpose/Mission | |
| | Nidumolu et al. (2009) | | Compliance as Opportunity | Compliance as Opportunity, Value Chain Efficiencies & Sustainability, Design Sustainable Products & Services, Develop New Business Models | Next Practice Platforms | | |
| | Aggerholm & Trapp (2014) | | First Generation | Second Generation | Third Generation | | |
| | Ainsbury & Grayson (2014) | Denier | Complier | Risk Mitigator, Opportunity Maximizer, Champion (or Leader) | Champion (or Leader) | | |
| | Dyllick & Muff (2016) | | Business-as-usual the current economic paradigm | Business Sustainability 1.0 Refined Shareholder Value Management, Business Sustainability 2.0 Managing for the | Business Sustainability 3.0 True Sustainability | | |

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|---|---|---|---|---|---|---|---|
| | | | | Triple Bottom Line | | | |
| | Winn & Angell (2000) | | Deliberate Reactive | Unrealized, Emergent Active, Deliberate Proactive | | | |
| | Darabaris (2008) | Firefighter | | Controller, Innovator, Best of the Best | | | |
| | Jabbour (2006) | | Functional Specialization | Internal Integration, External Integration | | | |
| | Jabour (2010) | | Reactive | Preventive, Proactive | | | |
| | Ormazabal et al. (2016) | | Legal Requirements | Responsibility Assignment & Training, Systematization, $ECO^2$, Eco-Innovative Products & Services, Leading Green Company | | | |
| **Macro models** | Pearce & Turner (1990); Pearce (1993) | | Cornucopian | Accommodation | Accommodation | Communalism | Deep Ecology |
| | Meyerson, G. & Rydin, Y. (1996). | | Quasi-Cornucopian | Social Choice | Social Choice | New Economics | Limits to Growth |
| | Hopwood, Mellor, & O'Brien (2005) | | Status Quo | Status Quo, Reform | Reform | Reform | Transformation |
| | Yanarella, Levine, & Lancaster (2009); Yanarella & Levine (2011) | | Level 0: Environmentalism | Level 1: Smart Growth, Level 2: Green Products, Techniques, Practices, Policies, Level 3: Weak Sustainability | Level 4: Transitional Sustainability | Level 5: Strong Sustainability<br><br>Level 6: Existentially Realized Strong Sustainability | |

Table 4

*Stages of Corporate Sustainability*

| | **Compliance** | **Business-Centered** | **Systemic** | **Regenerative** | **Coevolutionary** |
|---|---|---|---|---|---|
| **Sustainability spectrum position** | Very Weak | Weak | Intermediate | Strong | Very strong |
| **Orientation** | Economic science-oriented<br><br>Business-oriented | Economic science-oriented<br><br>Business-oriented | Economic science-oriented<br><br>Business-oriented | Ecological science-oriented<br><br>Ecology-oriented | Ecological science-oriented<br><br>Ecology-oriented |
| **Understanding of sustainability** | Meet compliance requirements<br><br>Internal firm-centric view | "Do less bad"<br><br>Internal firm-centric view | "Do more good"<br><br>Begins to look externally in defining sustainability<br><br>Business is part of a larger industry and community working together toward systemic change | Repair damage to systems | Humans and all earth's beings are in a mutually enhancing and beneficial relationship |
| **Relationship to natural world** | To be managed and controlled<br><br>Anthropocentric<br><br>Resource exploitation | To be managed and controlled; anthropocentric<br><br>Resource exploitation<br><br>Eco-efficiency | To be managed and controlled; anthropocentric<br><br>Resource exploitation<br><br>Eco-efficiency | Part of the natural world<br><br>Operate within planetary boundaries<br><br>Manage and repair | Self-management as part of the natural world<br><br>Participate in cooperative symbiotic relationship with the natural world |
| **Economic growth** | Pursuit of production, consumption, and growth | Pursuit of production, consumption, and growth | Pursuit of production, consumption, and growth | Qualitative development without production, consumption, and growth<br><br>Steady-state growth | No growth in production or consumption<br><br>Qualitative improvements |
| **Sustainability** | Externally enforced or | "Business case" is the motivation and measure | Integrates three realms of sustainability (economic, | Integrates three realms of sustainability (economic, | Work in balance with |

| | | | | | |
|---|---|---|---|---|---|
| **concerns** | regulated activities<br><br>Defensive actions with regard to economic, environmental, or social concerns | of success<br><br>Adoption and internal enforcement of activities<br><br>Incremental improvements to business-as-usual<br><br>May focus on one or more realms of sustainability (economic, environmental, social) | environmental, social)<br><br>Work with other human systems | environmental, social)<br><br>Work with human and non-human systems | other systems<br><br>Contribute to flourishing of other systems |