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PhD in Business and Territorial Competitiveness, Innovation and Sustainability

Doctoral dissertation

Exploring the relationship of Sustainability Strength to Operational Factors of Sustainability

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Abstract

Sustainability has become a fixture in academia and business. The concept presents a long-term approach to mitigating the risks of degrading environmental, societal, and economic resources. However, as global society accepts the tenets of sustainability the expected outcomes from doing so have not manifested. Organizations and academic researchers must tackle this problem because organizations are primary actors in sustainability. This thesis of the dissertation states that examination of strong sustainability theory is critical to advancing the concept of sustainability in academia and business. This theory is premised as an attempt to understand a range of evidenced sustainability outcomes, which can be assessed in relation to elements that affect sustainability.

Two lines of research confer the thesis. The first investigates the relationship between strong sustainability and organizational culture. The second applies strong sustainability to the schemes that dictate sustainability in organizations. Content analysis is applied to quantitatively examine the sustainability strength of elements that affect the approach organizations take in their sustainability.

This work contributes novel knowledge in sustainability theory and practice in multiple ways. Organizational culture, as measured through the Competing Values Framework, is related to a range of sustainability outcomes. This allows for practical advisement in the management of culture for achieving strong sustainability. The Stages of Sustainability model is applied to elements beyond the domain of sustainability, which answers calls of numerous researchers to find ways to assess sustainability rather than treating it as a monolithic result. Several theories and future research can be reassessed or enacted to advance relationships with sustainability theory.

Keywords: sustainability, strong sustainability theory, organizational culture, sustainability schemes, competing values framework, stages of sustainability model, content analysis, Global Reporting Initiative, measuring sustainability

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List of Abbreviations

ANOVA – Analysis Of Variance
AP 1000 - Accountability 1000 Accounting Principles (AP1000)
BCorps - Certified B Corporation
BIC - Bayesian Information Criterion
BS8001 - British Standards 8001
CAC - Computer Assisted Clustering
CDP - Carbon Disclosure Project
CDSB - Climate Disclosure Standards Board
CERES - Coalition for Environmentally Responsible Economies)
CEO - Chief Executive Officer
CircularEcon - The Circular Economy
CS – Corporate Sustainability
CSR – Corporate Social Responsibility
CVF – Competing Values Framework
DoughnutEcon - Doughnut Economics for Business
EMAS - European Union Eco-Management and Audit Scheme
ESG - Environmental, social, and governance
FAC - Fully Automated Clustering
G250 – Global 250 (top 250 companies by revenue)
GLOBE - Global Learning and Observations to Benefit the Environment
GRI – Global Reporting Initiative
<IR> - Integrated Reporting
ISO - International Organization for Standardization
ISO26000 - International Organization for Standardization 26000
ITP - Integrated Thinking Principles
N100 – Euronext Top 100 (index of 100 largest stocks on European stock exchanges)
NatCap - Natural Capitalism
NGO – Non-Governmental Organization
OC – Organizational Culture
OCAI - Organizational Culture Assessment Instrument
OECD - Organisation for Economic Co-operation and Development
PB - Planetary Boundaries
RMSE - Root Mean Squared Errors
S&P 500 – Standard and Poor's 500 (index of 500 largest companies on USA stock exchanges)
SA8000 - Social Accountability 8000
SASB - Sustainability Accounting Standards Board
SDG – United Nations Sustainable Development Goals
SDG Compass – United Nations Sustainable Development Goals Compass
SME – Small and medium enterprises
SE – Standard Error
STM – Structural Topic Modeling
TCFD – Taskforce for Climate-related Financial Disclosures
TNS - The Natural Step
TQM - Total Quality Management
UN – United Nations

UNGC – United Nations Global Compact
UNEP - United Nations Environment Programme
USA – United States of America
UTF-8 - Unicode Transformation Format 8-bit

1 Chapter 1: Introduction

This dissertation is an accumulation of research in the field of sustainability. By delving into strong sustainability and corporate sustainability theories, this research aims to contribute valuable and original academic and practical knowledge. Ultimately, the goal is to provide solutions that contribute to solving humanity's current needs without compromising the ability of future generations to meet their own.

This introductory chapter will first provide context and motivation for the research. Then, the research problems, goals, and questions will be stated. This will be followed by the thesis statement of the dissertation, along with the presentation of two lines of research that will test hypotheses which will confer the thesis statement. Finally, the dissertation structure will be explained.

1.1 Context and Motivation

Modern humans have existed for roughly 200,000 years. Throughout most of this time, the basic needs of everyone have been fulfilled by an abundance of resources. While life for humanity has not always been easy, there was never a worldwide threat to the state of basic resources until modern times (Rockström et al., 2009). As the global population surpasses eight billion people, there are now serious questions about humanity's future. What can be done to change? Will future generations have the opportunity to flourish?

Since the latter half of the twentieth century, serious concerns regarding potential devastation and decline to the planet's resources have manifested (Catton, 1982; Ripple et al., 2017; Union of Concerned Scientists, 1997; Wolfgramm et al., 2015). Potential and actual harms to the environment (Jackson, 2005; Sodeman, 1995) and society (Meadows et al., 1992) have been consistently observed. These findings are complimented by studies that contemplate threats to economic systems (Stern et al., 2007). Exemplification of research highlighting these problems include

studies of global warming (Heimann, 2005; Högbom, 1892; Monteith, 1965; Valone, 2021), food and water scarcity (Mekonnen & Hoekstra, 2016; Puma et al., 2015), biodiversity loss (Cardinale et al., 2012; Cardoso et al., 2020, 2021), urban stresses (Vojnovic, 2014), global conflicts (Cairns Jr., 2000), limits to economic growth (Crist et al., 2022; Meadows, 1972; Solow, 1974), and social inequality (Agarwal, 2018; Wiedmann et al., 2020). There is even evidence that a new historical epoch has begun, the Anthropocene, which is characterized by humanity's irreversible, negative, impact on the planet (Rose & Cachelin, 2018; Steffen et al., 2018). As the global population is expected to reach ten billion people by the year 2050, the urgency to solve these problems is intensifying (Crist et al., 2022; Lenton et al., 2019). These observations have resulted in solution-seeking calls from governments, politicians, academia, scientists, citizens, civil society organizations, artists, and business (Max-Neef, 2005).

The threat of degraded environmental, social, and economics resources can be categorized as a 'wicked' problem. Briefly defined, wicked problems are diverse, grand, and inter-connected problems that require urgent and complex solutions (Churchman, 1967). The problems seem overwhelming and intimidating, as they have a global reach and easy solutions do not exist. Theoretical approaches are often lacking, or in their infancy, making the wicked problem even more daunting (Metcalf & Benn, 2013). One-shot solutions, solutions without a defined ending, and the inability to test solutions augment the stresses of dealing with these problems (Rittel & Webber, 1973). Answers are not found in just one field, but in a combination of disciplines ranging across physical sciences, social sciences, and engineering. Tackling these problems can be paralyzing, breath-taking, and eye opening.

As the wicked problem of resource deterioration and depletion threatens prosperity for future generations, there is consensus that humanity needs to make major changes (Merz et al., 2023). A special trait of humankind is the capability to adapt (Steffen et al., 2015). Humanity has repeatedly shown the ability to create, reinvent, construct, devise, and manufacture solutions that perpetuate or improve the quality of life when resource scarcity becomes an issue. Whether this happens

inadvertently or on purpose, the continued pursuit towards a flourishing lifestyle has resulted in great benefits. This begets the wicked question, “how does humanity solve the problems of deteriorating resources and resulting impacts on the environment, society, and the economy?” In essence, the wicked problem and question of resource deterioration is about “*everything.*”

1.2 Enter Sustainability

Sustainability is the modern construct developed to answer this question. The concept is premised on the idea of managing, assessing, and developing current resources to ensure prosperity for future generations. It is a normative notion that indicates how humanity should act towards nature, one another, and in consideration of future generations (Mori & Christodoulou, 2012). Efforts in sustainability unite different actors, different fields of expertise, and different actions to solve the problems imposed by the threat of resource deterioration. Academic theories in sustainability explore how environmental, social, and economic systems can endure and thrive in the future without depleting vital resources or causing harm to the environment. Additionally, sustainability theory seeks to understand the transdisciplinary components of the construct that can guide humanity towards integrated environmental, social and economic solutions that satisfy all societal spheres, for both the short and long-term (Lang et al., 2012; Steurer et al., 2005). In essence, sustainability is about “*everything*.”

The problems sustainability attempts to solve are ingrained in various levels of society. Individuals, governments, civil society organizations, and businesses are all major actors in sustainability. There are regional, national, and global participants to study and understand as well. The poor and wealthy are all stakeholders, and the balance of who dictates the solutions is always in question (Allais et al., 2017). There are even arguments that flora and fauna are also stakeholders (Gibson, 2012). As the modern concept of sustainability is still relatively young, there are many problems and questions to address. A pressing challenge is that solutions are urgently needed, and time is running out.

A wide range of academic disciplines attempt to understand sustainability (Brandt et al., 2013; Lang et al., 2012). Natural scientists try to understand the extent of sustainability problems through studies of topics like ecology, oceanography, forestry, climate studies, and several other fields. Engineers attempt to apply and innovate to solve sustainability problems. Economists, psychologists, philosophers, ethicists, and sociologists attempt to understand harm done to society and the economy. Those who study humanities, government, law, and policy contribute by summarizing the problems from all sides and trying to devise fair solutions. Within the social sciences, business studies have become a particularly key area for sustainability theory because business often serves as the intersection for the various academic fields to converge and introduce new knowledge into practice (Bansal & DesJardine, 2014; Porter & Derry, 2012).

A closer look at business' academic relationship with sustainability highlights the importance of investigating the relationships between the two fields. This study of business and sustainability, herein referred to as corporate sustainability theory or just corporate sustainability, is supported by numerous journals, conferences, civil society organizations, practitioners, and researchers. Business elements such as leadership (Metcalf & Benn, 2013), management (Hemingway & Maclagan, 2004), strategy (Bonn & Fisher, 2011), organizational behavior (Cooper et al., 2017), financing (Borghesi et al., 2014), and operational activities (Niero & Rivera, 2018) have been increasingly examined in academic research to understand their relationship with sustainability to address problems and find solutions. Contributions to corporate sustainability research contribute to solving the wicked problem of resource deterioration. Additionally, corporate sustainability theory guides practitioners towards innovation and changes in their sustainability endeavors.

The role of businesses in sustainability has increased in prominence over time. When modern sustainability efforts were introduced in the mid-1980s, business was seen as an outside advisor to the concept (Ott et al., 2011). Through the 1990's and early 2000's businesses transformed into active participants of sustainability (Zoeteman, 2013). Now, researchers agree that business is a primary actor in

sustainability (Schaltegger & Burritt, 2006). The expanding participation of business in sustainability and the academic research of corporate sustainability has been expected to result in solutions to the issues that sustainability is challenged to solve.

Given the importance of businesses to sustainability, their current role, past actions, and future responsibilities have been scrutinized. Civil society organizations have linked environmental ailments to business actions (Carbon Disclosure Project, 2017; Intergovernmental Panel on Climate Change, 2018) and are backed by environmental researchers (Nice & Osborn, 1948; Shrivastava & Hart, 1995). Social problems have also been linked to business activity by civil society organizations (OECD, 2014) and are verified by academic research (Cobb & Stevens, 2017). Likewise, economic issues are also related to business, and again, are supported by civil society organizations and academia (Bird & Smucker, 2007; World Bank, 2012). Now businesses are tasked with the responsibility of integrating sustainability to deal with these problems that are primarily created from business activities (Gupta et al., 2015; Lozano, 2012; UN Global Compact, 1999). Businesses have attempted to answer these calls.

Businesses have espoused commitments and actively focused more efforts towards sustainability, but the environmental, social, and economic problems to be solved still persist (Borowy, 2014; Dyllick & Muff, 2016; Millward-Hopkins et al., 2020; Parrique et al., 2019; Visser, 2010). The assumed benefits of businesses integrating corporate sustainability are not significantly manifesting. This phenomenon is often referred to as, "The Big Disconnect," in which there exists an increase in the adoption of sustainability by organizations, but continued and even accelerated degradation of environmental, social, and economic resources (Dyllick & Muff, 2016). Finding a solution to The Big Disconnect motivates the research problems, questions, goals, and hypothesis of this dissertation.

The novelty and value of this dissertation stems from the application of strong sustainability theory. The general premise of strong sustainability theory is an attempt to understand if environmental, social, and economic resources can be substituted for human made capital while guaranteeing a prosperous future for future

generations. Strong sustainability theory attempts to focus understandings of sustainability, integrate various research streams into academia and practice, and bridge the gap between micro and macro level understandings of sustainability. Despite the expectation that strong sustainability theory will meaningfully contribute to corporate sustainability, the concept is notoriously difficult to study. This problem has resulted in few studies that consider the concept. Chapter 2 will further explain and explore the intricacies of strong sustainability theory.

1.3 Dissertation approach

This dissertation seeks knowledge that contributes to advance understandings of sustainability. The context of global resource deterioration, exemplification of problems caused by degradation of resources, and the pronounced role of business serve as broad concepts that sustainability is challenged to overcome. Now the focus is shifted towards this dissertation's specific research problems, research questions, research goals, and thesis statement. This research applies Alvesson's (2011) approach to developing research problems that yield research questions and research goals. This is done by acknowledging a wide contextual scope and narrowing down to specific areas of investigation. An additional benefit for following Alvesson's (2011) direction is that applying more than one line of research can address research problems, questions and goals. Two narrow lines will be applied in this dissertation.

1.4 Research Problems

The problematization for this dissertation begins with a wide scope and then narrows to focused problems. Figure 1 exemplifies this approach. First, the wicked problem of resource depletion which has already been stated in the context and motivation of this dissertation serves as a grand problem. Next, the problematization focuses on the corporate sustainability problem of The Big Disconnect. Then, the research gap in strong sustainability theory is proposed as a problem, from which two lines of research present two problems that upon investigation, will contribute to

better understanding of their predecessor problems, and affirm the thesis statement.

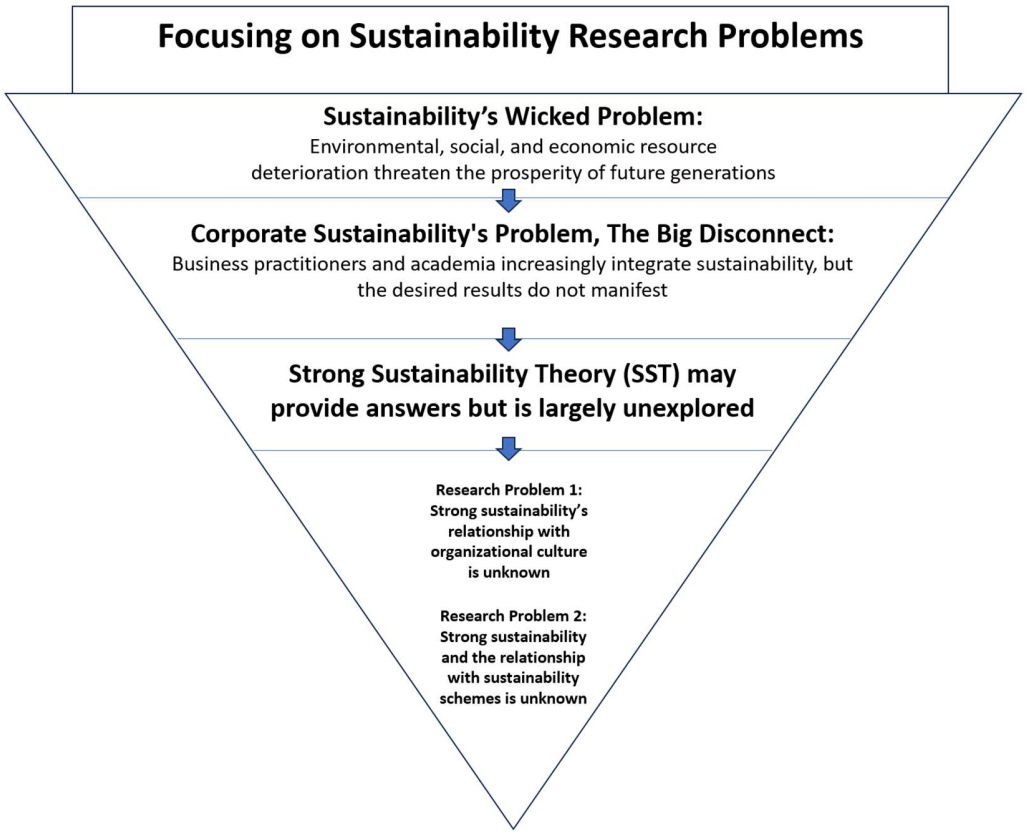

Figure 1 - Visualization of the dissertation's focus on sustainability problems.

The Big Disconnect was highlighted by Dyllick and Muff (2016), in conjunction with observations and conclusions from other research (Biely et al., 2018; Ehrenfeld, 2011; Elkington, 2018; Imbrogiano, 2021; Landrum, 2024; Roome, 2011). As established, The Big Disconnect is the phenomenon of increasing integration of sustainability in business and corporate sustainability research, but also an absence of the manifestation of solutions, improvements, or changes to the issues sustainability is charged with. Three main problems related to The Big Disconnect phenomenon have been established (Dyllick & Muff, 2016). These three problems will be addressed by the two lines of investigation that test hypotheses.

The first Big Disconnect problem is that businesses' understanding and focus on sustainability may be misdirected. In some cases, the actions taken by businesses thus far have been geared towards reducing unsustainability, but this is different from practicing sustainability (Chassé & Boiral, 2017; Landrum, 2024). This

view primarily centers around increased business performance or “the business case for sustainability,” as the driving force and measuring stick of sustainability, while neglecting wider environmental, human, social, and global concerns (Ehrenfeld, 2011; Merz et al., 2023). This approach to sustainability can be attributed to a limited interpretation of corporate sustainability (Gladwin, Krause, et al., 1995; Shrivastava, 1994).

The second Big Disconnect problem is that there are various literature streams that have not been effectively integrated by business, such as corporate sustainability theory, corporate social responsibility, and environmental management (Dyllick & Muff, 2016). A review of corporate sustainability research found that a standardized definition and method for measuring corporate sustainability are lacking (Montiel & Delgado-Ceballos, 2014). This is partially because academic discussions in corporate sustainability are still in their infancy, and partially because there is resistance in academia and business to change (Dyllick, 2018). The scopes, foci, and underlying theoretical approaches in corporate sustainability are diverse and subject to intense debate. Additionally, practitioner management journals have concluded that academic research has yet to inform businesses how to effectively manage and assess sustainability (Gao & Bansal, 2013; Imbrogiano, 2021; Imbrogiano & Nichols, 2021; Montiel & Delgado-Ceballos, 2014).

The third Big Disconnect problem is that there has been little integration between micro- and macro- level understandings of sustainability. Although some attempts have been made, each literature stream has largely followed its own path and focus (Dyllick & Muff, 2016; Landrum, 2015; Pearce, 1993). General sustainability discourse primarily focuses on the macro-economic concerns of the economy, society, or the world at large, while the discourse on corporate sustainability occurs at the micro level of organizations (Whiteman et al., 2013). There is a need for approaches that bridge the gap between the macro and micro discussions.

Addressing these three “Big Disconnect” problems requires further, more focused, investigations in corporate sustainability theory research. One key to solving these problems is applying existent knowledge that can be exploited in novel ways to generate new knowledge. For this dissertation, strong sustainability theory will be applied to contribute knowledge that solves The Big Disconnect. ~~called~~

For the final focus in problematization, two separate investigations will be conducted, each testing hypotheses that apply strong sustainability theory, and thus confirm the thesis statement. Both lines of research fill a gap in strong sustainability theory and corporate sustainability, and in turn contribute to solving the problem of the Big Disconnect. The research problem of the first investigation is that the relationship between organizational culture and strong sustainability theory is unknown. The research problem of the second investigation is that the relationship between sustainability schemes and strong sustainability theory is unknown. Organizational culture and sustainability schemes are two separate inputs into business that affect corporate sustainability and will be further explained for their roles in corporate sustainability in chapter 2.

1.5 Research Questions

This dissertation establishes research questions by first acknowledging a widely scoped question and then narrowing the focus of the questions to a niche, investigable, phenomenon. The research questions will address the research problems. Figure 2 shows the progression of research question focus developed in this dissertation. First, a global, all-encompassing, question addressing sustainability’s wicked problem was asked. Next, the research questions focus on corporate sustainability’s Big Disconnect. From there, research questions addressing strong sustainability theory are presented. Finally, two research questions are presented that will be answered by two lines of research, that apply strong sustainability theory. Upon answering these questions, contributions to answering the previous research questions will be created.

Figure 2 - Visualization of the dissertation's research questions.

By focusing on strong sustainability theory, research questions can be asked of the three problems that contribute to the big disconnect. The first Big Disconnect problem addresses misdirected understandings of sustainability. Thus the first research question asked is, "can application of strong sustainability theory in research establish help understand the misunderstandings of sustainability in business and corporate sustainability research?"

The second Big Disconnect problem notes that sustainability research streams have not been effectively integrated by business. A gap exists in corporate sustainability literature and in practice regarding the application of strong sustainability theory. Therefore the second research question asked is, "can the application of strong sustainability theory identify integration of sustainability in business?"

The third Big Disconnect problem notes the gap between micro and macro level understandings of sustainability. Strong sustainability was established in macro-level discussions and has evolved to consider micro-level theory. The application of strong sustainability theory can bridge this gap. Therefore the third research question asked is, “can the application of strong sustainability theory bridge the gap between micro- and macro- levels?”

These three research questions address The Big Disconnect by incorporating strong sustainability into the question. From here, the research focus sharpens towards two lines of investigation, each with specific research questions, which when answered will affirm the thesis statement. The explicit research questions of this dissertation specifically address the two lines of research in this dissertation. The first asks, “what is the relationship between strong sustainability and organizational culture?” The second asks, “what is the sustainability strength of sustainability schemes?” Addressing these questions will directly contribute to strong sustainability theory, which in turn will contribute to solving The Big Disconnect in corporate sustainability theory.

1.6 Research Goals

The goals of this dissertation follow the same development path as the research problems and research questions by first addressing a widely scoped goal and then focusing on the narrowly scoped goal (Figure 3). First the grand goal of the research aligns with the wicked problem of global resource deterioration. This over-arching goal is to contribute knowledge that will help solve the wicked problem of resource deterioration that threatens the prosperity of future generations. This goal will be achieved by addressing corporate sustainability’s Big Disconnect. The goals of the research will focus on contributing knowledge to the three main problems of The Big Disconnect by attempting to understand why corporate sustainability is misdirected, injecting a new or untapped literature streams into corporate sustainability discussions, and bridging the gap between micro- and macro level discussions. These goals will be achieved through explorations of strong

sustainability theory that focus on two distinct research lines considerate of organizational culture and sustainability schemes.

Figure 3 - Visualization of the dissertation's research questions.

The first research line's specific research goal is to understand how organizational culture is related to strong sustainability theory. Specifically, comprehension of the relationship between the Competing Values Framework and Stages of Sustainability models will be sought. Academically, this goal will provide knowledge to researchers seeking to understand how organizational culture fits into corporate sustainability endeavors. Practically, this goal will provide guidance to businesses as they adjust their cultures for the sake of sustainability. Further specific discussion about this will be presented in chapter 2.

The second research line's specific research goal is to understand how sustainability schemes relate to strong sustainability theory. Specifically, comprehension of the relationship between the schemes and Stages of Sustainability models will be sought. Academically, this goal will provide knowledge to researchers seeking to understand how the schemes affect corporate

sustainability endeavors. Practically, this goal will provide guidance to businesses as they apply sustainability schemes for the sake of sustainability. Additional specific discussion about this will be presented in chapter 2.

1.7 Thesis statement

Development of the thesis statement follows Alvesson's (2011) approach of acknowledging the a theory's wide context of research and then focusing on specific, narrow focuses. As two lines of research will be applied in this dissertation, this approach is advantageous because it allows for a general thesis statement to be constructed by hypotheses to be tested in multiple specific lines of research.

The two research lines both apply strong sustainability theory to two separate theories, organizational culture, and corporate sustainability respectively. Applying strong sustainability theory in both lines of research means this dissertation's general thesis applies to a general premise about strong sustainability theory, with more specific premises investigated in the two more specific research lines. It is through this notion that the following thesis is submitted: ~~behaviors.~~ Application of strong sustainability theory in research will create new understandings in sustainability. ~~behaviors.~~ This thesis will be constructed by two lines of research each with its own hypothesis.

1.7.1 The Two Lines of Research

The scope of this research was first brought into focus by observing the wicked problem of resource deterioration and presenting sustainability as the construct devised to solve this problem. ~~d~~ Then a specific problem of corporate sustainability, The Big Disconnect, was viewed through a more focused lens. To test the thesis, the scope of the research will be focused again on two investigations that apply strong sustainability theory to corporate sustainability concerns (Figure 4).

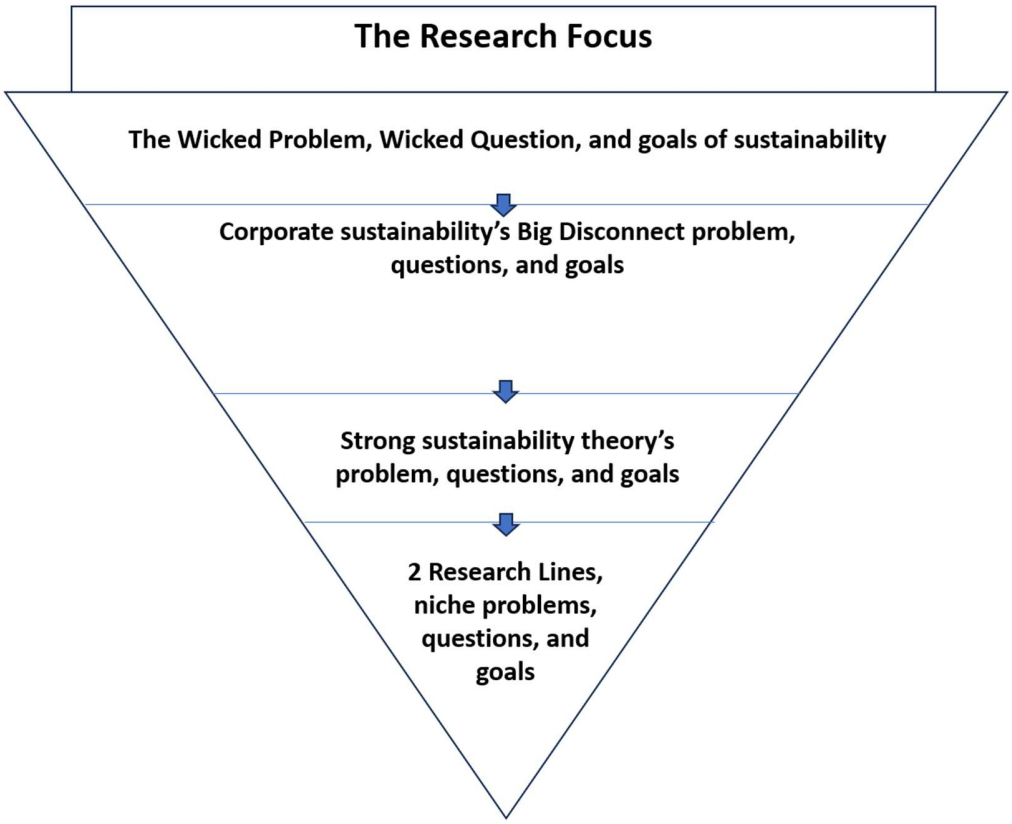

Figure 4 – Research Focus

The first line of research investigates strong sustainability theory and organizational culture. This line of investigation tackles the problem that organizational culture's relationship with sustainability strength is unknown. Researching this problem provides an opportunity to solve the three problems of The Big Disconnect. An understanding of how different organizational cultures understand sustainability, an integration of literature not yet applied in corporate sustainability studies, and a bridging of the micro-macro gap will be achieved.

The first research line's hypotheses will relate organizational culture to strong sustainability theory. The four Competing Value Framework Typologies and the five stages in the Stages of Sustainability Model will be measured from organizations to determine if there are any relationships between the two concepts. Specifically, it is expected that organizations most represented by the Market, Clan, and Hierarchy cultural types will align with weak sustainability while the adhocracy type will relate

to strong sustainability. Further specific discussion about this hypothesis will be presented in chapter 2.

The second line of research investigates strong sustainability theory and the sustainability schemes applied in corporate sustainability. This line of investigation tackles the problem that the principles, frameworks, standards, and guidelines that guide corporate sustainability activities have an unknown relationship with sustainability strength. Researching this problem provides an opportunity to solve the three problems of The Big Disconnect. An understanding of how different schemes understand sustainability, an integration of literature not yet applied in corporate sustainability studies, and a bridging of the micro-macro gap will be achieved.

The second line of research will consider the sustainability strength of sustainability schemes. The principles, frameworks, guidelines, and standards that direct organizations in their sustainability endeavors consist of sustainability schemes. For this research, it hypothesized that sustainability schemes will align with weak sustainability. Additional specific discussion about this will be presented in chapter 2.

1.8 Dissertation Structure

To achieve the research goals, answer the research questions, address the research problems, and confer the thesis, this dissertation is structured as follows. In chapter 2, the literature review and theoretical background related to sustainability and corporate sustainability will be established. Muff and Dyllick's (2014) “Input-Process-Output” approach to solving corporate sustainability problems will be explained and applied. Within this chapter, the two lines of research will be presented that present different research problems and questions related to the thesis. The first is through a consideration of organizational culture and corporate sustainability strength. The second is through analysis of the sustainability strength of sustainability schemes. Each of the concepts in these research lines will be defined and examined for their current state in academic discussions. The theory of each

concept will be presented, arguments why the research is necessary, and the contributions of this research to the respective theories will be presented.

In chapter 3, the methodology will be presented for each of the two research lines. The two research lines apply the same methodology of content analysis for assessing sustainability strength, first of organizations, and then of sustainability schemes. This includes a presentation of the Stages of Corporate Sustainability Model. Each research line will be presented with a sample, the precise methods applied, and statistical results.

Chapter 4 will discuss the results of the two research lines. A review of whether the hypotheses are supported and the context of what was found will be discussed. Limits to the research and future research will be considered. This chapter will also discuss the contributions made to the sciences specifically from the two research lines, the contributions to solving the problems of The Big Disconnect, and the contributions made to the wicked problem sustainability has been developed to solve.

Chapter 5 will conclude the dissertation. A review of the approach of the dissertation will be addressed. Then the research problems, questions, and goals will be restated along with an assessment of whether the research successfully addressed these items. Overall contributions, key findings, and novelty of the research covered in this dissertation will be addressed as well. Finally, final thoughts will be presented.

2 Chapter 2: Theory and Research Framework

This chapter includes four sections. The first is an explanation of the "Input-Process-Output" model applied to the research. The second section introduces the "inputs" of sustainability and corporate sustainability theory, to establish the context of the field in which the research is conducted. The third section introduces the "output" of strong sustainability theory, to establish the specific context that the research is working toward. The fourth section is divided into two subsections, which introduce the "process" that links the "inputs" to the "outputs." The processes are independent factors that when applied to the input of corporate sustainability will yield an output applicable to strong sustainability theory. Each section will briefly describe the history, main concepts, current states of the concepts to be studied, and the focus of the research.

This approach offers three key benefits (Randolph, 2019). First, establishing the framework provides a structure to understand the context of different theories and how they have previously related, and how they might relate in a novel, unexplored way. Second, the focus of the research is honed from a grand context to a narrow one, which is particularly important for dissertations that include multiple lines of research. Third, this style of presenting the theoretical frameworks allows for a unified context across different research lines that have a common theme.

2.1 Dissertation Framework: Input-Processes-Output Model

The framework applied in this dissertation is a basic business process model called, "input–process–output." (Table 1). This dissertation's chosen avenue is grounded in corporate sustainability theory. Following the guidance of Muff and Dyllick (2014) for researching corporate sustainability, the "input-process-output" model will be applied because it can address the three major problems of The Big Disconnect. This model considers the impact of organizational variables and their relationship to organizational behaviors. For corporate sustainability, this means that inputs of business are studied for their relationship with an outcome of sustainability.

INPUT	PROCESS	OUTPUT
Concerns	Organizational Perspectives	Values Created
What?	How?	For What?

Table 1 - The input–process–output framework as applied to this research.

Inputs are the first piece of the Input-Process-Output model and define the concerning item of research. Therefore the first step of this research framework is to address the concerns of "what" is corporate sustainability. There are many considerations of this concept and its current state. Discourse on sustainability has traditionally been confusing because the definitions of what sustainability is are unstated or unclear (Montiel & Delgado-Ceballos, 2014). Therefore this step is necessary to apply this step to clarify the scope and terms of the research. This allows for the integration of different topical streams in corporate sustainability by aligning definitions and expectations of sustainability. This approach benefits both future academics and practitioners considering this research by providing a direct discussion of the research context.

Process is the second piece of the Input-Process-Output model and dictates what factors will be applied to the input for the resulting output. The process step of the Input-Process-Output model addresses "how" organizational inputs affect business behavior. This research applies the input of corporate sustainability and addresses two process lines of research, organizational culture, and sustainability schemes. The first line investigates organizational culture to understand how two dimensions of an organization's culture affect output. The second line of research applies a study of the schemes that influence organizations as they pursue sustainability. These two lines of research seek to understand "how" these processes affect corporate sustainability.

Output is the third piece of the Input-Process-Output model and focuses on the values created or preserved by a business. This research seeks an understanding of how the input of corporate sustainability is related to the processes of organizational culture and sustainability schemes. The result is the output of corporate sustainability strength. The output represents the research goals.

Table 2 represents the research framework. As explained, the inputs and the process are applied, and the output is the result. This research applied corporate sustainability as the input, then considers 2 research lines of organizational culture and sustainability schemes. The output is an assessment of sustainability strength.

<table>
<tr><th>INPUT</th><th>PROCESS</th><th>OUTPUT</th></tr>
<tr><td rowspan="2">Corporate Sustainability</td><td>Research Line 1: Organizational Culture</td><td rowspan="2">Sustainability Strength</td></tr>
<tr><td>Research Line 2: Sustainability Schemes</td></tr>
</table>

Table 2 - The Input-Process-Output model to study corporate sustainability (Muff and Dyllick, 2014).

"Concerns" (INPUT) dictate "what" sustainability is. "Organizational Perspectives" (PROCESS) asks and answer, "how is corporate sustainability affected by inputs into the business?" "Values Created" (OUTPUT) asks and answer, "for what purpose is this research conducted?" Values created are the result of combining Inputs and Processes.

2.1.1 INPUT:

The first step in the Input-Process-Output model is Input. The input of this research is sustainability. First a brief history and definition of sustainability will be presented. Then corporate sustainability theory will be defined and explained. The state of corporate sustainability will be addressed to highlight problems, questions, and gaps in the existing research. The corporate sustainability literature emphasizes the need to measure, manage, and communicate corporate sustainability, with a focus on societal impact and key issues such as climate change, resource efficiency, employee welfare, inclusion and diversity, product safety, and anticorruption. The paradoxical nature of corporate sustainability, which involves addressing environmental, social, and economic concerns is a core focus of corporate sustainability research.

2.1.1.1Sustainability Background and Definitions

Sustainability science is a modern construct. However, a review of the history that has led to the modern premise of sustainability provides a long, historic background regarding the ideas that define the concept. A look back to 30,000 years ago suggests sustainability can be applied to cave-dwelling ancestors carefully who used all parts of animals collected from a hunt (Denevan, 1995). Cultures from ancient Babylonians until medieval times applied sustainability ideas like the use of water, tidal, and wind for energy while employing farming techniques that ensured long term fruition, like crop rotation (McKune et al., 2018). Centuries later, the industrial revolution made production simpler, cheaper, and automated. Aspects of environmentalism, economic protection, and social development were overlooked. Practitioners and academia realized that preservation of resources was needed for the sake of future generations (Högbom, 1892).

The earliest writings and analysis on the pre-cursors to modern sustainability theory have foundations linked to Hans Carl von Carlowitz's writings on management of the Saxony timber industry in the 1700s (Carlowitz, 1732). He noted in his book Sylvicultura Oeconomica that over-consumption of forests resulted in short-term gains but threatened longevity and the economics security of local communities (Guenther & Schneidewind, 2017). In the twentieth century, conservation, environmental, contra-technology, and anti-growth movements shaped sustainability into its current state as a science. Academic appeals for business to have responsibility outside of its own environs became prominent in the 1930s (Carroll, 1999).

In 1972 a pivotal moment in sustainability was the result of the United Nations Conference on the Human Environment (Stockholm Conference). This event signaled a significant shift in the trajectory of global environmental politics, as the Stockholm Declaration consisting of 26 principles along with an action plan was created. The phrase, "sustainable development" was first politically mentioned in a 1980 report from the International Union for the Conservation of Nature (International Union for Conservation of Nature and Natural Resources et al., 1980). The most

significant academic frameworks for sustainability have materialized in the last forty years. Additional political, public, and academic forces have continued to advance the science of sustainability (Kidd, 1992) (Table 3).

Year	Item/Event	Notes
1713	Publication of Carl von Carlowitz' Sylvicultura Oeconomica	Writings about sustainable forests for the Saxony Timber Industry
1821	Publication of Georg Ludwig Hartig's Instructions for the Taxation of Forests	Forestry management book that stresses thinking of future generations.
1969	National Environmental Policy Act (USA)	One of the first nationalized programs in a developed nation to support the environment, thus benefitting society
1972	1st UN Environmental Conference in Stockholm	foundation of the United Nations Environmental Programme (UNEP)
1973-1977	Strong Sustainability Debates	Strong Sustainability Theory was first debated among economists
1982	2nd UN Environmental Conference in 1982 in Stockholm	The term "sustainable development" becomes common
1987	Out Common Future is Published	The Brundtland definition of sustainability is established
1995	The first Conference of Parties, Berlin	Conference initiated to discuss climate change among nations
1997	Publication of Elkington's Cannibals with Forks	Established the Triple Bottom Line (3BL) approach to sustainability
1992	3rd UN Environmental Conference in Rio de Janeiro	Agenda 21 was established
2001	EU Gothenburg Summit	A European strategy for sustainability was developed
2002	4th UN Environmental Conference in Johannesburg	Corporations became part of UN Sustainability Conferences
2012	5th UN Environmental Conference in Rio de Janeiro (Rio+20)	UN Sustainable Development Goals (UN SDGs) were established
2015	At COP 21, The Paris Climate Accord is established	Most UN nations agree to policy for fighting climate change
2030	Deadline for UN SDGs	

Table 3 - Selected events in sustainability history

The modern moment in defining sustainability occurred in 1987. Individuals, nations, trade groups, academia, and international organizations contributed ideas that culminated in the seminal document defining modern sustainability, the Brundtland Report. The Brundtland definition of sustainability comes from this report, which was the first widely accepted descriptor of modern sustainability (Davies, 2013). It states, “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, Chapter 2, Section IV). Further statements in the Brundtland Report declare that sustainable development is achieved by assessing environmental, social, and economic capitals. These two notions clarify that sustainability is a concept developed to manage and measure activities related to preserving environmental, social, and economic resources to ensure future prosperity. Academic consensus currently accepts the Brundtland definition as a primary definition of sustainability (Davies, 2013).

To construct the thesis of this research, and test the hypotheses of the specific lines of investigation, the Brundtland definitions of sustainable development and sustainability will be applied because of the consensus that these definitions have achieved among research, and the definitions are applicable to corporate sustainability theory and sustainability strength theory (Davies, 2013). Use of the Brundtland definition aligns with the research problems, questions, and goals of this dissertation.

Since the introduction of the Brundtland definition, sustainability has been the core concept that is tasked with mitigating the wicked problem of resource deterioration caused by humanities overshoot (Merz et al., 2023). Increased demand for Earth's resources without careful management has presented negative externalities and impending issues that imperil the planet. Some researchers argue humanity has entered the Anthropocene Era, meaning humankind has irreversibly altered the eco-system of the planet (Hamilton, 2016; Laurance, 2019). Other researchers have found economic and social inequality has increased or strongly persists despite a reduction in poverty and technological innovations (Milanovic, 2011; Ortiz & Cummins, 2011; Piketty, 2014; Stiglitz, 2015). Attempts to alleviate the symptoms of production and consumption have been administered to rectify issues humanity now faces. While conservational practices have been realized throughout history, prioritizing such action as humanity's main goal is a modern concept (Glaser, 2014). The construct of sustainability has developed to solve the issues of managing

resources to ensure future prosperity has culminated into the concept of sustainability.

2.1.1.1.1 Challenges with understanding sustainability

A difficulty of understanding sustainability is the topic's vagueness. Missimer et al (2017) express the field has broad and narrow definitions for every related idea. The ontology is malleable to the user's comfort. Fischer et al (2017) have investigated the semantics of sustainability terminology. The terms "sustainability" and "sustainable development" can have similar or different meanings depending on context, culture, and language. Sustainability is typically used to describe an entire philosophy of the subject. The complimentary term, sustainable development, transforms the idea into action. Adding the term "development" generally refers to the practice and methods for achieving the assessments desired in sustainability behaviors and outcomes. Dryzek (2022) explains this phenomenon as two narratives, where "sustainability" is for purists and academics, and "sustainable development" is used to pacify business interests. When used casually, many journals, publications, and media synonymize the term for continuity (Aras & Crowther, 2008). Additionally, there is an argument that, "sustainable development" is a contradictory term because the continued production of almost every good in the world, by strict definition, is not sustainable (Redclift, 2005).

There are differing opinions to characterize sustainability. Kuhn (2012) describes sustainability as an "abnormal science," because normal, traditional science applies a specific discipline working on creating parts of a jigsaw puzzle and observing if there are any fits. The puzzle pieces of sustainability research emerge from multiple scientific disciplines. This aligns with the view that sustainability is as a post-modern scientific discipline consisting of biological, social, and governance disciplines. Further discussion calls sustainability a normative science, functioning with multi-disciplinary research problems coming from social problems and resulting in biologic results (Blättel-Mink and Kastenholz, 2005). Freericks et al., (2010) note that sustainability is frequently perceived as a novel approach to environmental policy; however, it extends beyond mere environmental preservation. It

encompasses a commitment to safeguarding the well-being of both future generations, promoting inclusive justice, and the well-being of present-day individuals, emphasizing distributive justice.

2.1.1.2The Three Pillars of Sustainability

The three pillars of sustainability, per academic consensus and the Brundtland Report, are environmental capital, social capital, and economic capital. Capital refers to resources with respect to each construct. These capitals have been deemed important because they are to be assessed to analyze sustainable development. Each represents resources that sustainability is tasked with preserving. These three pillars have been further described in academic literature.

Sutton (2004) defined environmental sustainability as “the ability to maintain the qualities that are valued in the physical environment.” Others define environmental sustainability with more specific nuances, suggesting eco-spheres, resource timelines, animal protection, and even beautiful sunsets (Moldan, 2009; OECD, 2008). Further definitions take a formulaic approach, stating an aggregation of natural resources used, products reused, and waste impact is the study of environmental sustainability (Daly, 1990). Environmental sustainability is often and wrongly assumed to be the entirety of the sustainability (Dyllick & Hockerts, 2002). The reality is that environmental sustainability should be prioritized because social and economic sustainability are dependent on the environment.

Naturally occurring capitals originating from the planet define the resources sustainability is meant to manage for future generations. Examples of environmental sustainability include, but are not limited to, concerns about climate change, biodiversity, land use, consumption, and pollution. Development of systems that mitigate the concerns with these items for the sake of future prosperity are considered environmental sustainability. Indicators to assess environmental sustainability could include CO2 emission data, product life cycle assessments, generation of hazardous waste, soil erosion, protected natural spaces, air quality, plant diversity, or emissions of toxic substances.

Social sustainability considers the capital that humanity can provide. Quality of life, educational development, indirect prosperity, declared human rights, equity, and empowerment are key pieces of social sustainability (Rogers & Ryan, 2001; Vallance et al., 2011). Definitions are often more geared for policy rather than attempts to describe a fair social world (Colantonio, 2007). This means the language of social sustainability is purposely vague, to be more encompassing. The ideals of social sustainability are sometimes stated clearly but their meaning can be abstract or relative. Social sustainability is driven by concerns for those who are or might be marginalized. Those who depend on ecosystems are prioritized. Then the populations vulnerable to social short-comings, and are at risk for a permanent poor livelihood are considered (Chambers & Conway, 1992; Fairhead et al., 2012; Leach et al., 2012; Paavola & Adger, 2006; Zoomers, 2010).

Capital that enhances the quality of life for humanity defines the resources considered in social sustainability. Examples of social sustainability include, but are not limited to, concerns about health, education, inequality, demography, and labor. Development of systems that mitigate the concerns with these items for the sake of future prosperity are considered social sustainable development. Indicators to assess social sustainability could include child mortality rates, access to childcare, education levels, literacy rates, gender employment, population growth, immigration, emigration, codes of conduct, and safety laws.

Economic sustainability refers to responsible application of capital in the form of human, human-made, and natural assets. Goals satisfied by this concept are economic equality, responsible growth, and efficiency (Goodland & Daly, 1996). In short, economic sustainability suggests stakeholders must separately strive for responsible capital levels as they change, without imposing social or environmental negative externalities. The approach of the goals in economic sustainability is to eliminate inequality, exclusion, and vulnerability. Tax faults, capital market exploitation, intellectual property rights manipulation, are some ways this happens.

Capital that is human-made defines the resources considered in economic sustainability. Examples of economic sustainability include, but are not limited to,

concerns about wealth accumulation, legal regulations, transparent accounting, honest taxation, and financial influence. Development of systems that mitigate the concerns with these items for the sake of future prosperity are considered economic sustainable development. Indicators to assess economic sustainability could include fair trade policy, supply chain management, freedom from credit, transparent taxation, responsible budgeting, fiscal autonomy, lobbying influences, fair wages, and tax pressures. It should be noted that economic sustainability does not refer to profitability, economic growth, or wealth.

2.1.1.3Corporate Sustainability Theory

Sustainability's transdisciplinary nature means it has influence in a wide range of subjects like the natural sciences, governance, engineering, economics, and business. Business is of particular importance to sustainability because it often serves as the intersection for different disciplines to meet. In the 1990s, corporate sustainability was born as a business practice and academic field tasked with understanding resource management while ensuring future prosperity. The Brundtland definition provides the foundation for defining the corporate sustainability practiced by organizations. It is mirrored in a definition of corporate sustainability theory; "Sustainable development when incorporated by the organization is called corporate sustainability and it contains, like sustainable development, all three pillars: economic, ecological and social" Baumgartner and Ebner (2010, p.77). In simpler terms, corporate sustainability refers to the application of sustainability to organizations (Dyllick & Muff, 2016; Hahn et al., 2017; Steurer et al., 2005).

Corporate sustainability is an important field of study because the environmental (Carbon Disclosure Project, 2017; Intergovernmental Panel on Climate Change, 2018; Nice & Osborn, 1948; Shrivastava & Hart, 1995), social (Cobb & Stevens, 2017; OECD, 2014), and economic (Bird & Smucker, 2007; World Bank, 2012) issues sustainability is meant to solve are primarily caused by business. Research and civil society organizations have also declared that business has the responsibility to develop a response (Gupta et al., 2015; Lozano, 2012; UN Global Compact, 1999). Business is a primary actor in sustainability, thus the field of

corporate sustainability which specifically focuses on business behavior and sustainability is important to understand. The myriad sustainability ideas formed in government, civil society organizations, and academia, percolate to businesses (Roome, 2011a).

Corporate sustainability has increasingly become prominent in business operations (Governance & Accountability Institute, 2020). From the 1980s until 2000, businesses were considered consultants to sustainable development while governments and civil society organizations dictated sustainability behaviors. From 2000 to 2010, the role of business evolved, as businesses became active participants in sustainability. From 2010 to the current time, businesses and corporations are now the primary actors in sustainability that develop, enact, and assess sustainability behavior (Gupta et al., 2015). It is now uncommon for a business to completely ignore sustainability (McCalla-Leacy et al., 2022).

Corporate sustainability is studied by researchers and practitioners assuming that activities and characteristics of an organization affect sustainability outcomes (Ivory and Brooks, 2018). Examples of the numerous business studies that have linked corporate sustainability to business include concepts such as organizational behavior (Al-Swidi et al., 2021), business models (Chesbrough, 2010), business drivers (Engert et al., 2016), and innovation (Iñigo, 2017). The sustainability observed based on these variables results in a wide range of outcomes.

2.1.1.3.1 The State of Corporate Sustainability

The current state of corporate sustainability is important to understand in justifying the need for corporate sustainability research. As the science of corporate sustainability develops as a concept, business has become a primary actor in the field. There is clear evidence that businesses embark on sustainability behaviors, but after more than 30 years of the concept integrating into business, the expected results have not manifested.

Despite the increased attention to policy and practice of sustainability, there is consensus that organizations are falling short in meaningfully addressing the

issues sustainability is supposed to solve (Howard-Grenville, 2006; Wunder, 2019; Young & Tilley, 2006). Practitioners manage business actions to pursue corporate sustainability policy goals. More than 50% of executives report that sustainability is very or extremely important, yet do not define the concept in alignment with academic definitions (Bonini et al., 2010; Ergene et al., 2021). Businesses demonstrate a lack of understanding by treating the economic, social, and environmental capitals as substitutes with which to achieve competitive advantages, rather than integrated complements to be preserved (Bansal & Gao, 2006; Muff & Dyllick, 2014). Furthermore, a majority of organizations approach sustainability without any strategy (Kiron et al., 2017). This lack of understanding and planning results in organizations disassociating the intentions of sustainability from the actual sustainability that is practiced (Bromley & Powell, 2012). Sustainability is supposed to inspire changes in capitalistic practices but practitioners and researchers "conceptually manipulate" the concept into a profit strategy (Elkington, 2018).

Organizations manipulate definitions of the concept, decoupling corporate sustainability efforts from the intentions of sustainability (Bansal & Gao, 2006; Elkington, 2018; Hahn et al., 2010). This results in business pursuing business-as-usual sustainability for the sake of profit, liability management, or image management rather than preservation of environmental resources for the prosperity of future generations (Gray et al., 2020; Testa et al., 2018). Consequently, the long-term planning and pro-active mentalities required of sustainability are lacking (Isil & Hernke, 2017; Norman & MacDonald, 2004). Furthermore, corporate sustainability reporting is corrupted, painting organizations as champions of sustainability when the reports actually mask unsustainability (Calabrese et al. 2017; Chatterji et al. 2016; Demastus and Landrum 2023; Dorfleitner, Halbritter, and Nguyen 2015; Lin et al. 2017; Milne and Gray 2013). These faults exemplify why the results desired from sustainability are stunted. A disconnect between what is expected of corporate sustainability behavior, and the reality of how businesses behave has resulted in these shortcomings.

There are doubts that business can navigate sustainability. Hajer made two observations, 20 years apart. The first noted corporate sustainability behaviors will manipulate the meanings and policy of sustainability through a type of eco-modernism called “greenwashing” (Hajer, 1995). The second observation Hajer made was that sustainable development has become corporate-centric (Hajer et al., 2015). This sentiment was echoed during the development of UN Sustainable Development Goals in 2014, when the World Business Council for Sustainable Development (2014) suggested there will be competing forces between stakeholders who want sustainability and businesses that want to set a narrative so they can remain in “safe and just operating space.” Ihlen & Roper (2011) hypothesized when businesses are placed in a position to change for the sake of sustainability, they will resist transformations. Barkemeyer et al (2014) analyzed financial statements, audited documents, and the results of sustainable initiatives in business finding businesses approached sustainability changes with a win-win mindset, where profit must be one of the wins, and any sustainable change is the other win. These phenomena help explain the disconnect between what is expected of business and how business pursues sustainability.

Researchers have been aware that business might corrupt the development of sustainable frameworks and reporting. Pingeot (2014) found 55 corporations participated in both the creation of the UN Sustainable Development Goals and UN Global Compact meetings. There was a tendency for large offenders of environmental sustainability (mining, oil, gas) to be a major contributor to the agenda. The geographical base was dominated by developed nations, as 35 of the participants were based in Europe, the USA, or Japan. There is precedent for this trend, as accounting of other conferences and seminars shows corporations contributing to global sustainability policy have been on the rise at since the mid-1990s.

Washing, a concept in which association with a theme, person, or idea, is used to positively improve one’s image, has become abundant in sustainability. Greenwashing is the term used to indicate the application of environmental

sustainability in products, processes, and businesses concerns that actually result in very little for little environmental benefit (Lyon & Maxwell, 2011; Yanarella & Levine, 2008). Organizations flagrantly use sustainability in reporting and marketing to push false narratives of environmentally friendly behavior when in fact their actions are unsustainable (Carrington, 2021; Testa et al., 2018). Some sceptics have realized organizations use the UN Global Compact and UN Sustainable Development Goals to improve their image without actually contributing to sustainable development (Hemphill, 2005; Williams, 2004). Companies perceived as offenders of sustainability can join the UN Global Compact without any follow-up from the UN or auditors. The associating of UN sustainability initiatives to generate a positive image for the organizations is deemed “blue-washing” because organizations can plant the UN flag on their communications to stakeholders (Knudsen, 2011).

As the number of organizations pursuing sustainability increases, it is observed the issues to be solved by organizations remains largely unaffected (Borowy, 2014; Dyllick & Muff, 2016; Visser, 2010) because of misapplication of sustainability concepts (Elkington, 2018). Some organizations have declared themselves sustainable or in the position of being historically responsible (Ihlen and Roper, 2011). Unfortunately, corporations cannot wave a magic wand to magically inject the word “sustainable” into annual financial statements and mission statements (Milne et al., 2006). This disingenuity is dangerous, as corporations and stakeholders accept a false premise of everything possible to be sustainable is achieved (Aras and Crowther, 2009). They should in fact be working on a multi-step change process with long-term goals. Calls from researchers have suggested that corporate sustainability needs to be assessed by sustainability strength.

Some research shows businesses are aware of the need for sustainability and they are open to the transformations presented by the concept (Burnes, 2004; Campbell, 2007; Kell & Levin, 2003; Schembera, 2016). Proactive businesses have found there is a great opportunity from sustainability to develop competitive advantages but the risk of change brings about hesitation (Pedersen, 2018). Harbi

et al. (2015) found the landscape of operationalizing sustainability is confusing to business, as there is no clear guide for what to do. Imbrogiano (2021) similarly found that management tools, mechanisms, and procedures for sustainability exist, but there exists a knowledge gap in how changes within an organization result in application of these devices. As a result, businesses frequently apply sustainability to gain marketing advantages, rather than for the conscious reasoning of preserving resources for future prosperity.

The numerous short-comings in corporate sustainability practice exemplify the corporate sustainability problem tackled in this research, The Big Disconnect (Dyllick & Muff, 2016). The actions of business and researchers in corporate sustainability are misdirected, inconsiderate of academic literature streams, and neglect to integrate macro- and micro- level concerns. Researchers have proposed that to reconnect organizations to the ideals of sustainability, corporate sustainability needs to be assessed not merely by its integration into firms, but rather if the sustainability being employed is authentic towards the intentions of the concept (Dyllick & Hockerts, 2002; Roome, 2011a). This is where the application of strong sustainability literature streams can be applied.

2.1.2 OUTPUT:

The Output component of the Input-Process-Output model focuses on the result created by applying the Processes to the Inputs. In this research, knowledge related to strong sustainability theory will be the Output because of the relationship between the input of corporate sustainability and the processes of organizational culture and sustainability schemes. First, the concept of strong sustainability theory will be explained with considerations of macro- and micro- level. Then debate that has led to the current state of discussions about strong sustainability theory will be presented. Finally, the stages of sustainability model will be presented, which will be applied in the methodology to assess strong sustainability in the two lines of research considered in this dissertation.

2.1.2.1Strong Sustainability Theory

As evidenced in the background literature, definitions, and state of corporate sustainability, the concept of sustainability is widely studied and applied. However, observations consistently show the environmental, social, and economic resources to be preserved for the prosperity of future generations are still facing issues. The natural question is, “if sustainability is ostensibly well-intentioned, why does consensus find that the pursuit of sustainability is not resulting in expected changes?” The premise for this dissertation’s thesis suggests that in corporate sustainability, not all sustainability efforts are equivalent. Numerous sustainability ideas, policies, and practices are observed, but are the impacts of these sustainability efforts adequate? Based on the state of corporate sustainability, the answer is no. Thus it is proposed to focus on strong sustainability theory to understand corporate sustainability.

Strong sustainability theory is a normative theory that emerged from economic discussions in the 1970s. The concept considers numerous dimensions to assess as either weak or strong for their approach to sustainability. Generally speaking, weak sustainability positions allow businesses to substitute human-made capital for natural capital, make incremental improvements, exploit nature (O’Riordan, 1989), emphasize unfettered growth, pursue unlimited production, and promote over-consumption of resources (Hartwick, 1977; Hediger, 1999; Solow, 1974). The origin of the weak sustainability position is situated within neoclassical economics, which focuses on total accumulated capital rather than individual categories of capital, and emphasizing resource exploitation and economic growth (Hartwick, 1977, 1978; Solow, 1974).

In contrast, strong sustainability positions limit substitutability between natural and man-made resources, seek to work in balance with nature (O’Riordan, 1989), limit production and consumption (Daly, 1991), and preserve natural resources (Turner, 1993). The strong sustainability positions (Daly, 1973) oppose neoclassical economics and are situated within the principles of thermodynamics, focusing on the maintenance of each category of capital for intergenerational equity while stabilizing

or decreasing economic and population growth. The importance of addressing strong sustainability theory is that weak sustainability positions perpetuate the issues sustainability is meant to resolve, while strong sustainability positions promotes pro-active, strategic, changes which prioritize environmental, social, and economic resources (Ott et al., 2011; Roome, 2011a).

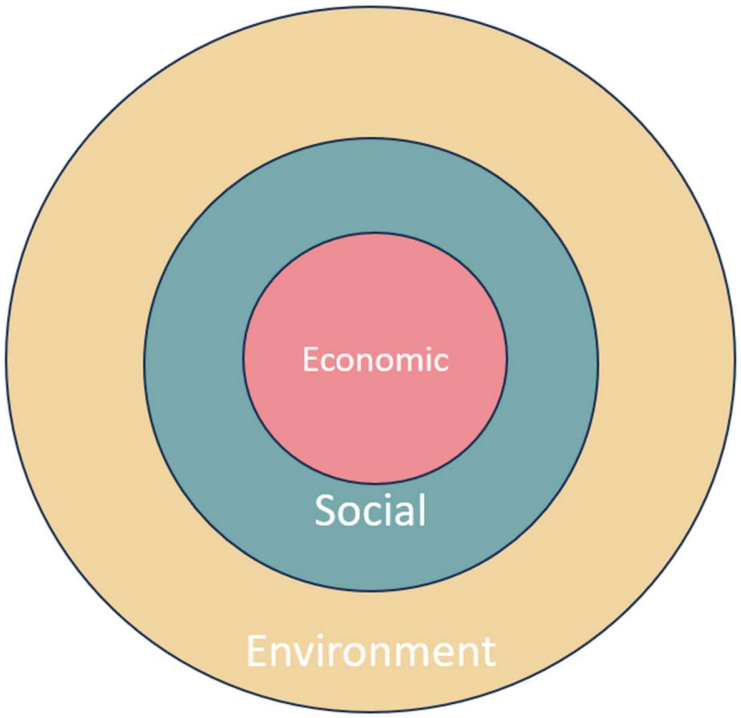

Figure 5 - The strong, "thermodynamic" sustainability model.

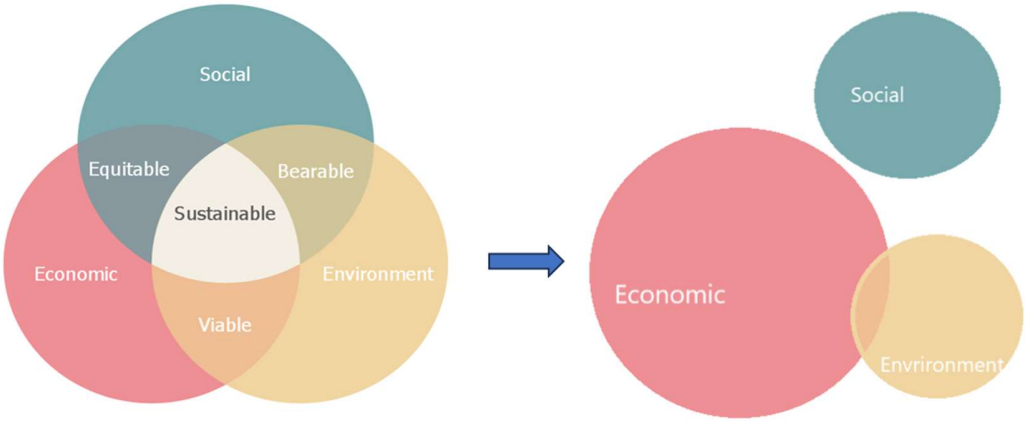

Figure 6 - The weak sustainability model.

Weak and strong sustainability models have been created to visually differentiate the two ideas. The strong, “thermodynamic” sustainability model (also known as the nested doll model, or concentric ring model) (Figure 5) assumes the environment is a finite space with finite natural resources, in which there is a society with finite human resources, that envelopes finite economic, human-made, resources. The three pillars are not substitutable, but they can encroach on one another and be depleted (Dragicevic, 2018; Hosseinian-Far & Jahankhani, 2015; Levett, 1998). The weak sustainability model (Figure 6) assumes the three pillars are substitutable. In weak sustainability, if one pillar’s capital is fully consumed, the other pillars are expected to grow and or shrink (depicted on the right of Figure 6). The pillars of the weak sustainability model may depict each pillar as prioritized by size, or even separated to show a lack of importance (depicted on the right of Figure 6) (Cato, 2009; Cox et al., 2007; Dragicevic, 2018; Hartwick, 1978; Hopwood et al., 2005; Solow, 1956).

The environmental, social, and economic pillars are represented in each model. The appeal of this type of arrangement is that the three pillars are consistently present in sustainability policy, practice, and research. While the representations suggest importance for all three pillars of sustainability, the weak sustainability model leans towards prioritizing economic growth. Whether intentional or not, this aligns with the Brundtland Report's emphasis on economic processes as the driver of change. However, focusing solely on economics can lead to significant environmental damage (Cox et al., 2007; Hopwood et al., 2005). Recognizing this tension, strong sustainability theory discussions have expanded to differentiate between "weak" and "strong" forms of sustainability.

2.1.2.1.1 Debates in Strong Sustainability Theory

Debates in strong sustainability theory are abundant. Arguments primarily consist of discussions about the viability of weak sustainability at the macro- and micro- levels (Table 4). At the macro level, limitations of substituting social, human,

capital and economic, man-made, capital, for the planet's environmental, natural, capital is unclear, thus weak sustainability approaches are inherently risky (Lorek & Fuchs, 2013). Weak sustainability allows for unfettered consumption of natural resources with the assumption that if they are depleted, substitutes will exist because of advances in technology, innovation, or efficiency (Goodland & Daly, 1996; Solow, 2014). Humanity cannot rely on this unsubstantiated prediction to solve future resource issues (Steffen et al., 2015).

The Amazon Rain Forest is particularly useful for exemplifying the difference between weak and strong sustainability. Weak sustainability positions would argue the Amazon rain forest can be logged, farmed, and exploited without limits to maximize the acquisition of resources within it, because the social and economic gains from doing so will offset problems that arise from doing so. The economic prosperity generated from harvesting the rain forest will lead to human-made capital that will substitute for the natural capital. Those who argue strong sustainability positions would state that the gains from harvesting the Amazon rain forest are not guaranteed or unlikely to result in human-made capital that substitutes the benefits that the natural resources provided. Similar examples include the bleaching of coral reefs, automation of human labor, and over-accumulation of human-made capital. It is impossible to predict that future technology or innovation will offset the problems caused by these circumstances.

One major issue with the weak sustainability model is the assumption of separate and autonomous dimensions, which leads to compartmentalized and sectoral approaches to sustainability (Elkington, 2018; Giddings et al., 2002). This invites the substituting between different the three pillars and their resources, particularly between the economy and the environment, rather than seeking integrated solutions that accommodate interconnected human and environmental interests (Cox et al., 2007; Hopwood et al., 2005). In contrast, a more integrated approach that promotes integration between different sectors and actors is needed while reducing conventional reductionism. Presently, the economy, or human made capital, tends to be prioritized over other dimensions, which poses a significant

challenge. Additionally, the weak sustainability model places human capital outside the environment and fails to recognize humanity's intrinsic connection to it. The environment is the foundation of any economy and human well-being, and it must be acknowledged as such, representing the Earth's ultimate limits (Gibson, 2001).

To address the flaws of weak sustainability, arguments for a strong sustainability model exist. In strong sustainability, the economy is intricately woven into the fabric of society, which, in turn, is enveloped by the natural environment (Figure 5). This arrangement ensures that economic and social dimensions are fully integrated into natural ecosystems. While economic capital remains central to wealth creation and development, it now operates within constraints imposed by social and environmental considerations. Consequently, sustainability can only be realized through a development approach with low entropy, minimizing impacts on natural capital as environmental restrictions place a ceiling on economic growth (Lawn, 2000). Importantly, this perspective recognizes that the economy exists as a subset of society, emphasizing that economic activities do not govern all aspects of social relations (O'Riordan, 2013). The strong sustainability model presents a more realistic integration of sustainability into the world (Dragicevic, 2018), minimizing the need for trade-offs and promoting a search for "win-win" solutions that consider the carrying capacity of the planet (Gibson, 2001; Giddings et al., 2002). The guiding ethic the strong sustainability models emphasizes limits first and then establishing feasible development within those limits to achieve sustainable development (Waas et al., 2011).

Sustainability		
	Strong Sustainability	**Weak Sustainability**
Main Idea	Natural capital substituted for human-made capital has limits	Natural capital substituted for human-made capital substitutable without restriction
Consequences	Irreversible consequences might result from diminishing natural capital substituted for human-made capital	Environmental and social consequences will be minimized by technological innovation and financial benefits of natural resource substitution
Sustainability Issue	Conservation of critical natural capital is necessary to ensure the chance of prosperity for future generations	The aggregate stock of natural capital should be at least maintained or ideally increased for future generation
Key Concept	Natural capital limits	Optimization of using natural resources
Definition of Thresholds and Environmental Norms	Current scientific knowledge dictates public deliberation	Future technical approaches predict safe substitution thresholds and norms

Table 4 - Key Differences between weak and strong sustainability

This dissertation applies strong sustainability theory to assess sustainability artifacts. The application of this theory will serve as the grounds to identify the sustainability strength of various units of measure, which in this dissertation will be sustainability schemes and organizations. The use of strong sustainability theory is justified by two primary aims (Ott et al., 2011). The first aim is to evaluate the environmental sustainability behaviors of organizations while considering a broad range of arguments. By doing so, the study moves away from viewing sustainability as an ambiguous and all-encompassing concept with no clear boundaries. Instead, it promotes a structured discussion that acknowledges and addresses paradoxical tensions. The second aim is to offer guidance on how to implement strong sustainability in practice. This means translating the theoretical concepts of strong sustainability into practical and operational strategies for sustainable development.

As businesses became responsible for solving the environmental, social, and economic problems they help create, the strong sustainability theory transformed from a macro-economic to a micro-economic discussion (Ott et al., 2011;

Schaltegger & Burritt, 2006). Corporate sustainability strength is an extension of strong sustainability theory and applied at the business level. Corporate sustainability strength is a measure of an organization's application of sustainability. Organizations partaking in corporate sustainability are desired to achieve strong corporate sustainability because firms doing so are expected to significantly address the issues sustainability is charged with solving. Organizations employing weak corporate sustainability will not enact meaningful sustainability (Ott et al., 2011; Schaltegger & Burritt, 2006).

At the micro-economic level, organizations apply weak sustainability principles to exploit resources. As contemporary businesses seek growth, there is irreversible environmental stress (Fleming, 1992). Businesses assume control and exploitation of the natural environment will result in technology that offsets depletion of resources (Ergene et al., 2021; Kuhlman & Farrington, 2010). Further examples include a mentality to reduce short-term unsustainability instead of creating long-term sustainability (Milne et al., 2006), purposely misinterpreting sustainability (Montiel & Delgado-Ceballos, 2014; Shrivastava, 1995), research focused on the business-case for sustainability (Salzmann et al., 2005; Schaltegger et al., 2017), a focus on measuring sustainability by business metrics rather than scientific measurements (Banerjee, 2008), and incremental innovation (Gray, 2010; Milne et al., 2006). These weak corporate sustainability approaches are proving to be insufficient (Pinto et al., 2020).

The call to inject strong sustainability theory in academic research has persisted for several years. Numerous researchers have stressed innovative changes to academic and practical approaches that consider sustainability strength rather than just integration are vital (Dyllick & Muff, 2016; Elkington, 2018; Wolfgramm et al., 2015). Dyllick and Hockerts (2002) questioned how organizations can pursue corporate sustainability beyond the business case (weak corporate sustainability), with the aim of achieving the original ideals of sustainability (strong corporate sustainability). Roome (2011) suggests corporate sustainability research

not previously conducted in consideration of sustainability strength should be reconducted.

The frequency of journal articles related to strong sustainability theory has been assessed (Demastus, in review). Unsurprisingly, of the 12,738 published articles which considered sustainability in 22 business-responsibility journals between 2000 and 2022, only 76 articles incorporated strong sustainability theory. Slightly over half (39) were snowballed articles that did not specifically refer to strong sustainability theory but rather related concepts like greenwashing or the business case for sustainability. The trend (Figure 7) from 2017 and onward seems to indicate a modest increase in articles that consider strong sustainability theory, but the peak of a mere 12 articles in 2018 is not encouraging. These numbers indicate that business-responsibility journals and researchers have not adequately answered calls to consider strong sustainability theory.

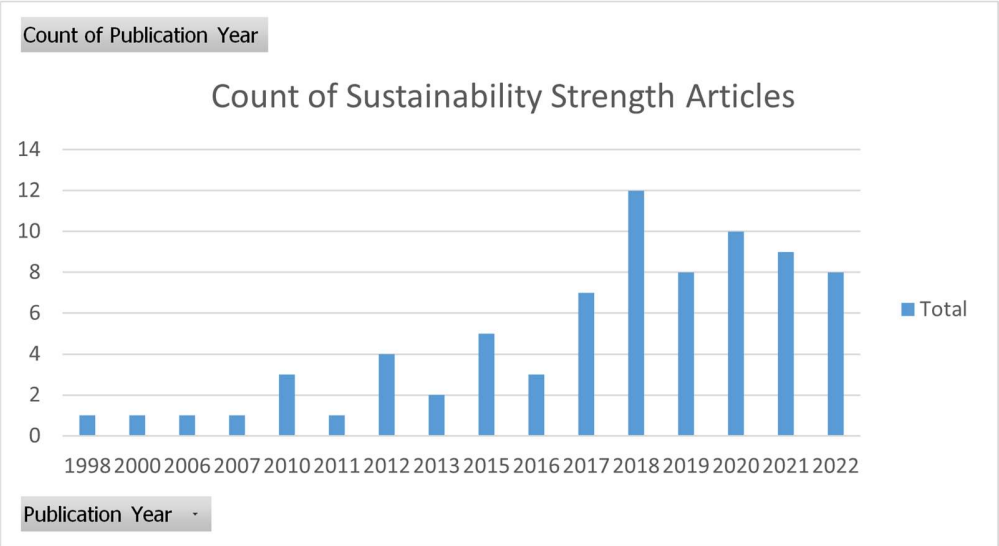

Figure 7 - Frequency of articles that consider strong sustainability theory.

Studies have found organizations primarily partake in weak sustainability to gain competitive advantages rather than strong sustainability that promotes carefully managed use of natural resources (Dyllick & Muff, 2016). This mentality is also embedded in business school curriculum (Cotterell et al., 2019; Landrum & Ohsowski, 2017), the schemes that direct organizations to sustainability (Demastus & Landrum, 2023; Liute & De Giacomo, 2021), and business ethos (Coen et al.,

2022; Collins et al., 2010; Laine, 2010; Niehoff, 2022). The perpetuation of weak corporate sustainability is also the norm in academic literature, which too often, overlooks the concept of sustainability strength (Davies, 2013; de Bakker et al., 2020; Neto et al., 2018; Roome, 2011a).

A literature review by Neto et al., (2018) exposed the gap of academic articles addressing corporate sustainability strength. In practice, organizations have been treated as monolithic units, wrongfully assumed to be partaking in the intended ideals of corporate sustainability (Howard-Grenville, 2006). Binder (2016) notes that organizations need to re-assess measuring sustainability based on behaviors and action rather than bottom lines from reports while Roome (2011) suggests that any sustainability research inconsiderate of sustainability strength needs to be reconducted.

There is a need to advance the understanding towards of corporate sustainability strength because eventually the supporting literature shapes policy and action (Khalili et al., 2015; Zilahy & Huisingh, 2009). The research in this field disseminates knowledge to academia, educators, oversight groups, and policy makers (André, 2020). Scholars need to ensure that future business-responsibility research stresses the concept of strong sustainability to stay relevant (Nyberg & Wright, 2020). If there is a consistent shortcoming in this research, students, standard creators, and policymakers will be consistently misguided.

Business-responsibility journals are not receiving or publishing a substantial number of articles focused on sustainability strength. This trend means that sustainability policy, research, frameworks, schemes, business education are also ignoring the concept (Demastus, in review). Researchers investigating modern systems of sustainability, like circular economies, life cycle assessments, green systems thinking, and eco-innovation need to realize their ideas risk mirroring the faults of precedential ideas. Perpetuating weak sustainability mentalities into new ideas will result in further delay from the results expected of sustainability.

2.1.2.1.2 The Stages of Sustainability Model

Sustainable development literature has macro-level perspectives from governments, societies, and economies. Literature with a micro-level perspective comes from studies of businesses, corporations, and organizations (Dunphy et al., 2003). Models that represent the stages of sustainability are abstractions, influenced by sensemaking, interpretations, worldviews. The existence of macro-level and micro-level models suggests that governments and societies differently understand sustainability from businesses.

The macro-level literature focuses on the writings and development of very few models. These models discuss how societies and governments apply sensemaking and worldviews to understand and actualize sustainability. The models generally apply economic development principles espoused by Rostow & Whitman (1960) that focus on environmental concerns, ethics, management strategy, self-image, power, and drivers of change. O'Riordan (1989) set the standard for others to follow in developing sustainability stage models, who was then followed by Turner & Pearce (1993). Further development in sustainability stage models (Hopwood et al., 2005; Myerson & Rydin, 1996; Yanarella et al., 2009) bookends the literature on sustainability stage models. These writings established sustainability stages that represent very weak, weak, strong, or very strong sustainability.

Development of micro-level literature on sustainability stages in more abundant. Over 50 models were identified by (Kolk & Mauser, 2002). Like the macro-level models, they are developed by identifying the sensemaking of the views held by those actualizing sustainability. Some are developed based on existing literature (Ainsbury & Grayson, 2014; Dyllick & Muff, 2016; van Marrewijk & Werre, 2003), while others were developed based on corporate behaviors (Dunphy et al., 2003; Nidumolu & Prahalad, 2009; Visser, 2010). The micro-models have different starting points that consider attitude towards practicing sustainability (Dunphy et al., 2003) or compliance (Ainsbury & Grayson, 2014). Some models consider subfields of sustainability, such as corporate social responsibility or environmental management.

Since the landscape of sustainability strength models (Table 5) is convoluted, complex, and rich, there was a need to harmonize and condense the research. Landrum (2017) identified weak and strong sustainability as normative theories to distinguish sustainable and non-sustainable action. Her work expands weak sustainability and strong sustainability into very weak sustainability and very strong sustainability. Weak sustainability is defined as a compromising position, striving to maintain the status quo in development and growth, but also appeasing environmental and social concerns. It is safe and espouses some positive externality. Very weak sustainability is unfettered growth, ignorant of any environmental or social harms. Both perspectives of weak and very weak sustainability originate in neo-classical (Solow, 1974) theories from the field of economic growth. Strong sustainability has a "thermodynamic" trait, stating the level of sustainability can rise if none of the pillars decline at the expense of another's expansion. Very strong sustainability is a preservation at all costs idea, with a sense of no action being made unless there is proof the world will be better off. Strong and very strong sustainability are tied to ecological economics, suggesting growth is reliant to environmental factors. There are also theoretical debates about whether truly strong sustainability is even possible or existent in corporate sustainability. Landrum (2017) developed a stages of sustainability model to understand not only the models themselves, but corporate sustainability behavior as well.

Sustainability Spectrum		**Very Weak**	**Weak**	**Intermediate**				**Strong**	**Very Strong**
Proposed Model	**Non-Participatory**	**Compliance**	**Business Centered-**				**Integrative**	**Restorative**	**Regenerative**
Carlisle & Falukner (2004)		Awareness	Promote Awareness	Initial Implementation	Mainstreaming				
Zadek (2004)	Defensive	Compliance		Managerial		Strategic	Civil		
Mirvis & Googins (2006)	elementary		Engaged	Innovative		Integrated	Transforming		
Maon, Lindgreen, & Swaon (2010)	Dismissing	Self-Protecting & Compliance Seeking							
Visser(2010)	Defensive	Charitable	Promotional			Strategic		Systemic	
Dunphy, Griffiths, & Benn (2003)	Rejection and Non responsiveness	Compliance	Efficiency			Strategic Proactivity	Sustaining Organization		
Van Merrewijk& Werre(2003)	Pre-CS	Compliance		Profit	Caring	Synergistic		Holistic	
Sengeet al. (2008)	Non-compliance	Compliance		Beyond Compliance		Integrated Strategy	Purpose/ Mission		
Nidumoluet al.(2009)		Compliance as Opportunity	Value Chain Efficiencies	Sustainable Products and Services	New Business Models	Next Practice Platforms			
Yanarella (2009)		Environmentalism, Smart Growth, Greening	Weak Sustainability			Transitional		Strong	Existentially Realized Sustain-ability
Baumgartner (2009)	Introverted		Extroverted			onservative	Visionary Conventional	Visionary Systemic	

Baumgartner and Ebner (2010)		Beginning	Elementary				Satisfying	Sophisticated	
Roome (2011)		Very Weak	Weak					Strong	Very Strong
Ashkanasy (2011)	Reactive	Defensive		Accommodative			Proactive		
Aggerholm & Trapp (2014)		First Generation		Second Generation			Third Generation		
Ainsbury& Grayson (2014)	Denier	Complier		Risk Mitigator		pportunity Maximizer	Champion/ Leader		
Dyllick and Muff (2015)		Economic Concerns	Refined Shareholder Value		Triple Bottom Line				Outside-in Thinking
Costanza (1991)			Weak			Strong			Very Strong
Pearce & Turner(1990), Pearce(1993)		Cornucopian		Accommodating				Communalism	Deep Ecology
Meyerson, G. & Rydin, Y. (1996)		Quasi-Cornucopian		Social Choice				New Eco-nomics	Limits to Growth
Hopwood, Mellor, & O'Brien (2005)		Status Quo		Reform					Transformation
Hitchcock & Willard (2008)		Compliance (Avoid Liabilities)	Eco Efficiencies (save money)	Green Marketing (Reposition Products and Services)	Sustainability (Gain Competitive Advantage)			Restorative (invest in human/ natural capital)	

Table 5 - Selected examples of Strong Sustainability Stages

The categorization is assigned to generalized understandings of strengths and dimensions (author's elaboration).

The Stages of Sustainability model assesses organizations in their pursuit of sustainability (Landrum, 2017). The framework is inspired by efforts from Pearce (1993) that noted sustainability can be viewed along a spectrum with four positions representing differing degrees of sustainability: very weak sustainability, weak sustainability, strong sustainability, and very strong sustainability. Landrum (2018) adapted this work to develop stages of corporate sustainability through the integration of 22 existing micro- and macro-economic sustainable developmental models. The previous models were assessed through card-sort methodology to understand common qualities. The results were aggregated into a table of five stages based on five dimensions (Table 6). Stages 1 and 2 represent weak sustainability, in which organizations demonstrate shortcomings in the application of corporate sustainability. Stage 3 represents intermediate sustainability, where organizations realize the need to work in systems outside of their own constructs, but they still primarily work within a system only they employ. Stages 4 and 5 represent strong sustainability. Dimensions are based on an organization's interpretation of sustainability, relationship to the natural world, economic growth, and sustainability concerns. The Stages of Sustainability model has been applied to determine corporate sustainability strength of organizations based on language used in GRI reports (Landrum and Ohsowski, 2018). The novelty of empirically measuring

corporate sustainability strength makes the Stages of Sustainability model a valuable research tool.

The application of the Stages of Sustainability model is advantageous in two ways. First, the model aggregates and harmonizes previous discussions of sustainability strength. Second, an existing methodology for quantitative measurement has been developed for the model (Landrum & Ohsowski, 2017, 2018).

	Stage 1 - Compliance	**Stages 2 - Business-Centered**	**Stages 3 - Systemic**	**Stage 4 - Regenerative**	**Stage 5 - Coevolutionary**
Sustainability spectrum position	Very Weak	Weak	Intermediate	Strong	Very strong
Orientation	Economic science-oriented, Business-oriented			Ecological science-oriented, Ecology-oriented	
Understanding of sustainability	Meet compliance requirements Internal firm-centric view	"Do less bad" Internal firm-centric view	"Do more good" Begins to look externally in defining sustainability. 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 Anthropocentric Resource exploitation	To be managed and controlled; anthropocentric Resource exploitation Eco-efficiency	To be managed and controlled; anthropocentric Resource exploitation Eco-efficiency	Part of the natural world Operate within planetary boundaries Manage and repair	Self-management as part of the natural world 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 Steady-state growth	No growth in production or consumption Qualitative improvements
Sustainability concerns	Externally enforced or regulated activities Defensive actions regarding economic, environmental, or social concerns	"Business case" is the motivation and measure of success Adoption and internal enforcement of activities Incremental improvements to business-as-usual May focus on one or more realms of sustainability (economic, environmental, social)	Integrates three realms of sustainability (economic, environmental, social) Work with other human systems	Integrates three realms of sustainability (economic, environmental, social) Work with human and non-human systems	Work in balance with other systems Contribute to flourishing of other systems

Table 6 - The Stages of Sustainability model.

Compliance, Stage 1 (very weak sustainability) businesses adopt sustainability practices only when required by regulating bodies. Organizations in this stage resist sustainability because there is a risk of disrupting business activities. Business-Centered, Stage 2 (weak sustainability) is marked by proactive adoption of sustainability for reasons that provide benefits to the business, such as profit, image management, or competitive advantage. Businesses "do less bad" in pursuit of growth and continue exploitation of resources. Systemic, Stage 3 (intermediate or mixed sustainability) businesses acknowledge external factors that result in integration of sustainability and work with other organizations to change systems. Business acknowledges capital management as important for the stakeholders beyond its internal operations, but still seeks to increase growth as a measure of success. Regenerative, Stage 4 (strong sustainability) businesses no longer focus on growth as the measure of success and adopt practices and policies that repair and restore natural capitals, particularly those critical to a company's value chain. Organizations acknowledge carrying capacities, ecological limits, and planetary boundaries. Coevolutionary, Stage 5 (very strong sustainability) businesses adopt sustainable practices to form symbiotic relationships with natural resources. Business success focuses on mutually enhancing natural capitals.

As evidenced in the literature review, the current state of corporate sustainability is rooted in weak sustainability that reinforces the application of sustainability for profit maximization, unfettered growth, excessive use of capital, capital substitution, and fails to account for the contradictions of market-based ideals and socio-ecological wellbeing. Therefore, businesses reproduce the illusion that unlimited economic growth can be sought while managing the natural environment and creating equitable societies (Ergene et al., 2021). As a result, businesses align

with weak, Business-Centered, sustainability (Davies, 2013; Ihlen & Roper, 2011; Isil & Hernke, 2017; Landrum & Ohsowski, 2018; Niehoff, 2022).

2.1.3 PROCESS

The Process component, the second piece of the Input-Process-Output model, determines the factors applied to the input to produce the output. It addresses how organizational inputs influence business behavior. In the context of corporate sustainability, this research examines two process lines: organizational culture and sustainability schemes. The first line investigates how organizational culture affects output, while the second line investigates the schemes influencing organizations as they pursue sustainability. Both lines seek to understand how these processes impact strong sustainability.

Each line of research will be described as its own Process. The first line of research examines sustainability schemes will be presented by first clarifying what the schemes are, the academic debates applying to them, and their relevance to corporate sustainability. The second line of research examines organizational culture and will be presented by the definition of this concept, debates regarding the concept and sustainability, the competing values framework as a measure of organizational culture.

2.1.3.1 PROCESS 1: Sustainability Schemes

Sustainability schemes are any program that provides tools, information, capacity building, facilitation of practice, policy for monitoring, audits, verification, assurances, certifications, and benchmarks in relation to sustainability objectives (King & Lenox, 2000). Various sources, such as academia, governments, civil society organizations, or industry groups, develop sustainability schemes. Research has observed widespread adoption of sustainability schemes by businesses as it is estimated that hundreds of voluntary schemes are currently applied across the world (Drolet et al., 2021; McCalla-Leacy et al., 2022; UNFSS, 2022; van der Lugt & van de Wijs, 2020). Accountancy studies have found widespread adoption of sustainability schemes by the world's largest companies. Surveys of businesses

comprising the S&P 500, N100, and G250 found that over 80% of the companies file sustainability reports as directed by various sustainability schemes (Governance & Accountability Institute, 2020; McCalla-Leacy et al., 2022).

Some of the most commonly adopted schemes in business include The Global Reporting Initiative, the Sustainability Accounting and Standards Board, the Carbon Disclosure Project, the Task Force on Climate-Related Financial Disclosures, Integrated Reporting, the United Nations' Sustainable Development Goals, and the International Organization for Standardization (Governance & Accountability Institute, 2020; McCalla-Leacy et al., 2022). Businesses face a convoluted landscape when determining which schemes to utilize. The wide prevalence of sustainability schemes influences sustainability outcomes of organizations (Farooq et al., 2021).

Numerous studies have established the significant influence sustainability schemes have on corporate sustainability behavior. Sustainability schemes initialize sustainability policy and practice in business (OECD, 2022), or at least motivate organizations to consider sustainability (Pedersen, 2018). Implementation of sustainability schemes increases business valuations and evokes at least minimal consideration towards sustainability causes (Gray, 2006; Ioannou & Serafeim, 2017; Sanchez-Planelles et al., 2022). Business leaders even expect sustainability schemes to instruct corporate sustainability behaviors (Barnes et al., 2022). Application of sustainability schemes impact management decisions in the pursuit of competitive advantages (Molenaar, 2022; Molenaar & Kessler, 2017). Schemes guide the development of policy and practice in organizations to fit regulations and company norms (Beunza & Ferraro, 2019). Longitudinal studies have shown the influence of the schemes changes over time, where sustainability policy transitions from compliance-based to pro-active changes (Slager et al., 2012).

Examples of the influence specific sustainability schemes have on businesses are ample. Organizations that adapt schemes like the Taskforce for Climate-related Financial Disclosures (TCFD) are prompted to develop sustainability management practices and strategies. Sustainability schemes like the GRI

Standards, <IR> Guidelines, and ISO 26000 and 14000 standards direct organizations in consistent sustainability reporting (Hamad et al., 2020; Rossi & Luque-Vílchez, 2020). Corporate structure, or restructuring, is addressed by schemes like the UN Global Compact or Integrated Thinking Principles (Haugh & Talwar, 2010; Kılıç & Kuzey, 2018; Vigneau et al., 2015). Doughnut Economics for Business and The Ellen MacArthur's directives for a circular economy galvanize sustainability in business models (Hausdorf & Timm, 2022; Morcillo-Bellido et al., 2022).

The negative influence of sustainability schemes has been examined. Businesses purposely or inadvertently integrate schemes that permit manipulation of means and ends, positioning corporations as sustainable when in reality they are not (Hayes et al., 2018; Lee et al., 2017; Lyon & Maxwell, 2011; Wijen, 2014). Schemes are often created in conjunction with business interests, thus sustainability issues are neglected to minimize risk or appease business for market share (Giamporcaro & Gond, 2016). Some schemes accredit organizations through bare minimums standards and allow for misinterpretations of sustainability (Whiteman et al., 2013). Other schemes allow organizations to look for short-term wins rather than long term changes (Bansal et al., 2018). It's even possible well-intentioned schemes will inadvertently guide organizations to mask or ignore sustainability issues (Khan et al., 2007).

Specific critiques of sustainability schemes further highlight their sustainability shortcomings. The Ellen MacArthur Foundation's circular economy has been critiqued for its continued focus on profit (Lemille, 2018) and lack of consideration for socio-cultural implications (Schröder, 2018). Likewise, Natural Capitalism stresses its adoption will be so profitable that market forces will ensure a sustainability transition (Slesser, 2001). The Carbon Disclosure Project alleges businesses compliant with its reporting guidelines will gain competitive advantage, improve reputation, and get ahead of regulatory changes (Carbon Disclosure Project, 2021). The OECD Guidelines omit key themes, such as climate change and biodiversity while promoting business growth (Mulder & Scheltema, 2018). The

compilation of these critiques rationalizes the position that sustainability schemes influence sustainability for competitive advantage rather than for preservation of natural capital.

Critiques of sustainability schemes often address key themes of efficacy, imitation, inadequacy, and definitions. The efficacy of the schemes' ability to direct businesses towards sustainability is often questioned because they are too complex (Wijen, 2014), too vague (Sethi & Schepers, 2014), or too restrictive (Rasche, 2010). Some schemes are bound to internal use, which limits a business' sustainability approach to its own self-interest (Bepari & Mollik, 2016). Other schemes are restricted to creating value for shareholders, rather than preservation of natural capital (Arvidsson, 2023; Flower, 2015). Siew (2015) shows that lack of standardization across schemes in both criteria and methods leads to benchmarking failures.

Sustainability schemes have been critiqued for being imitative. Existing ideas have persisted for decades, resulting in recirculated, reprocessed, and repackaged approaches to sustainability. The introduction of the Circular Economy and Natural Capitalism were presented as original ideas but were in fact imitative of existing concepts (Desrochers, 2003; Ekins et al., 2020; Kirchherr et al., 2017). The Global Reporting Initiative Standards and AccountAbility1000 Requirements have been revised multiple times over 25 years without major changes (Bepari & Mollik, 2016). This imitation results in schemes that compete for market share by appealing to business desires rather than addressing sustainability challenges (Reinecke et al., 2012).

Inadequacy is another critique of sustainability schemes. The Global Reporting Initiative Standards "…do not set allocations, goals, targets, thresholds, or any other benchmarks for good or bad performance" (Global Reporting Initiative, 2022, section 1.1). This claim confirms, "voluntary reporting and previously existing standards are not fit for purpose or they leave a lot of room for interpretation" (Reuters Events, 2022, p.4). Furthermore, schemes often align with corporate interests (growth, profit, etc.), rather than social or environmental interests, resulting

in a lack of adequate change (Hickel, 2019; Knight & Smith, 2008; Thatcher, 2014; Tourais & Videira, 2016). Many schemes have been derided as greenwashing tools (Camilleri, 2019; Coen et al., 2022; Wedari et al., 2021).

Finally, the schemes are critiqued for being poorly defined. While defining corporate sustainability is contestable (Montiel & Delgado-Ceballos, 2014), sustainability schemes often fail to address any definitions. The Carbon Disclosure Project's assessment asks businesses to identify sustainable activities but does not clarify the definition of sustainability or the specific actions in question. The Taskforce for Climate-related Financial Disclosures' Recommendations defines sustainability as the ability of businesses, rather than natural resources, to be "long-lasting or permanent based on social, governance, economic, and environmental capitals" (TCFD, 2017, p.64). Many schemes vaguely refer to the 17 UN Sustainable Development Goals as a definition of sustainability, but the official documentation of the UN SDGs does not formally define sustainability. Therefore, practitioners need to be savvy enough to know the UN SDGs have roots in the Brundtland definition of sustainability. When schemes fail to define sustainability, the misaligned idea that sustainability is a continuation of internal economic success is perpetuated (Biely et al., 2018), resulting in schemes becoming tools for public relations rather than sustainability (Kramer et al., 2019).

Since sustainability schemes are highly influential in directing businesses towards sustainability, we presume sustainability schemes are a contributing factor to the current state of businesses that are embedded in weak sustainability. We test this by assessing the schemes' sustainability strengths within the Stages of Sustainability model.

2.1.3.1.1 Assessing Sustainability Strength

As established in the previous section, the application of sustainability varies as applied in different artifacts. There is a differentiation of weak and strong sustainability based on numerous dimensions that relate to how natural capitals are prioritized. Since there are different levels of sustainability, there is a need to assess

sustainability so judgements can be made about the factors contributing to corporate sustainability.

Measurement and assessment of sustainable development has proven difficult. Modern sustainability has been developed to assess the impact of business on environmental, social, and economic systems. However, the actual act of measuring sustainability is challenging because the definition of sustainability is vague and complex (Montiel & Delgado-Ceballos, 2014). There is not a “one-size-fits-all” solution that exists to measure sustainability across different regions, eras, and industries. Every artifact to be measured for its sustainability strength differs in units of analysis, and different philosophies toward sustainability.

Differentiation between weak sustainability and strong sustainability is a common way to establish end points of an assessment scale. However, Davies (2013) appraisal of weak and strong systems suggests the differing philosophies and aspects of their real-world approach make a middle ground necessary for understanding sustainability success. A middle ground, as explained by Steurer et al (2005) does exist. A term they deem as balanced sustainability is a harmonizing concept between weak and strong sustainability. It advocates acceptance of a partial substitutability of (non-critical) natural capital and concedes physical limits to economic growth where crucial forms of natural capital (world climate, rain forest, or human labor) are seriously affected. Bjørn and Røpke (2018) also have suggested a middle ground exists. They identify the two extremes of sustainability as weak sustainability and very strong sustainability. The middle ground suggested is referred to strong sustainability, but matches the balanced sustainability definition of Steurer et al, meaning allowance for capital substitutions in an organization is accepted as long as no harm is done to other critical capital.

Studies that develop ways to measure corporate sustainability strength have proposed various dimensions and scales. Some approaches propose investigations of business psyches to develop a measurement of corporate sustainability, like risk aversion, focus, and beliefs (Yanarella et al., 2009) Roome (2011) similarly identified intangible corporate sustainability dimensions (frames) of business, as mentality,

and values. Alternatively, more tangible approaches to defining corporate sustainability strength have been proposed. Research from van Marrewijk (2003) proposed studying weak and strong levels of corporate sustainability based on an organization's ambition of profits, compliance with stakeholders, and social orientation. Barbier and Burgess (2017) recommended weak and strong corporate sustainability assessment based on metrics related to human, environmental, social, and economic capitals.

Dimensions developed to assess corporate sustainability strength have been developed. Common examples include innovation degree (Young & Tilley, 2006), rationale (Foerstl et al., 2014), focus (Shevchenko et al., 2016), timing (Ihlen & Roper, 2011), reporting (Calabrese et al., 2017; Chatterji et al., 2016), and risk aversion (Yanarella et al., 2009). Less common dimensions, but still relevant to the discussion include political orientation (Yanarella et al., 2009), degree of organizational concern (just the business, or supply chains and the industry) (Roome, 2011a), acceptable degree of harm, appeals to stakeholders (Hart, 1997), pro-action (Russell & McIntosh, 2011), synergy with nature (Quinn & Dalton, 2009), and technocentrism (Gladwin, Kennelly, et al., 1995), ambition (Van Marrewijk's, 2003). These examples scratch the surface of the 100's of dimensions discussed by academia in trying to establish what to measure in strong sustainability.

Additionally, there are various scales or spectrums to assess sustainability strength dimensions, beyond just weak and strong. Assessments of sustainability strength apply a variety of labels, including weak, very weak, strong, very strong, intermediate, neutral, sustainability 1.0, sustainability 2.0, sustainability 3.0, unsustainability, false sustainability, or true sustainability (Dyllick & Rost, 2017; Landrum, 2018). Some discussions refer to the paradox as greening vs sustainability (Hart, 1997; Yanarella et al., 2009). Other terms like compliance-driven, caring, holistic, pre-corporate, technocentric, ecocentric, and cornucopian exist try to focus the descriptors of the dimensions (Gladwin, Kennelly, et al., 1995; O'Riordan, 1989; Quinn & Dalton, 2009). The plethora of choices to measure and judge corporate sustainability strength presents researchers with divergent options.

The frameworks created to quantitatively measure sustainability strength is a task that has diverged into many paths. In an attempt to describe how a measurement framework should be created, (Muñoz & Gladek, 2017) noted multiple steps in developing the to the One Planet Approach (OPA). They stressed frameworks will have different definitions of sustainability (weak vs strong) operating spaces (states vs flow of work) local and global concerns, overlapping concerns, and constant evolution to understand what is being measured. A popular and influential approach that exemplifies this is the triple bottom line (Elkington, 1994). It stresses that businesses should create their own quantitative indicators to determine if social, environmental, and economic sustainability is achieved. Other frameworks quantitatively assess items like absorptive capacity, regeneration rate, and carrying capacity to disseminate the constitution of critically endangered capital (Barbier & Burgess, 2017). Their units of measure are aspects of planetary and social sciences.

Several different methods of measurement have been applied to measure corporate sustainability strength. Singh et al (2009) amassed and analyzed a list of over forty different ontological indicators for use in measuring corporate sustainability. A compendium of surveys, interview questions, questionnaires, accounting systems, and diagnostics are available to study sustainability levels. These many considerations add to the convoluted and unclear landscape of trying to measure sustainability strength.

Numerous epistemic challenges in measuring sustainability strength exist since there is a wide array of contexts. The quality of information released by a corporation is not always reliable. Hummel and Schlick (2016) found organizations releasing high quality, transparent, audited and analyzed sustainability disclosures are in fact higher scoring in sustainability measures. Likewise, organizations with poor sustainability disclosures, often touting high levels of sustainability, are more likely to be based in a reality of low sustainability. Businesses that produce Environmental-Social-Governance reports pick and choose a reporting based on the ability to mask unsustainable activity or improve image (Chatterji et al., 2016). Additionally, the reporting from organizations might be produced by different

departments, each with its own understanding and sense making of sustainability. In an effort to create a Sustainability Performance Measurement System Searcy (2012) stated corporate attempts to initiate sustainability are complex. Each case must be examined to fit the nature of the organizations. Many valid frameworks for measurement have been submitted, legitimately claiming to be right for their particular situation. Sala et al (2015) proposed three levels of creating a measurement system include ontological assessments considering the planetary boundaries and philosophies of sustainability science, methodological assessments for modeling the framework into the real world, and epistemological assessments for acknowledging cultural or political context.

Some studies have tried to generalize previous work on measuring sustainability strength. Goyal et al (2013) and Searcy (2012) studies sustainability frameworks which were developed to assess corporate sustainability strength. Both investigations similarly concluded measurement units (financial and non-financial measurement units or a combination of them), aspects of sustainability methodology focusing on (e.g. environmental, social, econ-efficiency or triple-bottom-line approach), and the nature of the proposed indexes (single-based or composite-based indexes) were common. Büyüközkan and Karabulut (2018) performed a literature review of 128 sustainability assessment methods published over a 10-year period. They found drawing a line between the three sustainability pillars is undesirable because there are interdependencies and overlapping impacts that require a holistic approach. Agostinho et al (2019) analyzed numerous frameworks to evaluate if they were multi-dimensional or singular and found a mix. Most frameworks are presented without reasoning for emphasis on one way or the other.

2.1.3.1.2 Assessing Sustainability with Triple Bottom Line models

The swathe of considerations for practitioners and academics to apply when measuring sustainability leads to confusion. Since there is no universal solution for sustainability, it's uncommon for a framework to take hold. One exception is the Triple Bottom Line. From the mid-1990s until present day, the Triple Bottom Line has

served as a standard for academia and businesses to assess sustainability. However, the Triple Bottom Line is not appropriate for measuring strong sustainability in this research. The following rationale applies.

The Triple Bottom Line encourages organizations to evaluate relationships with environmental, social, and economic capitals within their own contexts, to ensure future prosperity (Elkington, 1994). This business framework mirrors the Brundtland definition, stating that organizations should manage and assess the environmental, economic, and social capitals to encourage innovation and competitiveness that preserves future prosperity. The creator of the concept (Elkington, 1994) stresses the holistic management of environmental, social, and economic resources is to be met unconditionally. The framework's main idea is that organizations will achieve sustainability because what gets measured gets managed.

The Triple Bottom Line has become a dominant influence in many aspects of corporate sustainability. Corporate sustainability frameworks, initiatives, research, and reporting systems used in business are heavily influenced by the Triple Bottom Line. For example, The Two Tiered Sustainability Equilibrium (Lozano, 2008), the Framework for Strategic Sustainable Development (Broman and Robèrt, 2017), The United Nations Millennium Development Goals, the UN Sustainable Development Goals, the Global Reporting Initiative (GRI,) The Corporate Register, and Environmental-Social-Governance (ESG) are based on Triple Bottom Line principles. Business, academics, and civil society organizations embrace the Triple Bottom Line because application is simple. It's a guideline for interpreting results to derive future strategy (Pope et al., 2004)

Elkington (2018) recalled his Triple Bottom Line framework because of conceptual and practical abuse. He re-professed the framework's original intention was to bring about non-negotiable, holistic change to business practices. His realization was backed, as research noted shortcomings of corporate sustainability research and practice (Wunder, 2019; Young and Tilley, 2006). Examples are abundant. Businesses and researchers piecemeal the economic, social, and

environmental pillars as substitutes rather than treat them as complements (Bansal & Gao, 2006; Hahn et al., 2010; Muff & Dyllick, 2014). Social issues often succumb to preference of economic and environmental concerns (Isil and Hernke, 2017; Norman and MacDonald, 2004). Long-term planning and pro-action are ideals often ignored in practice. Corporate sustainability is often an action of regulations, compliance, or marketing trends (Hart & Milstein, 2003; Sridhar & Jones, 2013) External stakeholders are overlooked as inward considerations dominate corporate sustainability adoption (Foerstl, Azadegan, Leppelt, and Hartmann, 2014; Shevchenko, Lévesque, and Pagell, 2016). Sustainability reporting that applies the triple bottom line is often manipulated, corrupting the premise that good measurements lead to good management (Calabrese et al., 2017; Chatterji et al., 2016; Dorfleitner et al., 2015; Lin et al., 2017; Milne and Gray, 2013). Corporate sustainability issues are pursued more through happenstance than with a clear strategy because the triple bottom line fails to define sustainability (Isil & Hernke, 2017). Businesses actively engage in corporate sustainability, however a lack of strategy results in businesses disassociating the intentions of sustainability from the actual sustainability practiced. These strategic deficiencies in the triple bottom line allow for “conceptual manipulation” of corporate sustainability, resulting in failure to achieve sustainability goals (Bjørn et al., 2017; Bromley & Powell, 2012; Elkington, 2018; Hahn et al., 2010).

Measuring sustainability strength by faithfulness to the triple bottom line is debatable, as the concept is often cited as an example of weak sustainability (Isil & Hernke, 2017; Milne & Gray, 2013; Norman & MacDonald, 2004). The concept permits substitutions of man-made capital for natural capital, and is unclear in definitions of sustainability (Passerini, 2019). Researchers suspect this is the case because the Triple Bottom Line over simplifies sustainability for the sake of businesses (Boje, 2016).

Nikolaou et al (2018) presented a Triple Bottom Line approach to assessing corporate sustainability strength through a system of measurable indicators provided in financial reports. They argued previous frameworks are flawed in various ways

like standardization, reliability, Triple Bottom Line abuse, and enforcement. To develop a new framework, strong and weak sustainability were defined and then indices fitting the definitions were chosen. Weights and ratings were applied to the indices by the research team, and outside academic consulting, to develop a multi-variate scoring system for sustainability. Their composite is Triple Bottom Line based and based without concession of principles of strong sustainability. A critique of the framework developed by Nikolaou et al (2018) was presented from Bjørn and Røpke (2018). They argue the choices for thresholds and environmental indicators are flawed because they can only indicate weak and strong sustainability on a binary level, but not on a scale. Additionally, the eco-indicators used by Nikolaou et al (2018) are also accused of being proponents of weak sustainability. A published reply from Nikolaou and Tsalis (2019) states the “framework’s main goal is to suggest a way to evaluate corporate strong sustainability by utilizing information in a practical way through certified sources.” The approach from Bjørn and Røpke (2018) is from an ecological viewpoint, whereas the approach from Nikolaou et al (2019) has basis for appealing to a corporate understanding.

Environmental, social, and governance (ESG) reports are the most produced reports that apply the Triple Bottom Line framework. Businesses and business consultants commonly produce these reports to indicate how responsible an organization is towards environmental and social issues. The reports generate scores based on various indicators (e.g. emissions, environmental innovation, resource use, community, human rights, product responsibility, workforce, CSR strategy, management, and shareholders) to evaluate performance (Thompson Reuters, 2019). Data is reported from companies, rather than audits from outside firms.

Hundreds of agencies publish ESG reports on behalf of businesses. There are differences in sources, methodology, reputation, size, and age. ESG scores provided by Thomson Reuters (run by a subsidiary called ASSET4) are, according to the publishing firm, transparently designed and objectively evaluate a company's relative ESG performance, commitment, and effectiveness. Their database includes

over 4000 firms dating back to 2002. Bloomberg ESG scores starts in 2005 and contains over 1000 U.S. firms. ESG scores from MCSI (formerly KLD) present the largest database used in empirical paper (Halbritter and Dorfleitner, 2015). The firm observes more than 4000 firms dating back to 1990. The industry of ESG ratings has experienced growth, mergers, acquisitions, and takeovers. Escrig-Olmedo et al (2019) mapped the relationships between ESG firms over time, resulting in a complicated web of events muddling ESG research.

The initial purpose of producing ESG reports was to appease investors by limiting corporate liability and producing a statement that the business is doing more than nothing to deal with sustainability issues. Attempts have been made to determine if ESG scores are useful for more than investing. Rajesh & Rajendran (2019) studied Environmental, Social, and Governance (ESG) scores from Thompson Reuters to create sustainability scores for organizations. They found there is no consideration of strong or weak sustainability. The scores are more likely to be binary, “yes” or “no” indicators of sustainability. Their model uses weights of scores and calculations by industry, but the validity of ESG scores is highly debatable.

An attempt to rate the rating agencies based on their fostering of sustainability was made by Escrig-Olmedo et al (2019). They used five criteria of transparency (clear definition and instructed use,) commensurability (measuring the same item in different ways,) trade-offs (weighing of scores across ratings,) overall scoring (the usefulness of each system’s score at a glance,) and stakeholders’ preferences (usefulness). Sustainability principles of triple bottom line approach, long term perspective, stakeholder usefulness, and life-cycle assessment were compared to the ratings criteria. No entity was found to satisfy the requirements for indicating sustainability.

The scores frequently focus on short-term results rather than long-term plans. ESG scores lack regulation and standardization across borders. Audits are seldom. ESG as an indicator of sustainability, let alone weak or strong sustainability is not a good choice.

2.1.3.2 PROCESS 2: Organizational Culture

How organizations achieve their goals is investigated within the science of organizational behavior. This large body of work includes, but is not limited to, the sciences of organizational culture, leadership, business modeling, change strategy, human resources, innovation, and knowledge management. Elements of psychology, economics, sociology, and governance are all combined to contribute to understandings of organizational behavior. Broad definitions portray the entire interlocking body of work.

Organizational culture is considered the foundational field of study in organizational behavior (O'Reilly, 1989). Various definitions portray the academic and practical pursuits of the field. A foremost scholar in the field, Edgar Schein (1990), states "Organizational culture is the pattern of shared basic assumptions—invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration." Lundy and Cowling (1996) state it is, "the way we do things around here." Smircich (1983) espouses organizational culture as contrasting something an organization "has" versus something an organization "is." For example, an organization that has tendencies to take risks, work urgently, value strong leadership or other behaviors are observation to be studied in organizational culture.

Understanding organizational culture is a basis for change in organizations. Frameworks and theories in organizational culture promote investigations to assess organizational dimensions. These can explain values, behaviors, and goals. Researchers and practitioners of organizational culture combine concepts of members (workers, managers, leaders), levels (groups, teams, corporations, sectors, nations, families), and influencing behaviors (values, beliefs, and assumptions). An assessment of an organization's culture will evaluate values, beliefs, and goals to determine harmony or conflicts affecting performance. Once the assessment is made, organizational culture can be changed.

Organizational culture has been studied throughout the history of business studies, but the discipline did not become serious until the management studies craze of the 1980s (Ostroff et al., 2012). Hofstede's (1980) contribution to organizational culture set a standard for how studies in the field are conducted. The purpose of Hofstede's study was to predict culture for outsiders navigating the business course of an unfamiliar nation. His research uncovered specific behavioral traits that trend in business, categorized those traits as dimensions, and measured them across different nations. Members of an organization can provide data about the way things are in the organization, and the researcher applies the answers to theorized dimensions.

While Hofstede's study assessed four dimensions in business, other studies expanded his methods to develop hundreds of more frameworks, models, and theories. No one opinion dictates what is studied in organizational culture. Overlap in dimensions from a myriad of organizational culture models highlights differences in values and attitudes across various fields. Management scholars focus on work-related values (Hofstede, 1984; Schein, 1990). Cohorts in sociology compare values of attitudes in the context of political and social issues (Inglehart et al., 1998) while psychologists explore individual self-perception values (Singelis, 1994). Studies beyond artifacts and values test models of context (Hall, 1976), strength (Barney, 1986), and influencing forces (Quinn and Rohrbaugh, 1981). Organizational culture is a multi-level, multi-variate system.

The levels of analysis for organizational culture studies are as varied as the dimensions. Schein's (1990) seminal work identifies artifacts, espoused values, and underlying assumptions as corporate culture. He defines artifacts as easily identified characteristics of an organization through direct observation. Dress, décor, branding, colors, language, architecture, and organization structure are some artifacts commonly observed. Espoused values are the stated goals, beliefs, and strategies typically purveyed by a founding member or executive. These values may be observable through mission statements, mantras, or any form of communication. Underlying assumptions are unstated beliefs and values, manifested unconsciously

throughout an organization. The examples of these are abstract in nature, like desire to do good, fear of time, commitment to profit, or risk aversion. Studying culture from this approach is a clear and repeatable method for qualifying culture.

The intention for studying organizational culture is to understand how organizations perform (Deal & Kennedy, 2000; Sackmann, 2011; Schein, 2017; Schneider et al., 2013; Wilkins & Ouchi, 1983). Studies relating organizational culture to performance are abundant because the numerous dimensions and levels to study relate to organizational results (Sackmann, 2011). Such studies are challenging, as the levels of culture (e.g., myths, stories, values, behavior,) units of analysis (e.g., nations, sectors, entire organizations, divisions, teams,) and dimensions (e.g., employee experience, onboarding, leadership actions, forces, structure) must be determined. Numerous studies have shown links between organizational culture and subjects including sustainability (Baumgartner, 2009; Linnenluecke & Griffiths, 2010), financial performance (Gregory, 1983; Hartnell et al., 2011), manufacturing (Nahm et al., 2004; Naor et al., 2008), operational performance (Hartnell et al., 2011), leadership (Ogbonna and Harris, 2000), customer satisfaction (Gillespie et al., 2008), goal achievement (Xenikou and Simosi, 2006), reporting (Chan et al., 2004; Glisson et al., 2008), knowledge management (Lee et al., 2016), gender in business (Bajdo and Dickson, 2001), employee attitudes (Hartnell et al., 2011), or offerings of mental health care (Glisson and Green, 2005). If there is a performance to be measured, its relationship with organizational culture is opportune for investigation.

2.1.3.2.1 Assessing Organizational Culture and the Competing Values Framework

Organizational culture is studied what can be seen and what can be inferred from what is not seen (Taras et al., 2009). Observable behaviors, symbols, artifacts, stories, myths, language, ceremonies, and patterns are the main artifacts of organizational culture. The unseen or context of these artifacts are the interesting aspect to study in organizational culture. They include studies of abstract ideas, like assumptions, and internal feelings. A qualitative approach is overwhelmingly the

norm in organizational culture, resulting in a “native-view paradigm” (Gregory, 1983; Schneider et al., 2013) based on ethnographical tools like interviews, questionnaires, and surveys. This method allows researchers to identify the unique indicators of culture in natural settings.

There are numerous frameworks available to study an organization’s culture. Not one captures every relevant aspect of the science (Reader et al., 2020). Jung et al., (2009) suggest two considerations for choosing an organizational culture model. First, the purpose of assessment determines if the model is used for formative, summative, or diagnostic reasons. A goal for this research is to determine if organizational culture is a determinate of CS strength. Thus, a model that measures organizational culture to identify how it affects an output like CS strength satisfies this research goal. Second, the application of assessment must be considered. In alignment with the research goals, a model that measures paradoxical dimensions can guide practitioners and researchers to direct organizations in strategically managing organizational behavior for achieving strong sustainability.

The Competing Values Framework meets the diagnostic and application criteria sought in this study to satisfy the research goals; it has persisted in studies of organizational culture for nearly 40 years and is frequently studied by researchers (Hartnell et al., 2011; Ostroff et al., 2012; Schneider et al., 2013) as a factor in organizational achievement (Barley & Kunda, 1992; Gregory et al., 2009; Schneider et al., 2013). Cameron and Quinn (2011) proclaim the Competing Values Framework serves as a model to diagnose an organization’s culture as it progresses through life cycles and copes with the pressures of goal achievement. Once a diagnosis of culture is made, the model can be applied to manage changes needed in an organization. Paradox frameworks like the Competing Values Framework are critical to understanding sustainability because of continuous efforts to meet multiple, divergent demands (Smith & Lewis, 2011). The Competing Values Framework can be applied to manage organizational culture, in turn shifting organizational behavior towards policy and practice that invokes strong sustainability and therefore, green innovation.

Quinn and Rohrbaugh (1983) created the Competing Values Framework by considering criteria from Campbell's (1977) research on success factors for organizations, and asking 30 experts to appraise the elements for relevance. The result was a quadrant (Figure 8) assigning four typologies to an organization based on the two dimensions of focus and structure. Both dimensions assess means and ends (e.g., shareholders, stakeholders, customers, suppliers, capitals, profits, processes, regulations, the environment, or technologies). The focus dimension assesses organizational means and ends as orientated internally (e.g., to maintain, self-preservation, and stabilization) or externally (e.g., outward positioning, exploratory, and outreaching). The structure dimension assesses the same means and ends as either flexible (e.g., free to innovate, or able to change) or controlled (e.g., bureaucratic, risk averse, or bound by tradition). When the dimensions are combined with each other, four typologies emerge, called Adhocracy, Clan, Hierarchy, and Market.

Several techniques have been used in determining an organization’s taxonomy in the Competing Values Framework. A study of banks from Gambi et al (2013) used a questionnaire to collect information concerning Total Quality Management (TQM) and Competing Values Framework type, linking the type of organizational culture likely to embed itself into holistic management. The tool was able to study both issues in accordance with variables identified in literature review. Shang et al (2016) used questionnaires for a meta-study, triangulating the Competing Values Framework model to Hofstede (1980) national culture model to asses Chinese businesses. McDermott and Stock (1999) and Woodman and Pasmore (1991) used Competing Values Framework to show propensity for organizations to adopt new technology. Through questionnaires, they found organizational attitudes, speed of adoption, successful implementation, and feedback learning were all influenced by Competing Values Framework type.

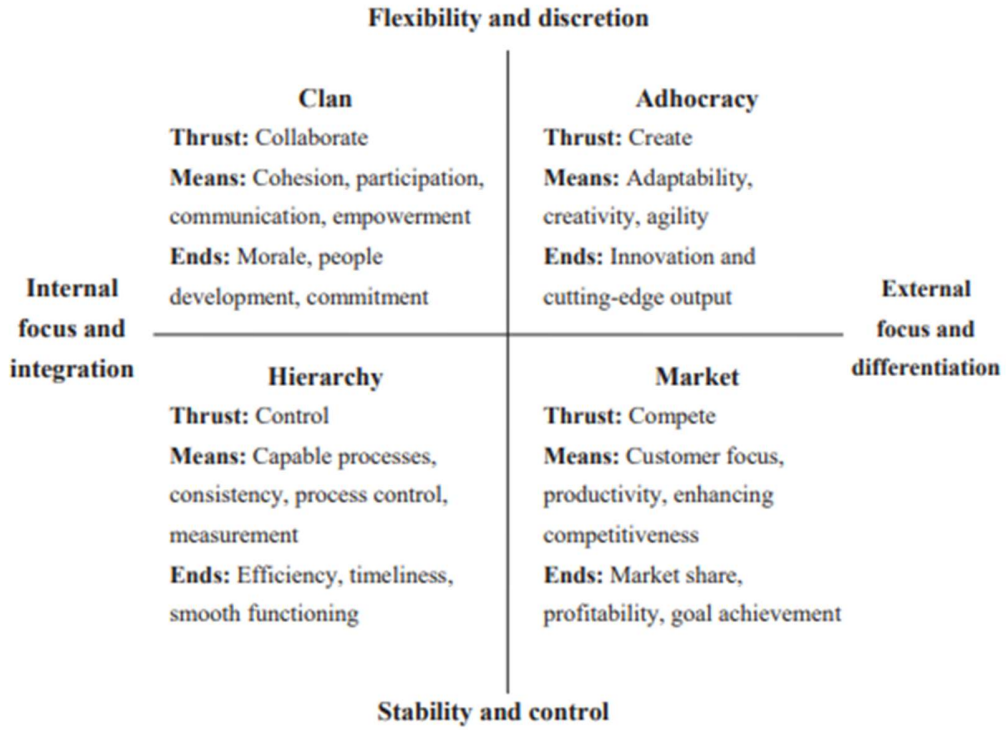

Figure 8 - The Competing Values Framework

The prominent Competing Values Framework model (Figure 8) has persisted in studies of organizational culture for over 40 years. It is frequently used by researchers (Hartnell et al., 2011; Ostroff et al., 2012; Schneider et al., 2013). Cameron (2006) professes measurements directly or indirectly applying the Competing Values Framework have been administered over 100,000 times (according to the official website of the tool, https://www.ocai-online.com). The model has also crossed international borders and applied in various languages (Choi et al., 2010; Kwan and Walker, 2004; Lamond, 2003). Numerous empirical studies have validated the instrument (Howard, 1998; Kalliath et al., 1999). The Competing Values Framework has repeatedly predicted organizations performance based on their positioning on the quadrant (Barley and Kunda, 1992; Schneider et al., 2013).

The clan culture type is internally oriented and is reinforced by a flexible organizational structure. Cameron (2006) explains clan organizations succeed because they nurture individuals. The organization's trust and commitment to employees enables open communication and empowerment. Attachment, affiliation,

membership, and support are valued (Cameron & Quinn, 2011). Associated traits include teamwork, participation, employee involvement, and open communication. These means are expected to promulgate the outcomes of employee morale, satisfaction, and commitment (Smart and Hamm, 1993).

The adhocracy culture type is externally oriented and is supported by a flexible organizational structure. Adhocracy thrives in change to promote new opportunities. Principled and innovative concepts invoke risk and creativity. Growth, stimulation, variety, autonomy, and attention to detail are valued. Risk taking, creativity, and adaptability are typical adhocracy behaviors. Innovative output is the result (Denison and Spreitzer, 1991).

The market culture type is externally oriented and is reinforced by an organizational structure steeped in control mechanisms. Competitiveness and aggressiveness, resulting in productivity and shareholder appeasement stems from market cultures (Cameron, 2006). Clear goals and incentives inspire members. Communication, competence, and achievement are valued. Careful planning, task focus, centralized decision making, goal setting are important behaviors. Winning, goals, improving product quality, and augmenting sector dominance is important (Cameron, 2006).

The hierarchy culture type is internally oriented and is supported by an organizational structure driven by control mechanisms (Figure 9). Control, stability, and predictability result in an organization’s competence. Hierarchy cultures clearly define expectations and roles for members. Precise communication, routinization, formalization, and consistency are valued (Cameron and Quinn, 2011). Conformity and predictability are usual behaviors. Efficiency, timeliness, and smooth functioning are the result (Denison and Spreitzer, 1991).

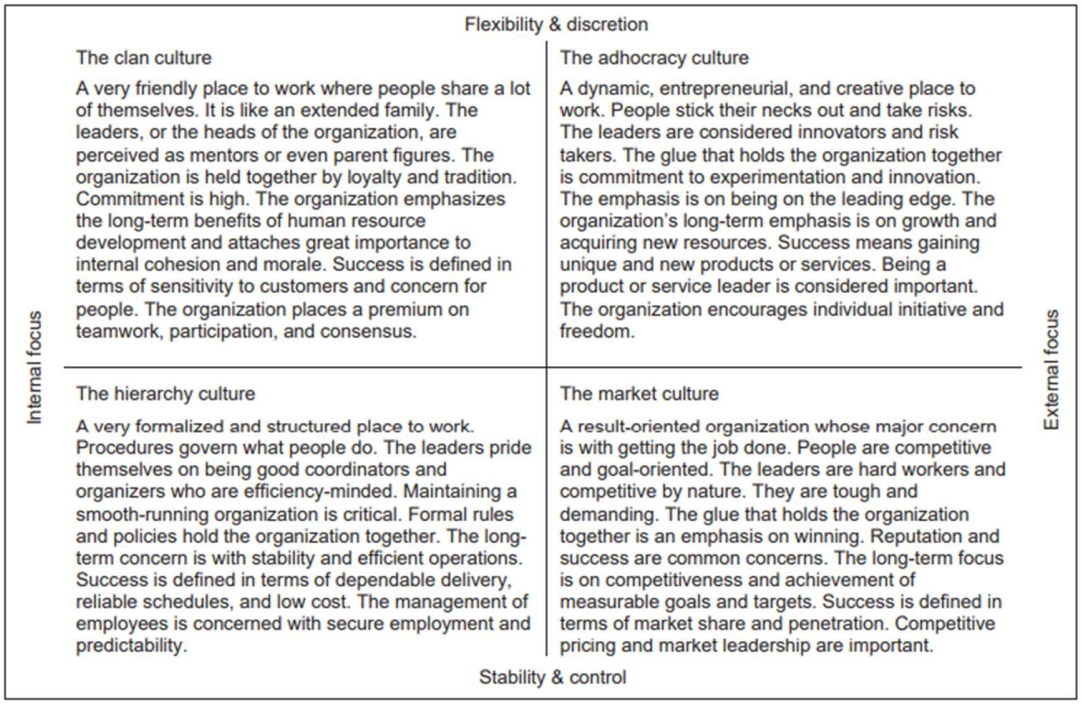

Figure 9 - Descriptions of typical organizations in the Competing Values Framework (Cameron, 2006).

Cameron (2006) notes most organizations develop a dominant Competing Values Framework culture type but all four types are ingrained in an organization. An overly strong cultural type may cause an organization to be dysfunctional. A primary reason for failure when organizations process change is often cited as incompatible organizational culture.

The task of corporate practices of sustainable development relies on management of organizational culture. Sustainability is a modern part of business models requiring transformation in communication, processes, products, and mentality (Cameron, 2006; Jarnagin and Slocum, 2007).

2.1.3.2.2 Sustainability Performance and Organizational Culture

It is established that organizational culture is related to an organization's performance. Since organizations are observed to be increasingly embarking on sustainability policy and practice, but the intended sustainability results are not manifesting, it is natural to ask how organizational culture affects corporate

sustainability. Once this relationship is known, culture can become part of the equation to strong sustainability in organizations. In practice, the link between organizational culture and sustainability will enhance self-awareness of organizations partaking in sustainability. One of the four Competing Values Framework types may prove to be incompatible with achieving strong sustainability or one may be proficient at directing organizations towards weak sustainability. A controlling organization may need to shift culture to accept some risk to achieve true sustainability. Managers, workers, suppliers, customers, and sector competitors could be examined for further cultural compatibility. Acknowledgement of a culture type could inspire shareholders to choose executives and boards willing to shift culture to achieve sustainability results.

Calls to study organizational culture and sustainability have persisted. Roome (2011) recognized strong sustainability as a new, vital, piece of business modeling, creating a need to revisit past and current business research. Current research has created an environment where sustainability is adapted, but not in good faith. He suggests business thinking must expand from narrow focuses of agency success and partake in models focusing on outward needs. He concedes progress of sustainability has not matched the challenge, but organizational culture is the starting point to solve this problem. Dominant theories within the old paradigm of weak sustainability are seen as offering little contribution to the future, whereas strong sustainability emphasizes the development of new considerations for radical rather than incremental change. Hansen and Schaltegger (2016) showed sustainability-oriented approaches are driven by normative policies and theoretical viewpoints, which leads to their recommendation to study culture to change this approach. Landrum & Ohsowski (2018) found organizations overwhelmingly profess weak sustainability worldviews and suggest investigating culture to remedy this. A study of leadership and sustainability suggests an organization's culture has to be understood as a first step to fully embrace sustainability (Wolfgramm et al., 2015).

Studies of organizational culture's relationship with sustainability do exist. Melo (2012) studied humanistic organizational culture to determine a relation to

sustainability ideals. Baumgartner (2009) directly applied Schein's (1990) organizational culture model to corporations developing sustainable processes, finding if outward actions do not match the organization's espoused values, sustainability pursuits fail. Attig and Cleary (2015) found management practices attempting sustainability must be supported by an organizational culture nourishing of transparency, meaningful communication, and authenticity. Glavas and Mish (2015) reviewed organizations taking a triple bottom line approach sustainability, and found organizational culture is a contingency for organizations to embark on this process of sustainability, and once the first step of sustainability is taken, culture may change as values are redefined. Kucharska and Kowalczyk (2019) explored the relationship between Hofstede's cultural dimensions and sustainability, discovering organizations with cultures oriented towards long-term plans were more likely to practice sustainability and be concerned about sustainability reputation.

Efforts to study organizational culture's relationship with sustainability via the Competing Values Framework exist. A case study of a university's organizational culture from Adams et al (2018) used the Competing Values Framework model to understand the promotion of sustainability in universities. The propensity for structure and focus was examined to show sustainable initiatives from the University of Worcester were partially related to externally focused values. Two studies from Baumgartner and Ebner (2010) and Linnenluecke and Griffiths (2010) attempted to theoretically align each Competing Values Framework type with the environmental, social, and economic pillars of sustainability. Dyck et al (2019) applied data from surveys to align the Competing Values Framework types most likely to tackle environmental, social, economic, approaches. A study in Brazil by Soares et al (2018) assessed GRI reports and organizational culture corresponding to Competing Values Framework. They found the quality of indicators and quality of report was related to a balance of multiple Competing Values Framework types in an organization. Naranjo-Valencia et al. (2011) applied Quinn and Rohrbaugh's (1983) Competing Values Framework, finding organizational culture type is a determinant of sustainable innovation strategy. They showed adhocracy cultures foster innovation strategies and hierarchical cultures promote imitation cultures.

2.2 Theory and Research framework summary

This chapter has presented the Input-Process-Output model applied to be applied in this dissertation. The input, sustainability, will be subjected to two different processes. The first will be organizational culture, and the second will be sustainability schemes. The output will result in the advancement of knowledge in strong sustainability theory. This knowledge will be applied to support hypotheses of two lines of research, affirm the thesis, and contribute to satisfying the research problems, questions, and goals. The next step is to apply methodology that supports the theory and research framework.

3 Chapter 3: Methodology

To confer the thesis that Application of strong sustainability theory in research will create new understandings in corporate sustainability theory ~~behaviors~~, two lines of research are conducted. Each line tests hypotheses regarding factors of organizational behavior and resultant sustainability strength. These two research lines will exemplify that assessment of sustainability strength is important to expanding the epistemology of sustainability. Both research lines tackle problems and answer questions that have received ample calls in sustainability literature but have yet to be adequately breached.

The first line of investigation investigates the possible relationship between sustainability strength and organizational culture. Specifically, organizations will be assessed for their positioning on the Stages of Sustainability model and their orientations on the Competing Values Framework model. The research problem of the first line of investigation is that Organizational Culture's relationship to sustainability strength is unknown. Specifically, the relationship between a business' Competing Values Framework Profile and Sustainability strength stage on the Stages of Sustainability model has yet to be linked. To solve this problem, it is asked, “how does an organization's culture relate to its sustainability strength? To answer this, the typologies of the Competing Values Framework will be investigated for a relationship to the Stages of Sustainability model.

The goals of the first line of investigation are academic and practical. Academia has theorized the links between organizational culture via the competing values framework and sustainability. Previous research has only surmised what the relationships might be and have not addressed sustainability strength. A goal of this research is to provide the first quantitative evidence linking the two concepts. These findings will be applicable to future work. The practical goals are to prescribe change in organizations based on the diagnosis of an organization’s culture. Managers will be able to shift culture to achieve strong sustainability.

The second line of investigation will explore the sustainability strength of sustainability schemes applied by organizations. Specifically, the principles,

frameworks, standards, and guidelines organizations use to employ sustainability policy and practice will be assessed for their positioning on the Stages of Sustainability model. This line of investigation will answer the question of whether the fundamental directives used to guide organizations in sustainability promote weak or strong sustainability.

The research problem of the second line of investigation is that the sustainability strength of the principles, frameworks, guidelines, and standards that direct businesses towards businesses has yet to be addressed. The sustainability strength of sustainability schemes is unknown. This line of investigation will answer the question, “do current corporate sustainability schemes promote strong sustainability?” Specifically, “what is the strength of sustainability schemes on the Stages of Sustainability model” will be answered.

The goals of the second line of investigation are academic and practical. Academia can apply the findings to future studies of sustainability principles, frameworks, guidelines, and standards. Practically, the creators of the schemes will have directive for improvement.

3.1 Methodology Technique: Content Analysis

To choose a research technique the type of data needed, the time available for data collection, the ability to analyze the data, and the practicality must be considered (Allen et al., 2008). For this research, quantitative data is desired to fulfill the novelty of empirically exploring the relationship between organizational culture and strong sustainability theory. Quantitative data can be analyzed through the application of statistics, which in this research was done with the aid of a computer. The practicality of the research technique must be able to examine hundreds of organizations, and at the time of the research an unobtrusive technique that does not require human contact during a global pandemic was also warranted. The research methodology of content analysis was chosen, as it satisfies the considerations for this research.

Krippendorff (1989) defines content analysis as a research technique for making replicable and valid inferences from data to their context. Shapiro and Markoff (1997) provide a more specific definition for business and organizational study use, stating content analysis is any methodological measurement applied to text for social science purposes. The use of content analysis assumes analyzed communication allows a researcher to understand a communicators cognitive schema, implied by word use unveiling underlying themes and underlying concepts (Huff, 1990). The technique quantifies what messages communicate. Using it is an attempt to understand data from a specific context in view of a communicator's attributions to the data. Researchers of business and management find content analysis useful for assessment of many important but difficult-to-study concepts (Duriau et al., 2007)

Content analysis allows researchers to construct contexts for inquiry, applicable to myriads of scientific concepts. Words, symbols, body language, and messages are understood to reveal properties beyond the direct language of the communication. With content analysis, there is a circumvention of immediately observable qualities of a message to observe true meanings (Krippendorff, 1980) Content analysis typically examines information without the communicators prior knowledge of future analysis. Barley et al (1988) state, "texts can be treated as traces of an author's world view at a point in time and immune to retrospective construction."

The technique is important to social sciences. Data can be examined from any form of communication, from financial reports, newspapers, films, and comics to more niche studies like postage stamps, wear and tear on books, music, or designs on ancient pottery. Content analysis is typically a quantitative practice, but it can be used for qualitative study as well (Gephart, 1993). A successful content analysis will ensure all units of analysis receive objective observation. Message traits of placement, communicators, time, or location in the extracted data can be controlled. Krippendorff (1989) promotes the use of content analysis for any communitive media

occurring in sufficient numbers and providing meaningful messages to specific receivers.

3.1.1 Content Analysis Advantages and Limitations

Content Analysis presents numerous benefits to research. Content analysis is applicable to a broad range of organizational phenomena. Management researches will suggest the foremost benefit is a replicable methodology applicable to individuals (CEO's, a worker, a manager) collective groups (a team, a company, a collective), written artifacts (reports, marketing, letters), and symbols, to learn intent, attitude, or thoughts (Huff, 1990; Kabanoff, 1996).

Another strength of content analysis is the ability to conduct inductive and deductive research (Roberts, 1989). On the surface, text, symbols, or communications can be collected and applied to several statistics. Digging deeper into a second level, a researcher can apply the text to concepts not directly conveyed by the next. For example, researchers could study ancient currency to understand circulations and denominations, while additional observations of the symbols and styles can provide additional data.

A third advantage is the ability to longitudinal research designs. Annual reports, or corporate responsibility communications over time periods can serve as consistent, unchanging sources of data. Even sources of data internal and external (audits) to an organization can serve as a data source for a time based study (Jauch et al., 1980; Kabanoff, 1996). An artifact studied through content analysis today will yield the same results if replicated in future. If the content analysis methodology is changed, a technique can be developed to apply to all artifacts over various eras.

Specific advantages of applying content analysis to disclosure reports have been noted. Luminaries of content analysis have concluded these documents are reliable because they avoid retroactive sensemaking (Barr et al., 1992; Gephart, 1993; Osborne et al., 2001). A published report will not be (legally) re-edited to fit a narrative. Non-intrusiveness is another benefit Bowman (1984) observes when applying content analysis to annual reports. Reports can be collected without the

need to approach an organization. The unobtrusive nature of using published sources relieves researcher demand bias. There is no need for surveys, interviews, or any other direct request for data from an organization. Nonintrusive methods also escape biased responses from an organization (Morris, 1994; Woodrum, 1984). Individuals are not able to explain annual reports with extra meanings.

Content analysis is considered a safe methodology. An error or misstep found in coding can be fixed easily, and assuming computers are used to perform text analysis, tests can be re-run with minimal effort (Tallerico, 1991; Woodrum, 1984). Correct use of content analysis allows for categorization of criteria for reliability and validity checks. This self-checking database of data is replicable and shareable (Lissack, 1998; Woodrum, 1984).

Other research techniques can be used in conjunction with content analysis for the purpose of triangulation (Jauch et al., 1980; Kabanoff, 1996; Smith et al., 1992). Costs of research can be managed efficiently in both money, time, and people needed (Woodrum, 1984). Finally, data storage, dictionaries, and word counts managed on computers allow for scalability. Ambitious projects are enhanced through automation of tasks, functions, and collaboration (Gephart, 1991; Tallerico, 1991).

There are limitations to content analysis. For a study to be considered statistically significant, many research units may be required, resulting in an unsurmountable workload. This can be alleviated by wisely choosing a sample and automation tools. Replication may also be a limiting factor; thus a proper study must use fixed and observable data sources. Another shortfall is processes of communication or ambiguities will not be easily justified in a content analysis study (Krippendorff, 1989).

A common criticism of content analysis applied to data resources like annual reports and industry publications, is the language style is intentionally biased for specific audiences. A sustainability report may use sustainability language to appease stakeholders, while a financial report will use language more appealing to investors (Huff, 1990; Morris, 1994). Suggested offsets to this issue are multiple

sources of data (Kabanoff, 1996), richer databases (Gephart, 1991), triangulation, linguistic indicators, causal mapping, or ethnomethodology.

Additional warnings for using disclosure reports exist. A firm specially prepared for public relations management may use language to obfuscate truths or image boosting (Barr et al., 1992). Researchers must give heed to communication strategies for the sake of image and brand management (Arndt and Bigelow, 2000). An appropriate study using content analysis will conduct reliability testing (Duriau et al., 2007).

3.1.2 Content Analysis in Sustainability and CSR

Precedence for applying content analysis to sustainability exists. A contrasting of social performance and languages from businesses was performed by Gephart (1991). He was able to show the language in social reports regarding industrial accidents was vague, nonchalant, and inconsistent with actions. A study from Ullmann (1985) showed U.S. corporations inconsistently report social disclosures, social performance, and economic performance through subsequent documents and across sectors. A meta-study from Duriau et al (2007) used content analysis to study the use of content analysis over time in organizational journals. Common organizational behavior and business themes were studied using content analysis. Some themes relevant to sustainability include strategic management, impression management, corporate reputation, content of mission statements, content of corporate disclosures, managerial cognition, and corporate values. Supply chain sustainability was studied by Ahi and Searcy (2015) using content analysis to determine the tendencies of peer-reviewed articles applying concepts to environmental issuers more frequently than social ones. An investigation of supply chain sustainability from Garcia-Torres et al (2019) (of the University of Deusto) in the form of a content analysis literature review clarified a muddle landscape of concepts in governance, collaboration and tracking and tracing. Another study from Garcia-Torres et al (2017) used content analysis to determine the validity of sustainability scorecards in the fast fashion industry.

Despite distinct differences existing between sustainability and CSR, they typically face the same issues of data collection from reports. There are numerous studies of Corporate Social Responsibly (CSR) applying content analysis. Voluntary codes of conduct and CSR were studied by Bondy et al (2008), showing adherence to an industry or social code means little towards actual CSR. Analytic information collected by Campopiano and De Massis (2015) from CSR reports of Italian firms, found differences between family and non-family businesses. Dobbs and van Staden (2016) applied content analysis on disbursed surveys to contrast what corporations report against what stakeholders want to know. A study of 237 European companies was conducted by Lock and Seele (2016) to validate CSR reports. Key findings indicate mediocre reporting practices and a need for standardization. GRI reports from NGO's around the world were put under the microscope by Manetti and Toccafondi (2014) exposing an unwanted distancing between stakeholders and NGOs. Vurro and Perrini (2011) performed a longitudinal study showing CSR disclosure does not correlate to improved CSR performance.

3.1.3 Content Analysis: How-to

Krippendorff (1980) established the steps for performing content analysis (Table 7). These steps were applied to both lines of this research investigation.

Step of Content Analysis	**Brief Explanation**
Design	What is wanted to be known, data sources, and data analysis construct
Unitizing	Determine the units of analysis
Sampling	Define the sample
Coding	Describe and classify units
Inferring	Apply to theory
Validation	Compare and contrast to previous findings

Table 7 - Content Analysis Steps (Krippendorf, 1980)

Design – The context of what is wished to be known and what is to be gained from previously unobservable data is defined. There are three requirements for this. What is wanted to be known is decreed, the source of data is justified, and a construct is decreed to formalize the knowledge gained. Additionally, observational conditions are acknowledged.

For this research, knowledge of how two different factors of organizational culture and sustainability schemes are related to sustainability strength. The data examined in each research line were written artifacts. In the first research line, sustainability reports and annual reports from businesses were studied. In the second research line, sustainability schemes were studied. The content of these artifacts was analyzed through the terminology they employ to observe sustainability strength and organizational culture. Empirical measures of each were yielded.

Unitizing – The units of analysis are defined with respect to the available data. Sampling units and recording units are established.

Sampling units in the first research line were annual reports and GRI reports, for which organizational culture orientation and sustainability strength were established as recording units. Sampling units in the second research line were sustainability schemes, and sustainability strength was established as the recording unit.

Sampling - Population and samples are defined. The process of undoing statistical biases (e.g., focus on too similar or too dominant sources) is established. Additionally, sampling hierarchy is clear (e.g., publication format, sections, paragraphs, words) so the data units have consistency across samples.

The population of the first research line was businesses that had submitted a GRI report, and the sample is further established in the section describing the sample for the research line's methodology. Words in GRI reports and annual reports were the data units. The population of the second research line was sustainability schemes, and the sample is further established in the section describing the research line's methodology.

Coding – The units are described and classified. This is done in relation to the analytic constructs from the design process.

The words that served as units were described and classified. Words related to the five stages in the Stages of Sustainability model were applied to measure

sustainability strength. Words related to the four Competing Value Framework typologies were applied to measure organizational culture.

Inferring – The prior knowledge of concepts is applied to the coded data. Relations to the phenomena are sought. Coded unit frequency, style, tendencies, or any other attribute can be applied to existing literature, hypothesis, laws, or theories.

Sustainability strength theory, and organizational culture theory were applied in the content analysis.

Validation – The intention of the research is discussed with relation to the inferences. Academic and practical applications may be presented. New, opposing, or agreeable findings are compared to past research.

3.2 1st line of Investigation – Organizational Culture and Corporate Sustainability Strength

As established, an organization's values, culture, drivers, and competencies may be tested against sustainability results. Some organizational cultures are better than others for change. Different organizational culture models predict organizational achievement. Findings from Hartnell et al (2011) clearly show a link between Competing Value Framework types and organizational effectiveness. Organizational culture has been established as an important variable found in quantitative studies of organizational culture. Linnenluecke and Griffiths' (2010) investigation of organizational culture and sustainability reveals changes on the surface level (e.g., sustainability reporting, integration sustainability employee pathos, espousing sustainability) fords a path for changes of an organizations underlying assumptions.

3.2.1 Hypothesis development

Our literature review finds that organizations are ingrained in business-as-usual, weak sustainability. Literature also asserts that businesses manage OC to achieve sustainability goals. This research seeks to uncover links between OC and sustainability strength. Therefore, hypothesis development is based on previous findings between the Competing Values Framework types and general ideas on

sustainability. Precedential studies that investigated relationships between CS and OC via the Competing Values Framework exist but are uncommon. The limited selection of prior literature does not address sustainability strength or empirically measure sustainability.

3.2.1.1 Adhocracy hypothesis

Generally, Adhocracy organizations have been surmised to be the typology most related to CS integration. Inductive studies have predicted Adhocracy type organizations welcome CS easily because an external focus and flexible structure promotes a business environment needed for change (Baumgartner & Ebner, 2010; Linnenluecke & Griffiths, 2010). A high level of flexibility found in Adhocracy organizations is presumed to be important in initiating changes of policy and practice necessary for an organization partaking in CS. An externally oriented focus on organizational means and ends was speculated to be important for appeasing the stakeholders affected by sustainability.

Literature has similarly found a positive relationship between Adhocracy culture and innovation (Naranjo-Valencia et al., 2011). Businesses oriented towards the Adhocracy type were found to have managers and workers more competent than the other types for integrating CS, because CS is an innovative action for which organizational flexibility and external focus are necessary (Linnenluecke et al., 2009). The trend of Adhocracy types fostering CS integration is further observed in studies of CS innovation because external foci and flexibility create an amicable business environment for doing so (Globocnik et al., 2020; Matinaro & Liu, 2017).

H1: Organizations with proclivity toward Adhocracy typologies will relate positively to Regenerative (Stage 4) and Coevolutionary (Stage 5) sustainability.

3.2.1.2 Clan hypothesis

Clan organizations have aligned with weak CS in previous studies. Inductive studies have found Clan-leaning organizations are hesitant in integrating CS because of risk aversion (Linnenluecke & Griffiths, 2010). Also, these organizations

are expected to focus on social sustainability because of a strong emphasis on human relations (Baumgartner & Ebner, 2010; Linnenluecke & Griffiths, 2010). These results indicate a weak sustainability approach from Clan organizations.

Empirical studies have associated Clan organizations with weak CS. When the Clan typology prevails in business, employees exhibit limited understanding of sustainability by relating it to only social endeavors, while integration of environmental and economic aspects lagged (Linnenluecke et al., 2009). Analysis of energy companies found Clan organizations focus primarily on economics in CS reporting (Soares et al., 2018). Studies of CS innovation found Clan organizations were hindered in integrating CS because of aversion to external foci (Globocnik et al., 2020; Matinaro & Liu, 2017).

H2: Organizations with proclivity toward Clan typologies will relate positively toward Business-Centered (Stage 2) and Systemic (Stage 3) sustainability.

3.2.1.3 Market hypothesis

Past research links Market types to weak CS. From inductive studies, Market type organizations are expected to direct their focus on environmental sustainability because natural resource management can be a strategy for competitive advantage (Dyck et al., 2019; Linnenluecke & Griffiths, 2010). This narrow focus exemplifies weak CS. In another theoretical study, a Market-like type of CS strategy called extroverted was examined. Extroverted organizations are expected to partake in weak CS efforts like greenwashing and manipulation of resources to gain competitive advantages (Baumgartner & Ebner, 2010).

In empirical studies of OC, orientations towards the Market type were found to impede strong CS integration. Piecemealing of economic, environmental, and social capitals is apparent, as Market oriented companies only integrate environmental CS because a competitive advantage is gained by doing so (Dyck et al., 2019; Linnenluecke et al., 2009). Integration of CS was found to be sluggish in Market organizations, because reluctance to change is a prominent characteristic of this typology (Soares et al., 2018). A similar conclusion was found in studies of CS

innovation, as Market organizations were stunted because of aversion to change (Globocnik et al., 2020; Matinaro & Liu, 2017).

H3: Organizations with proclivity toward Market typologies will positively relate to Compliant (Stage 1) and Business-Centered (Stage 2) sustainability.

3.2.1.4 Hierarchy hypothesis

Studies of Hierarchy organizations have been repeatedly linked to resistance of CS. Inductive studies have concluded the internal focus and strict structure of this type are exceptionally prohibitive to CS. Organizations with an internal focus and high levels of control result in prioritization of economic sustainability through stable, predictable, means and ends (Linnenluecke & Griffiths, 2010). Hierarchy-like organizations are expected to be inflexible and rigid, with a goal of maintaining the status quo (Baumgartner & Ebner, 2010). Hierarchy organizations thrive on predictable and reliable environments. A change like CS threatens trusted means and ends.

Empirical studies of OC show Hierarchy organizations trend towards weak CS. Hierarchy type firms exhibited weak sustainability by focusing primarily on economic profit in CS reporting (Dyck et al., 2019; Soares et al., 2018) When CS innovation was studied, Hierarchy organizations were averse to CS because internal foci and strict structures inhibited changes (Matinaro & Liu, 2017).

H4: Organizations with proclivity toward Hierarchy typologies will positively relate to Compliance (Stage 1) and Business-Centered (Stage 2) sustainability.

3.2.2 Hypothesis Testing

Content analysis was used for measuring corporate sustainability strength and Competing Values Framework type. In this line of investigation, applying content analysis is an attempt to understand data, in the form of reports from organizations, from a specific context.

A specific technique of content analysis is text mining. The use of text mining specifically analyzes texts for data beyond the surface level. In the most basic form, text mining counts pre-determined keywords in a document to determine something interesting about the document. The technique is used for making replicable and valid inferences from data to their context. There are several ways to apply text mining, and in conjunction with computers, additional options enrich the technique. In the methodology of this research, known keywords will be sought in documents to assess organizations' corporate sustainability strength and Competing Values Framework typology.

The practice of text mining has been applied in business studies. Antweiler and Frank (2004) showed specific internet message language boards affect stock prices. Li's (2008) conclusions show disclosure report clarity and quality correlates to how well a company performs. (Loughran & Mcdonald, 2011) showed words in disclosure reports used in a financial context differ from day-to-day context. Media language towards a firm has influence on performance (Tetlock, 2007; Tetlock et al., 2008). Applying content analysis to 10-K's, financial reports, GRI reports, sustainability reports, or any other communication from an organization is a proven way to determine organizational culture through application of the Competing Values Framework for a large sample of organizations.

Hypothesis testing was conducted by developing linear regression models that indicate if a significant relationship between organizational culture and corporate sustainability strength exists, and the strength of that relationship. Sustainability strength data was acquired by text mining applied to General Reporting Initiative (GRI) reports, to position organizations on the Stages of Sustainability model. Likewise, text mining of Annual Reports to shareholders provided data for organizational culture by quantitatively measuring an organization's Competing Values Framework profile. The data was used to empirically test the hypotheses by determining the existence of relationships between organizational culture and corporate sustainability strength.

3.2.3 Sample

The sample of organizations for inclusion in this first line of research were required to meet the following criteria (Table 8):

Sample Criteria	Qualifying Criteria
Location	USA
Language	English
Size	Large (per GRI definition)
Time Frame	2013-2017

Table 8 - Criteria for inclusion in sample

Location. The organization is headquartered in the United States of America. Multi-national organizations are accepted, but the main headquarters must be in the USA.

Language. The GRI and annual reports to shareholders are written in English. While it is possible to develop content analysis for any language, this research only applies to one language.

Size. Organizations must be considered large, based on the GRI size definition of over 250 employees and fifty million euros in annual revenue. The GRI definition of large organizations is applied because the sustainability reports studied come from the GRI database.

Time Frame. The GRI and annual reports were created for fiscal years 2013-2017. This period is recent and includes the latest years for which GRI report data is available. As of 2021, the GRI database stopped updating with reports newer than 2017. This obstacle for researchers has made acquiring reports published after 2017 a cumbersome process.

These criteria were established *a priori* to increase the likelihood of a qualifying GRI organization having also produced an annual report to shareholders. After filtering out unqualified documents from the GRI database, 667 GRI reports from 233 organizations were available to examine in this study. Collection of annual

reports for the respective organizations yielded 580 reports from 198 organizations. Complete annual observations resulted in 562 reports from 197 organizations. Since some organizations had submitted a GRI report for all 5 sample years, and some had only submitted one, only the most recent report was used for each organization to eliminate bias.

3.2.3.1 GRI Reports: Background and History

The sample examines GRI reports from organizations. The GRI is currently the leading reporting framework corporate sustainability reporting in the world Currently (Brown et al., 2009; Ernst & Young, 2016; Levy et al., 2010; Marimon et al., 2010; McCalla-Leacy et al., 2022; Rasche, 2009; Skouloudis et al., 2009; Tsang et al., 2009). The relevance and influence of GRI reporting for research is profound. Organizations rely on it not only for reporting, but also for guidance in establishing sustainability policy and practice. The following is additional background and critiques of the GRI which further explain the reporting standard.

The Global Reporting Initiative (GRI) is an international independent organization. The goal of the organization is to provide a clear framework for reporting of sustainability data between businesses, governments stakeholders, and other organizations. It can be said stakeholders are provided with a basic channel of communication from firms by way of GRI. Global Reporting Initiative reports are based on specific principles. Transparency, comparability, accuracy, completeness, and materiality are basic tenets. GRI reporting provides a way for individual firms are able to espouse efforts in sustainability with some regulatory caveats (Tsalis et al., 2020).

In the 1980s a trend manifested. Companies began adopting codes of ethics and informing stakeholders about non-financial issues. This was not a completely new development in reporting, but the rate companies started offering non-financial reporting accelerated. Non-financial trust between organizations and stakeholders was, for the first time, taken seriously by both parties (del Mar Alonso-Almeida et al., 2014). From the onset, there was no standardization of how to do this. European

firms highlighted environmental issues, while firms in the United States relayed information about philanthropy and social issues (Ioannou & Serafeim, 2017). In the 1990s Increasing concern about environmental problems further accelerated the propensity for disclosure of non-financial reporting.

The need for standardization resulted in the establishment of the GRI in 1997. CERES (Coalition for Environmentally Responsible Economies), the Tellus Institute (specialists in environmental policy), and the United Nations Environment Programme (UNEP) converged to create the first draft of GRI sustainability reporting. A global secretariat for the GRI was established in Amsterdam in 2002, and it remains independent, but with heavy collaboration from UNEP and the UN Global Compact (UNGC). Organizations submitting GRI reports are referred to as partners, and number over 15,000 in March 2020. Revisions to the GRI occur at irregular intervals. The current guidelines called GRI Standards (released in 2018), were proceeded by GRI 4.0, G3.1, G3.0, G2.0 and the initial guidelines.

3.2.3.2 GRI Critiques

Ample literature has tackled the benefits and caveats of GRI reporting. The adoption of GRI reporting correlated with an increase in actions taken to improve environmental performance. The positive sustainability results from organizations applying the GRI framework have been noted. Studies show GRI reporting and disclosure have different effects as Leaders and managers are obliged to pursue social and environmental goals, sustainable development is innovated to improve organizational performance, and organizations establish credibility (Ioannou & Serafeim, 2017). Clarkson et al (2008) found positive correlation between environmental performance and disclosure in GRI reporting among 191 firms. The investigation claims proactive firms use GRI measurements to push environmental strategies while communication to stakeholders. Clarkson et al., (2008) was able to reproduce this finding 51 Australian firms from the mining and manufacturing sectors. Gamerschlag et al (2011) similarly observed more profitable companies are associated with more environmental disclosure. Similarly, entire sectors with more need for regulation (mining, oil, agriculture) provide more GRI data and improved

environmental performance compared to less regulated sectors (Fonseca, 2010; Mio, 2010). Progress in social reporting and performance has also improved, according to studies of the financial sector (Bravo et al., 2012; Kuo et al., 2012). Lozano (2013) was able to find a positive link between sustainability and GRI. Organizations in Europe who had submitted the highest quality reports seem to treat environmental, social, and economic issues with a holistic, high regard. A case study of a Canadian firm from (Herremans & Herschovis, 2006) showed the act of GRI reporting made the organization more aware of achieving sustainability goals. Contrary to these findings, Chiarini (2017) showed GRI reporting is not a driver of sustainable changes in an organization, but rather regulation and compliance are the main factors swaying an organization towards sustainability.

Corporate sustainability and GRI reporting are developed to work hand in hand. GRI reports purposely choose environmental and social indicators for application towards business sustainability's three pillars. The third pillar, economics, is assumed to be part of an organization's financial report. This is a debatable practice, as the definition of economic sustainability refers to relationships outside of the firm as well. A bevy of research has attempted to determine if GRI reports indicate sustainability. Several researchers have found GRI reports skew towards only reporting positive impacts of a firm's sustainability efforts, but negative impacts are easily hidden from the scores (Archel et al., 2011; Boiral, 2013; Criado-Jiménez et al., 2008). Calabrese et al (2017) found sustainability reporting is unreliable. Organizations putting more carbon into the atmosphere (an unwanted outcome) were able to still improve their scores by including non-important indicators and obfuscating results. Results from developing nations study indicates GRI reporting is also subject to control variables, like language, profitability, size and audit potential (Orazalin and Mahmood, 2019; Piñeiro-Chousa et al., 2019; Uddin et al., 2018).

Goel and Cragg (2005) declared the GRI is too general and forgiving of sustainability short comings. Efforts to make GRI guidelines malleable per industry have been made in the pursuit of full corporate disclosure of economic,

environmental and social impacts of organizations (GRI, 2018), however there are an abundance of unnecessary indicators confusing companies. Asif et al (2013) reasoned GRI is a good starting point for addressing sustainability, but it does not capture all the relevant sustainability development indicators. It instigates sustainability initiatives, making sustainable measurement more systematic and allowing for the comparison of different companies across sectors.

There is an aspect of GRI reporting, as with all reporting, in data manipulation. There are clear examples of published reports used to fulfill compliance and regulatory practice rather than provide honest disclosure (Cho and Patten, 2007; Deegan et al., 2006; Duchon and Drake, 2009; Milne et al., 2006). GRI reporting places a responsibility on firms to report negative impacts or trends, however Hahn and Lülfs (2014) identified several ways organizations legitimize negative impacts to convey a positive message. Impression management, a corporation's act of relaying favorable behavior to the public, is an unwanted but common driver of GRI reporting (Fortanier et al., 2011; Hahn and Kühnen, 2013; Moneva et al., 2006). A study from Merkl-Davies and Brennan (2008) outlines corporate narrative strategies commonly used. Obfuscating under-performance in some metrics and overly-emphasizing positive metrics is typical. Metrics providing unexpected findings are stumbled upon to improve organizational outcomes for future use.

The quality of GRI focus is a common criticism. There are arguments suggesting the GRI is inundated with too many ways to report on various indicators. As a result, the quality of some GRI reports is meaningless, or the reports can be manipulative to the reader. Some reports are used simply as public relations fodder, rather than actual analysis and scoring. This happens because GRI, as an organization, is pushing to inject itself into governments and stock exchanges for the financial benefit of its own organization. The evolution of GRI reports (G2, G3, G3.1, G4, G-Standards) has been problematic. The reporting upgrades have hindered comparisons between years, industries, and indicators (Zsóka and Vajkai, 2018). Their research of GRI reports additionally found small and medium enterprises

(SMEs) have difficulty complying with reporting standards, due to a lack of internal resources to complete such a task.

Assurances, or audits of GRI data exists, but is should be noted third party review is not required to submit a report. Manetti and Becatti (2009) acknowledged a sustainability reporting credibility gap. While third party review is not required to submit a GRI report, reports are noted if they have been verified. An audited report providing GRI measurements is labeled with a “+” symbol in the GRI 3.1 database. However, this notation was removed in the GRI G4 reports. In this regard Calabrese et al (2017) found GRI reports are unreliable because organizations cannot be trusted to reliably report sustainability data without a third-party verification. Users (shareholders, stakeholders, customers, investors, employees, governments, communities) of such reports rightfully have concerns about validity of non-financial reporting. Auditors are overwhelmingly not versed in a complete review of GRI reports (Gray, 2000). Evaluating economic, environmental, social and governance indicators, each in qualitative and quantitative terms requires distinct skill sets. Specialists most successfully tackle non-standardized and subjective auditing techniques. Another aspect of assurances in sustainability reporting is a lack of diverse assurance firms. There is a tendency for auditors to sign off GRI reporting without certification or standard measures (Gürtürk and Hahn, 2016). Organizational isomorphism, when organizations mimic each other, has become a symptom of sustainability audit practice.

Credibility of the GRI reports has been questioned (Boiral & Henri, 2017; Dingwerth & Eichinger, 2010). Their two distinct studies found GRI reporting is submitted as transparent but deep dives into auditing the results are murky. Quantitative data is often inappropriately, or incompletely gathered, and qualitative data is submitted with vague results and flattering language. Specificity is generally ignored. Solomon et al (2013) is critical of GRI reporting to convey accuracy, concluding, “frontstage, ritualistic impression management in private reporting is inconsistent with backstage activities within financial institutions where private financial reporting is prioritized.” As a result, the dissemination of myths is common.

Gal (2018) highlighted numerous ways corporations abuse the GRI to mis-communicate stakeholders in the reporting process, citing numerous examples in literature. Reporting has at the same time been a way to discipline corporations but also allowing them to manage perceptions.

Marginalization, abstraction, understatement of facts, rationalization, authorization, and dissemination strategies were found to be in use by firms ranking in the top of sustainability rankings and submitting GRI reports. The decoupling of words from actions is an ethically reprehensible trend common to sustainability reporting. Stakeholders are misdirected and a “legitimacy backlash” is possible (Moneva et al., 2006).

The perception of stakeholders digesting GRI reports has been studied. A study of annual reports from Moseñe et al (2013) shows stakeholders are powerless to deep dive into GRI reporting, thus the question of transparency and legitimacy is posed. O’Dwyer et al (2005) found GRI disclosures in NGO’s were also just as vague and opaque as large, for-profit, corporations. Sometimes reporting is even customized to persuade stakeholders not to audit GRI reporting (Hahn and Kühnen, 2013). Diouf and Boiral (2017) interviewed stakeholders actively engaged in reviewing GRI reports in Canada. The perceptions further exposed the malleability of GRI principles in determining the quality of reports. Stakeholder perceptions generally agree the impression management strategies used by companies to highlight the positive aspects of their sustainability performance and to obfuscate negative outcomes. To further conflate the issue of transparency, Fernandez-Feijoo et al (2014) show transparency is affected by ownership ethos, organization size and global region.

At the university level, GRI reports have applied sustainability dimensions as open education, open research, community outreach, and transparent operations (Ceulemans et al., 2015; Hoover and Harder, 2015). However, Jorge et al (2019) examined universities posting reports to the GRI database, finding favorable reports, but little auditable data to show why the reports are favorable. Similarly, to business, dissemination by universities is a function of geographical region, external

assurance, and leadership. Results from developing nations study indicates GRI reporting is also subject to control variables, like language, profitability, size and audit potential (Orazalin and Mahmood, 2019; Piñeiro-Chousa et al., 2019; Uddin et al., 2018).

Technical and scientific measurements may be problematic in GRI reports. A study from Belkhir et al (2017) examined environmental emissions data submitted in GRI reports from large firms. Their findings show no correlation between GRI-reporting and sustainability improvement. They suggest several improvements for GRI. One obvious fix is for GRI reports to show how an organization's sustainability achievements compare to corporate, industry, and global goals. Another improvement is for organizations to implement "Plan, Do, Check, Act" management systems. They predict this would encourage continual improvement and innovation based on internal and external goals.

Leong and Hazelton (2019) assessed organizational changes to sustainability through the composition of reports. Changes were made when external entities were going to view reports, data could be compared to other organizations, data was available, and external drivers forced a change. Essentially the reports didn't change performance, but the threat of penalties or low rankings did. Chiarini (2017) showed GRI reporting is not a driver of sustainable changes in an organization. Regulation and compliance are the main factors swaying an organization towards sustainability.

An unbalance between economic, social, and environmental indicators hinders reporting from being truly sustainable. Moneva et al (2006) believe GRI guidelines "runs the risk of losing sight of the big picture for sustainability." Corporations in their study can mask environmental negligence by incorporating social scores into reporting, or vice versa. The GRI promotes satisfying rating criteria instead of instilling business with values to change their mentality. Dumay et al (2010) similarly conclude GRI promotes a managerialism rather than evaluation of sustainability.

The communication of actual sustainability is a problem with the GRI according to Isaksson and Steimle (2009). How sustainable a corporation is or how

quickly a corporation approaches sustainability are two huge concerns for stakeholders not actually addressed in the reports. Their industry wide study of cement companies showed GRI reports lack comparisons of main environmental indicators, lack comparisons of other companies or with industry average, lack substantial data on prior reporting periods, lack comparisons of social indicators, and lack information of international standards.

Not all research surrounding the GRI seeks to find flaws. Some investigations seek solutions. A summarization of failings and recommended fixes from Fonseca et al (2014) provides a path for improvement in GRI. Their study of corporations in the mining sector found glaring flaws in reporting, preventing meaningful comparisons and analysis. A number of recommendations for future research to fix these issues stems from an investigation completed by Siew (2015). There is a need for improving the measurability of criteria. The foremost issue is overwhelming amounts of vague qualitative responses. Roca and Searcy (2012) back this point, in their analysis of trusting GRI reports. Interlinking sustainability criteria is another recommendation for improvement. Piecemealing the pillars of sustainability allows for substitutions and promotes business as usual rather than innovation. Similarly, it is suggested GRI reporting needs to push corporations heavily involved with environmental issues to pursue economic and social issues. A final suggestion for the framework is to harmonize more with other frameworks for comparison's sake.

3.2.4 Measuring Organizational Culture

Organizational culture is studied through the visible and invisible data from organizations (Taras et al., 2009). Surface elements include observable behaviors, symbols, artifacts, stories, myths, language, ceremonies, and patterns. The underlying elements indicate true culture. They include communication, assumptions, and internal feelings. Typically, ethnographic tools are used to collect data, like interviews, questionnaires, and surveys. Scott et al's (2003) review of several methods to measure organizational culture confirms questionnaires (e.g., values), direct observations (e.g., artifacts) or interviews (e.g., underlying assumptions) constitute almost every study. However, Reader et al (2020) have

found unobtrusive methods are warranted and valid as methodologies are developed.

Taras et al (2009) observed 121 instruments for measuring culture over 50 years, finding every published model of culture and instruments used are multidimensional. Upon their comprehensive review of management literature, they surmise organizational culture models are presented by dimensions corresponding to artifacts, values, and underlying assumptions. They express the field's growth is spurned by mimicry of Hofstede's (1980) study. Since most organizational culture studies are ethnographic. These obtrusive techniques result in most studies being small-scale, time consuming, labor intensive, and financially dependent (Jung et al., 2009). Use of unobtrusive techniques like content analysis allows for larger sample sizes and eliminates the need for interacting with an organization. The unique indicators of organizational communications in natural settings can be used to infer Competing Values Framework typologies of organizations. It is noted future studies could validate the quantitative data from content analysis through more obtrusive (Yauch & Steudel, 2003) or unobtrusive techniques (Reader et al., 2020).

No single opinion dictates what is studied in organizational culture. Overlap in dimensions from a myriad of organizational culture models highlights differences in values and attitudes across various fields. Management scholars focus on work-related values (Hofstede, 1984; Schein, 1990). Cohorts in sociology compare values of attitudes in the context of political and social issues (Inglehart et al., 1998) while psychologists explore individual self-perception values (Singelis, 1994). Studies beyond artifacts and values test models of context (Hall, 1976), strength (Barney, 1986), and influencing forces (Quinn and Rohrbaugh, 1981). Organizational culture is clearly a multi-level, multi-variate system. Measurement in organizational culture research trends towards inductive studies (Ashkanasy et al., 2011). A qualitative approach is overwhelmingly the chosen approach, resulting in a "native-view paradigm" (Gregory, 1983; Schneider et al., 2013). This method allows researchers to identify the unique indicators of culture in natural settings.

Large-scale studies of more than 20 organizations have been conducted to study organizational culture, but the norm is small-scale and case studies. Larger studies are also more in-tune with observing artifacts in organizations, rather than values. A seminal study from Hofstede (1980) influenced the method many organizational culture studies are conducted. In what is still considered one of the grandest and still ongoing studies of organizational culture, he received questionnaire responses from IBM offices around the world (50 countries, 3 regions) from 1967-1973. He was able to derive dimensions of national organizational culture. GLOBE organizational culture studies compare in scale but are infrequent. The Organizational Culture Assessment Instrument (OCAI) applies Competing Values Framework to surveys to assess organizational culture types. The website professes over 10,000 results. Unfortunately, policy prohibits sharing of company data.

Non-ethnographic studies do exist. Knight (2018) notes innovations in technology along with the propensity for digital information to be shared more frequently has buffed studies of organizational behavior and management. Tonidandel et al (2018) expressed organizational data gives scholars an opportunity to reexamine the science of organizational behavior. A benefit from using data according to Tonidandel et al (2018) is replication. Other social scientists have found replications to be a major weak spot in social sciences. Similarly, traditional methods of interviews, case studies, and surveys may be inadvertently biased in questions asked and answers provided. The use of immutable data is a way to circumvent bias and verify findings. Another problem solved with the use of unobtrusive data collection is sample sizes. Organizational science studies with 20 organizations are typically considered large. With the use of data, thousands of organizations can be studied. Unobtrusive data collection is expected to enhance modeling and measurements of organizations. Both examinations of unobtrusive methods in organizational sciences provide the caveat that new methods require careful verification of data.

Unobtrusive methods have been vetted by Reader et al (2020) to clarify how social sciences are studied without contact from organizations. The team observed

naturally occurring data from social media, institutional reports, company websites, published transcripts, and other artifacts are increasingly important to study organizational culture. These methodologies have primarily matured since 2010. The main benefit of this unobtrusive methodology is a focus on culture that is observable, expressed and entrenched in the organizations. A secondary benefit is the ability to assess many organizations, in this case 197, without intrusive methods that would be unfeasible. The typical methods for measuring culture, such as interviews, participant- observation, and self-reports are limiting because the data they yield is subject to the participant's feelings in that moment (Bhatt et al., 2022). Application of content analysis overcomes this limitation by measuring organizational culture based on purposeful, crafted language.

3.2.4.1 Competing Value Framework measurement

For this research, the Competing Values Framework is the model applied to assess the organizational culture of the sample organizations. Several techniques have been used in determining an organization's type in the Competing Values Framework model. Gambi et al (2013) used a questionnaire to collect information concerning Total Quality Management (TQM) and Competing Values Framework type, linking the type of organizational culture likely to embed itself into holistic management. The tool was able to study both issues in accordance with variables identified in literature review. Shang et al (2016) used questionnaires for a meta-study, triangulating the Competing Values Framework model to Hofstede (1980) national culture model to asses Chinese businesses. McDermott and Stock (1999) and Woodman and Pasmore (1991) used Competing Values Framework to show propensity for organizations to adopt new technology. Through questionnaires, they found organizational attitudes, speed of adoption, successful implementation, and feedback learning were all influenced by Competing Values Framework type. This has practical implication for an organization implementing an innovative practice like sustainability.

Case studies with surveys and interviews have been used to measure Competing Values Framework. Dyck et al (2019) dissected Competing Values

Framework to determine the organizational cultures most likely to tackle environmental, social, economic, and holistic approaches. The reasoning and background to the hypothesis creation seems tenuous, but the approach is interesting. A case study was undertaken from selected businesses. First, a survey found their tendencies on the Competing Values Framework quadrant, representing clan, market, adhocracy, and hierarchy cultures. While this approach has a thin basis, the researchers created an interesting survey to measure the extent of sustainable approaches to the 3BL. As expected, the Competing Values Framework types did not correlate to sustainability pillars. A case study of a university's organizational culture from Adams et al (2018) used a loose Competing Values Framework model to understand the promotion of sustainability in universities. The propensity for structure and focus was examined to show sustainable initiatives from the University of Worcester were partially related to malleable and externally focused values.

Surveys are abundant when Competing Values Framework type is sought. Innovation management is a part of implementing sustainability. Naranjo-Valencia et al. (2011) found organizational culture is a clear determinant of innovation strategy. Through the use of Quinn and Rohrbaugh's (1983) Competing Values Framework, and surveys, they showed adhocracy cultures foster innovation strategies and hierarchical cultures promote imitation cultures. A study in Brazil by Soares et al (2018) assessed GRI reports and organizational culture corresponding to Competing Values Framework. The firms were surveyed to indicate placement among Competing Values Framework types. They found the number of indicators and quality of report was related to a balance of multiple culture types in an organization. This non-dominant, balanced approach to success is espoused by (Linnenluecke and Griffiths, 2010). Dueholm-Müller and Axel-Nielsen (2013) also used content analysis to determine Competing Values Framework placement. They text-mined surveys and project documentation for relevant Competing Values Framework words for analyzing documentation from a case study of a business developing business units.

Wahid El Kelish and Kamal Hassan (2014) used corporate disclosures as artifacts to create and judge dimensions of a self-created organizational culture model. They measure Competing Values Framework dimensions to study correlations with risk levels of firms in the United Arab Emirates. Chatman et al (2014) studied annual reports to determine whether cultural strength of an organization (the ability to adapt/change and get everyone on board with adaption) affects financial performance. Through a combination of text mining annual reports and industry insider analysis, components of organizational culture were found to influence financial performance. Suzuki (2013) used text mining of annual reports to determine organizational culture patterns of business growth. Andreou et al (2020) used text mining of annual reports to determine if an organization's market orientation focus on competition or customers could be predicted. This non-dominant, balanced approach to success is espoused by Linnenluecke and Griffiths (2010) and Dueholm-Müller and Axel-Nielsen (2013) who also used content analysis to determine Competing Values Framework orientation. They text-mined surveys and project documentation for relevant Competing Values Framework words for analyzing documentation from a case study of a business developing business units.

Text mining, a prominent technique in content analysis methodology, measures semantic content of a document. This practice has been used in various management studies. Recently, the text mining approach has been applied in business studies. Antweiler and Frank (2004) showed internet message language boards affect stock prices. Li's (2008) conclusions show disclosure report clarity and quality correlates to how well a company performs. Loughran & Mcdonald (2011) showed words in disclosure reports used in a financial context differ from day-to-day context. Media language towards a firm has influence on performance (Tetlock, 2007; Tetlock et al., 2008). Applying content analysis to 10-K's, financial reports, GRI reports, sustainability reports, or any other communication from an organization is a promising way to determine organizational culture with Competing Values Framework for a large sample of organizations Dueholm Müller and Axel Nielsen (2013). Other researchers have used Fiordelisi and Ricci's (2014) method for research. Busco et al (2020) studied the effect of corporate culture on integrated

reporting. Nguyen et al (2019) studied risk taking at banks using the same keywords from content analysis.

Finally, Fiordelisi and Ricci (2014) performed a large-scale study to determine Competing Values Framework culture in all publicly traded US companies. Text mining the words (Figure 10) related to clan, adhocracy, market, and hierarchy resulted in a study linking CEO turnover to the organizational culture value. They conclude that organizational cultural characteristics of organizations are reflected in written communications. They showed different cultures do correlate to propensity to change CEO. Other researchers have used Fiordelisi and Ricci's (2014) method for research. Busco et al (2020) studied the effect of corporate culture on integrated reporting. Nguyen et al (2019) studied risk taking at banks using the same keywords from content analysis. This research replicates these keywords for the text mining methodology.

Culture type	*Bag of words*
Control (CON)	capab*, collectiv*, commit*, competenc*, conflict*, consens*, control*, coordin*, cultur*, decentr*, employ*, empower*, engag*, expectat*, facilitator*, hir*, interpers*, involv*, life*, long-term*, loyal*, mentor*, monit*, mutual*, norm*, parent*, partic*, procedur*, productiv*, retain*, reten*, skill*, social*,tension*, value*
Compete (COM)	achiev*, acqui*, aggress*, agreem*, attack*, budget*, challeng*, charg*, client*, compet*, customer*, deliver*, direct*, driv*, excellen*, expand*, fast*, goal*, growth*, hard*, invest*, market*, mov*, outsourc*, performanc*, position*, pressur*, profit*, rapid*, reputation, result*, revenue*, satisf*, scan*, succes* signal*, speed*, strong, superior, target*, win*
Collaborate (COL)	boss*, burocr*, cautio*, cohes*, certain*, chief*, collab*, conservat*, cooperat*, detail*, document*, efficien*, error*, fail*, help*, human*, inform*, logic*, method*, outcom*, partner*, people*, predictab*, relation*, qualit*, regular*, solv*, share*, standard*, team*, teamwork*, train*, uniform*, work group*
Create (CRE)	adapt*, begin*, chang*, creat*, discontin*, dream*, elabor*, entrepre*, envis*, experim*, fantas*, freedom*, futur*, idea*, init*, innovat*, intellec*, learn*, new*, origin*, pioneer*, predict*, radic*, risk*, start*, thought*, trend*, unafra*, ventur*, vision*

Figure 10 - Competing Values Framework keywords for content analysis (Fiordelisi & Ricci, 2014)

3.2.5 Data Analysis

To determine the sustainability strength of organizations, GRI reports were acquired from the publicly accessible GRI database and assessed by content analysis. GRI reports are voluntarily submitted by organizations to notify stakeholders of sustainability efforts based on various indicators relating to environmental, social, and economic capitals. These documents present an organization’s voluntary, self-evaluation, of sustainability efforts. Over 15,000 participating organizations have submitted more than 65,000 reports since 1999. All reports are open access and free to download from the GRI Database (*SDD - GRI Database*, 2021).

Content analysis of GRI reports is justified to assess an organization's corporate sustainability strength because reporting reflects organizations understand sustainability and wish to be understood (Gray et al., 1995; Milne & Gray, 2013). Precedence for assessing an organization's sustainability strength as measured by the language used in GRI reports exists (Demastus & Landrum, 2023; Landrum & Ohsowski, 2017, 2018; Niehoff, 2022). A benefit of using this technique is to eliminate biases and weaknesses in reporting. Measuring corporate sustainability strength has proven to be difficult because units of measuring corporate sustainability are unaligned across regions, standards, industries, audits, and timing. Efforts to measure corporate sustainability by only quantitative (Ahi et al., 2018; Nikolaou et al., 2018) or only qualitative methods (Agostinho et al., 2019; Giannetti et al., 2015) have breached academic literature but have not proved to be widely replicable.

The GRI reports were assessed through content analysis and text mining. Landrum & Ohsowski (2018) set precedence with this method when they developed keywords related to the Stages of Sustainability model. Following this protocol, Landrum & Ohsowski's identified keywords were employed in this study to assess sustainability report corporate sustainability strength.

The percentage of strong sustainability keywords per each organization's GRI report served as output variables. Additionally, keyword counts from stages 1, 2, and 3 were aggregated to form a measure of Weak corporate sustainability and the same was done for stages 4 and 5 to form a measure of Strong corporate sustainability. The percentage of these aggregated keywords of the total document word count was calculated to serve as additional output variables.

Competing Values Framework typology data was gathered by text mining publicly submitted Annual Report documents from organizations. Annual Reports (aka prospectus or 10-k's) are proven to have contextually communicated information. Fiordelisi & Ricci (2014) set precedence in the use of text mining to discover Competing Values Framework typologies of over one hundred thousand firms. They developed their keyword list by creating a synonym list related to the

Competing Values Framework types, then expanding the list with the Harvard IV psycho-social dictionary. Subsequent research has replicated this technique to measure Competing Values Framework typologies to determine their effect on organizations' various performance metrics (Busco et al., 2020; Nguyen et al., 2019). This methodology will be replicated for this research.

To determine the organizational culture of the organizations, Annual Reports to shareholders were acquired for each organization that had submitted a GRI report. The Annual Reports publicly communicate business activities via letters from executives, statements on the organizations' missions, discussion of future strategy, performance assessments, and notes on financial results. Annual Report documents represent a significant source of understanding organizations' organizational culture (Mohr, 2020).

Content analysis of language used in the Annual Reports was applied to measure the Competing Values Framework profile of each organization. This methodology aligns with the seminal work from (Schein, 1985) that states organizational culture can be studied by the artifact of language. Precedence for this methodology was established in research seeking links between the typologies and various business outcomes (Busco et al., 2020; Fiordelisi & Ricci, 2014; Nguyen et al., 2019).

3.2.5.1 Text mining and statistical software

The technique of text mining was used to perform the content analysis of the GRI and Annual Report documents. Text mining is a methodological technique to search documents and count keywords related to the concepts studied. The frequency of the counted keywords can be used to analyze data. Keywords to asses corporate sustainability strength (Appendix A) were replicated from prior studies (Landrum & Ohsowski, 2017, 2018) in which the authors used two iterations of citation pearl growing (Schlosser et al., 2006) to develop the word list.

Text mining to measure each organization's Competing Values Framework profiles was replicated from a prior study (Fiordelisi & Ricci, 2014) in which the

authors derived the Competing Values Framework keywords (Appendix B) by taking relevant words from the Competing Values Framework type definitions, and then adding relevant synonyms as suggested by the Harvard IV-4 Psychosocial Dictionary.

Directives from past studies that utilized text mining were followed. The methodology followed guidelines of Structural Topic Modelling (Roberts et al., 2014) by applying an unsupervised approach, meaning computer software automatically counted the keywords in digital files. Fully Automated Clustering was also applied, meaning no algorithms were used to induce data beyond word count (Grimmer & Stewart, 2013; Lucas et al., 2015).

There are two approaches suggested by Lucas et al., (2015) for conducting STM. An unsupervised approach will be used to create a low-dimensional summary best explaining observed documents given a set of assumptions. Unsupervised methods identify theoretically useful strings of text, for study of what is previously unknown from reading the text. The supervised approach involves manually searching for what is interesting in the documents of research and then using a computer to automatically apply those findings to more documents. This approach will not be used, because the keywords relating to elements of interest (sustainability strength stages and competing value framework typologies) are already known.

The unsupervised approach of using computers to text mine can be divided into two broad categories, Fully Automated Clustering (FAC) and Computer Assisted Clustering (CAC) (Grimmer & Stewart, 2013). FAC will be used, as this process simply accomplishes what the experiment requires, the counting of word occurrences in documents. CAC methods will not be used, as they require complex programming and algorithm development to discover and assess word trends. In summary, an unsupervised, FAC approach will be used.

The acquired GRI and Annual Report documents were converted from original formats (either pdf or txt) to a recognizable text format, encoded as UTF-8 with xPDFreader (version 4.02). Text mining and statistical analyses were performed in R-Studio version 1.4.1103 and R-version 4.2.1 (R Core Team, 2021) with Text

Mining Package (*tm*) version 0.7-8 (Feinerer & Hornik, 2020). R-script for the text mining and statistical analysis was written by the authors.

The keyword counts in GRI documents were used to obtain quantitative data for corporate sustainability strength. Keyword counts related to the Stages of Sustainability model were collected for each organization and summed by stage. Then, keyword count was divided by total document word count and converted to a percentage for each stage to standardize keyword count regardless of document size. The percentage of corporate sustainability strength keywords from each stage served as dependent variables.

The keywords counted in annual reports to shareholders were used to obtain quantitative data for Competing Values Framework profiles of each organization. Keyword counts related to the Competing Values Framework were collected for each organization and summed by stage. Then, keyword count was divided by total document word count and converted to a percentage for each stage to standardize keyword count regardless of document size. The percentage of Competing Values Framework keywords from each stage served as independent variables.

The raw data was transformed with log10 transformations because a long-tailed distribution of the data was skewing linearity, homoskedasticity, normality and independence. The relationship between data was approximately exponential, meaning the variance was approximately proportional to the square of the mean. A log10 transformation of the data was found to satisfy the data in assumption testing.

Data were analyzed using ordinary least squares regression analyses with the multi-level modelling function "*lm( )"* from the base R software (R Core Team, 2020). The *lm( )* function regressed the corporate sustainability keyword percentages against the Competing Values Framework type keyword percentages. Model selection and Root Mean Squared Errors (RMSE) via Cross Validation were employed to find the most parsimonious models that best describe the relationship between the Stages of Sustainability model percentage of keywords and Competing Values Framework percentage of keywords.

Bayesian Information Criterion (BIC) values were chosen to evaluate model selection performance due to an increased applied penalty for an increase variable inclusion. BIC is a statistical method for selecting among different models. It is based on the idea that the best model has a balance of fit and complexity. BIC investigates the difference between maximum log likelihood and a penalty due to the number of parameters in the model. A benefit of applying BIC is that it reduces the overfitting of running too many regressions, which can reduce significance of the entire model by compounding probabilities, leading to false positives. While some methods to address p-value penalties exist (e.g., the Bonferroni Correction method), application of the BIC methodology satisfies the requirement of answering research questions that seek to find relationships between variables.

Models with BIC values equaling 2 or less were considered to be equivalent. An additional downstream statistical check was employed via k-fold cross validation. Models were randomly subset with the R-FUNCTION to create a training data set and test data set. Subset test data was predicted via the subset training data and RMSE was calculated. The lowest RMSE values based on the randomly subset k-fold cross validation data indicated the best performing models. Results were determined to be statistically significant when $p \leq 0.05$. To satisfy assumption and normality testing, square root transformations were applied to the corporate sustainability stage keyword percentages, and natural log transformations were applied to the Competing Values Framework type keyword percentages.

3.2.6 Statistical analysis and results

Descriptive statistics were calculated to establish means and standard errors on the keywords counted (Figure 11). The mean and standard error of keyword percentage for each of the stages of sustainability is calculated by the total keywords for each stage divided by the entire document keyword count, and then converted to a percentage. Keyword percentage in Stage 1 (mean: 0.606 ; ± SE: 0.026), Stage 2 (mean : 1.603 ; ± SE: 0.047), and Stage 3, (mean: 0.693 ; ± SE: 0.020), were significantly larger compared to either Stage 4 (mean: 0.211 ; ± SE: 0.011) and Stage 5 (mean: 0.047 ; ± SE: 0.058). The means of the weak and intermediate stages

(Stages 1, 2 and 3) being larger than the means of the strong corporate sustainability stages (Stages 4 and 5) in the sample are similar to precedential findings (Landrum & Ohsowski, 2018).

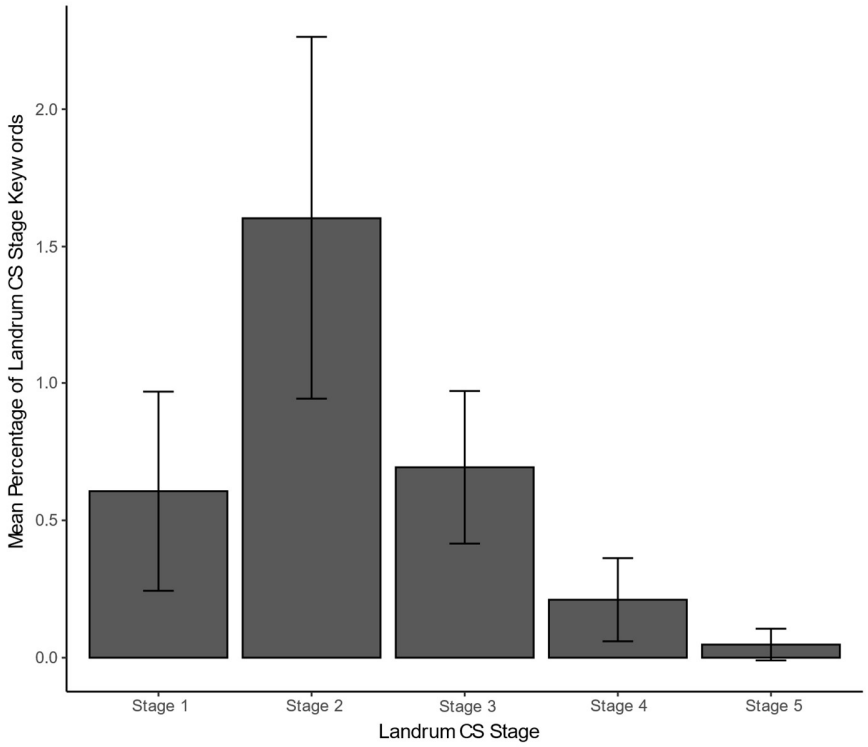

Figure 11 - The mean and standard error of keyword percentage for each stage of sustainability.

Bars represent keyword percentage. Lines represent standard error of keyword percentage. Graph is based on raw data. N=197.

The descriptive statistics keywords for the Competing Values Framework keywords were calculated (Figure 12). The mean and standard error of keyword percentage for the Competing Values Framework is calculated by the total keywords for each type divided by the total number of Competing Values Framework keywords counted, and then converted to a percentage. Keyword percentage of the Market type was significantly larger (mean : 52.425 ; ± SE: 0.337) than the Adhocracy (mean: 17.951 ; ± SE: 0.250), Clan (mean: 11.848 ; ± SE: 0.227), and Hierarchy (mean: 17.776 ; ± SE: 0.249) types. The means of the Market type being larger than the means of the other three types in this sample is validated by precedential findings using the same methodology (Andreou et al., 2020; Busco et al., 2020; Fiordelisi & Ricci, 2014; Nguyen et al., 2019).

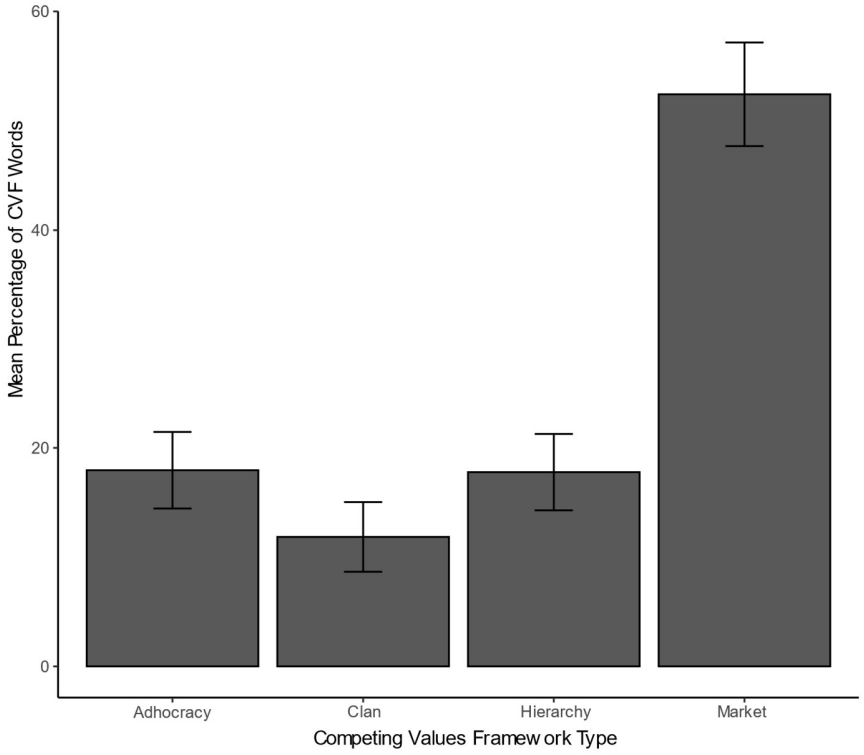

Figure 12 - The mean and standard error of keyword percentage for the Competing Values Framework

Bars represent keyword percentage. Lines represent standard error of keyword percentage. Graph is based on raw data. N=197

The model selection process identified the existence of significant relationships between individual the Stages of Sustainability model and the Competing Values Framework. The keyword counts for each of the five stages were regressed against the keyword counts for each of the four Competing Values Framework types. Two models with significant ($p < 0.05$) relationships in Business-Centered (Stage 2) sustainability and one model with significant relationships in Regenerative (Stage 4) sustainability were identified.

The first Business-Centered (Stage 2) model shows a positive relationship with the Market type (Figure 13). The second Business-Centered (Stage 2) model exhibits a negative relationship with the Clan typology (Figure 14). The model derived for Regenerative (Stage 4) sustainability shows a negative relationship with the Hierarchy type (Figure 15).

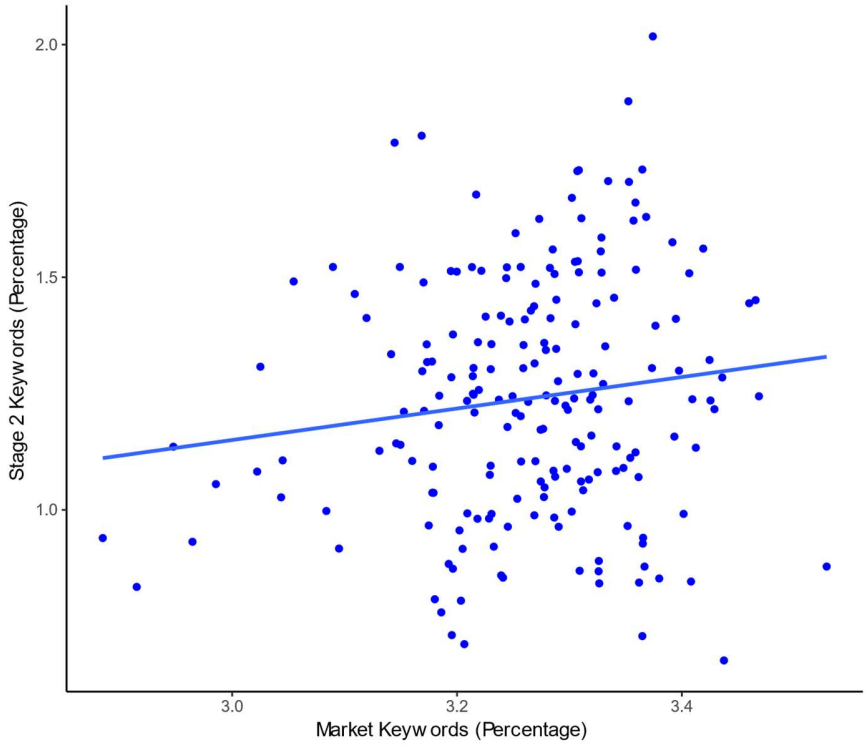

Figure 13 - Market keywords relate to an increase in Business-Centered (Stage 2) keywords.

N=197

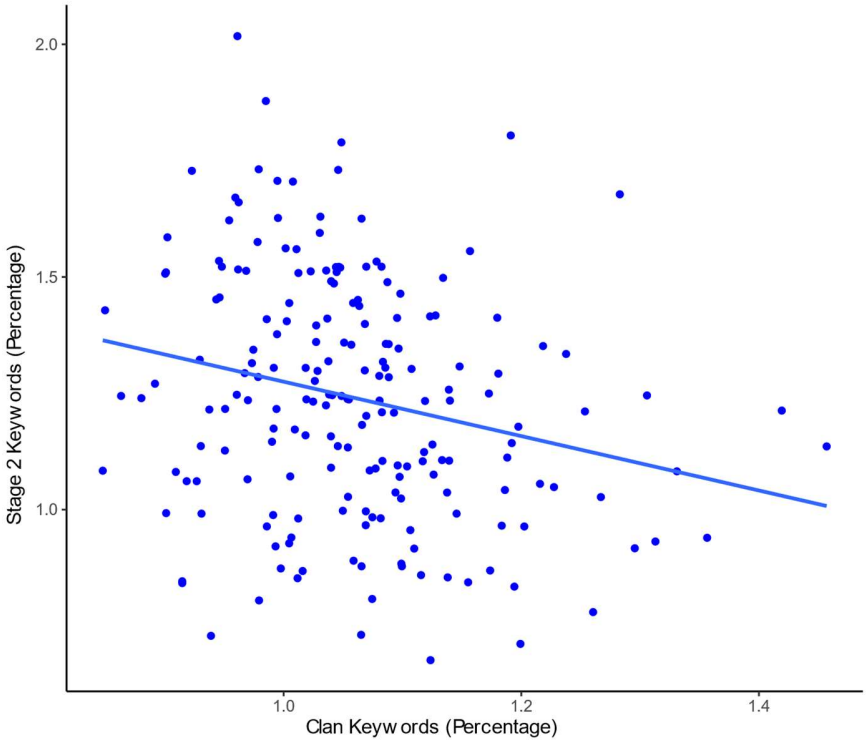

Figure 14 - Clan keywords relate to a decrease in Business-Centered (Stage 2) keywords.

N=197

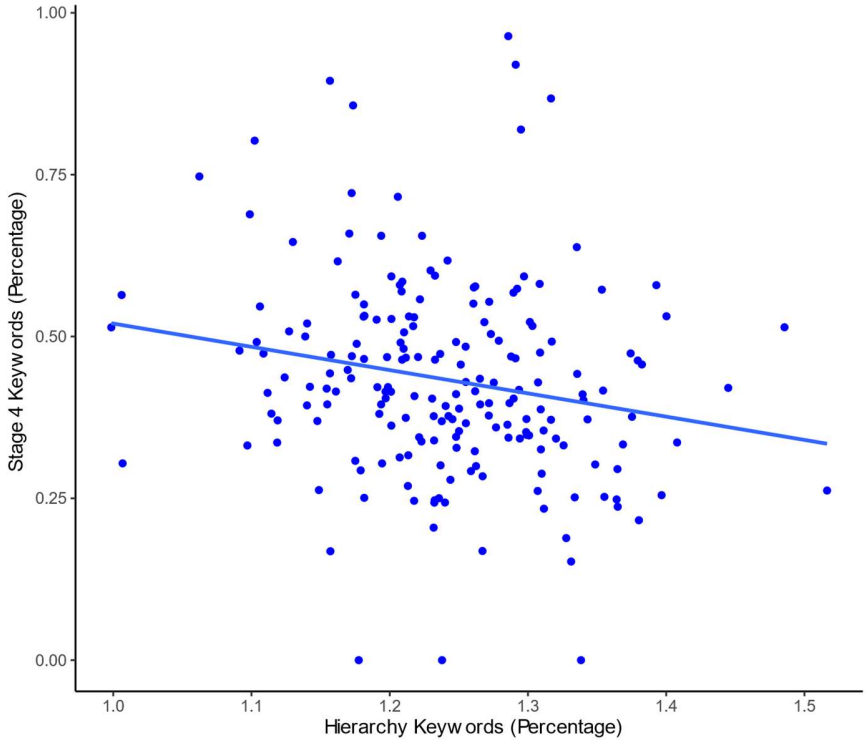

Figure 15 - Hierarchy keywords relate to a decrease in Regenerative (Stage 4) keywords.

N=197

The three models identified significant relationships between corporate sustainability strength and organizational culture for Business-Centered (Stage 2) sustainability, and the Market, Clan, and Hierarchy types (Table 9). No significant relationships were found for the Adhocracy type, or sustainability stages of Compliance (Stage 1), Intermediate (Stage 3), and Coevolutionary (Stage 5). The p-values are significant for each model ($p < 0.05$), but the strength of the models is low as indicated by a low R-squared values. This suggests that other factors besides organizational culture are contributors to sustainability strength.

Model	Function	R^2	p
Stage 2 - Market	Y=0.14 + 0.34x	0.018	0.002621
Stage 2 - Clan	Y=1.9 - 0.58x	0.054	0.001006
Stage 4 - Hierarchy	Y=0.88 - 0.36x	0.039	0.005704

Table 9 – Individual corporate sustainability Stage Models identified (n=197)

3.3 2nd line of investigation - Methodology Scheme Sustainability Strength

The primary documentation of 22 sustainability schemes was assessed by content analysis to determine each scheme's positioning within the Stages of Sustainability model. First, the sample of schemes was selected, and then subjectively categorized. Standardized keywords related to each sustainability stage were counted from each document to quantitatively create data for each scheme. Statistical analysis and results are presented for the sake of discussion and implications.

3.3.1 Sustainability Scheme Hypothesis

As organizations have oriented towards the weak, Business-Centered stage of sustainability, it is necessary to study the inputs that contribute to this phenomenon so that changes can be made. As literature shows, sustainability schemes are influential in directing sustainability efforts, thus, hypotheses are proposed that evaluate sustainability schemes for their sustainability strength.

Our literature review has summarized the general questions about efficacy of sustainability schemes and the current state of sustainability strength in organizations. Given that corporate sustainability efforts are minimal (Landrum & Ohsowski, 2018), management lacks direction (Bonini et al., 2010), there is a lack of standardization across schemes in both criteria and methods (Siew, 2015) as well as desired outcomes (Rasche, 2010; Sethi & Schepers, 2014), and both sustainable and unsustainable ideals have converged (Reinecke et al., 2012), coupled with the fact that sustainability schemes influence corporate sustainability behavior (Farooq et al., 2021) two hypotheses have been generated. It is posited that assessing sustainability schemes' strength within the Stages of Sustainability model will align with previous observations.

H1: Corporate sustainability schemes primarily promote Compliance, Business-Centered or Systemic corporate sustainability.

3.3.2 *Sample*

The population of sustainability schemes is estimated at over 600 (Drolet et al., 2021; van der Lugt & van de Wijs, 2020). To narrow the sample for this study, the literature related to sustainability schemes was collected and reviewed to determine the following criteria for inclusion.

Level of analysis. Sustainability schemes were selected based upon their applicability to businesses (micro-level). Schemes developed for products (nano), regions (meso), and nations (macro) were excluded.

Geographic region. Because the United States has one of the highest sustainability reporting rates among countries (Governance & Accountability Institute, 2020; McCalla-Leacy et al., 2022), this was the target geographic region of the study; the sustainability schemes studied were restricted to those used by companies in the United States of America. The sample was further narrowed through the exclusion of sustainability schemes used in a specific geographic region of the USA.

Business Size. To keep the data set manageable, the study of schemes used by large and multinational enterprises was restricted. The hundreds of local and regional schemes targeted at small- and medium-sized enterprises were excluded.

Authorship and iteration of publication. Several schemes in this study have been widely adopted and modified by practitioners and researchers. For this study, the most recent documents from the original purveyor of each scheme were acquired.

Category. (Figure 16) The constructs of principles, frameworks, guidelines, standards, and tools were first defined. Then, the construct category for each scheme was identified. In cases where documents contained information that would categorize it in more than one scheme, the document was classified within the most specific scheme categorization. Schemes that fit the definition of tools (metrics for measurement) were excluded from this study since tools are neutral in sustainability strength. This study also excluded third-party rating or ranking systems of corporate sustainability since businesses do not internally apply those.

This categorization has two benefits. First, it validates schemes as acceptable to the sample. Second, it provides a hierarchy to which researchers and practitioners can conceptualize sustainability schemes. Constructs are defined as follows.

Principles are high-level guiding values statements of thoughts or beliefs about how to act (Glavič & Lukman, 2007). Principles are non-binding and symbolic in nature, acting as a call for business to address sustainability (Shrivastava & Berger, 2010).

Frameworks are broad, flexible, conceptual organizational structures that connect actionable guidelines of sustainability to principles. A framework is a skeleton, pattern, or architecture that can be customized; a template that dictates what should be managed and assessed (Kobryn, 2000).

Guidelines are unbinding, flexible, qualitative general recommendations. They identify what a company "should" do and "what" to assess but lack specificity in "how."

Standards are voluntary rules for common use, offering specific, mandatory, actions reported to an overseeing third party of authority (Sandholtz, 2012). Standards specify "what" to do and, more importantly, "how" to do it. Standards can sometimes lead to certification or accreditation within the realm of the accrediting body's authority.

Tools are methods, metrics, and techniques to measure and track progress and measure outcomes of the sustainability schemes. Tools, such as a methodology to measure carbon, a survey to measure quality of life, or an audit to measure financial fidelity, are assumed to be neutral in sustainability strength, thus, tools have been excluded from this study.

Standards (quantitative) and guidelines (qualitative) attempt to assess the application of frameworks (implementation) and principles (ideals). The schemes' focus ranges from broad and general to explicit and exact.

Figure 16 - Hierarchy of sustainability schemes (author's creation.)

The final dataset consists of 22 sustainability schemes that fit the sample criteria.

Principles. (7): Accountability 1000 Accounting Principles (AP1000), The Circular Economy (CircularEcon), Integrated Thinking Principles (ITP), International Integrated Reporting Framework (<IR>), Natural Capitalism (NatCap), The Natural Step (TNS), and the United Nations Global Compact (UNGC).

Frameworks. (8): Carbon Disclosure Project (CDP), Climate Disclosure Standards Board (CDSB), Doughnut Economics for Business (DoughnutEcon), Global Reporting Initiative (GRI), Planetary Boundaries (PlanetBound), Sustainability Accounting Standards Board (SASB), Sustainable Development Goals (SDG), and Task Force on Climate-Related Financial Disclosures (TCFD).

Guidelines. (4): British Standards 8001 (BS8001), International Organization for Standardization 26000 (ISO26000), Organization for Economic Co-operation and Development Guidelines (OECD), and SDG Compass (SDGCompass).

Standards. (3): Certified B Corporation (BCorps), European Union Eco-Management and Audit Scheme (EMAS), and Social Accountability 8000 (SA8000).

3.3.3 Principles

Principles are high-level guiding values statements of thoughts or beliefs about how to act (Glavič & Lukman, 2007). In corporate sustainability, they make a call to action of organizations to address sustainability issues (Shrivastava & Berger, 2010). Principles are unbinding and symbolic in nature (Shrivastava & Berger, 2010).

This study included seven principles (Table 10): Accountability 1000 Accounting Principles (AP1000), The Circular Economy (CircularEcon), Integrated Thinking Principles (ITP), International Integrated Reporting Framework (<IR>), Natural Capitalism (NatCap), The Natural Step (TNS), and the United Nations Global Compact (UNGC).

3.3.3.1 AA1000 Accountability Principles (AA1000AP)

AccountAbility's AA1000AP offers 4 principles to guide organizations' sustainability performance. It was published in 1999, with an update in 2008. The creators claim that the principles guide organizations in engaging with stakeholders, identifying sustainability areas, and developing strategies to improve accountability (AccountAbility, 2018). Criticisms are that it promotes communication with and accountability to traditional stakeholder groups (suppliers, investors, employees) but fails to promote meaningful engagement with non-traditional stakeholders (communities, government) and it is primarily one-way communication rather than dialogue, both of which impede effective integration of sustainability into organizational practices (Bepari & Mollik, 2016; Farooq et al., 2021).

3.3.3.2 Circular Economy (CE)

The circular economy is based upon three principles (Ellen MacArthur Foundation, 2021) that require us to redesign economies, companies, products, and processes. The Ellen MacArthur version of the circular economy also includes the

“butterfly diagram” framework. The authors argue that a circular economy will tackle climate change, biodiversity loss, address social needs, create jobs, and cut emissions, waste, and pollution (Ellen MacArthur Foundation, 2021). One of the critiques of the circular economy is that it is not a novel concept but rather is a rehash and repackage of several pre-existing ideals (Ekins et al., 2020). The circular economy has also been critiqued for its continued focus on profit (Lemille, 2018), lack of consideration for socio-cultural implications (Schröder, 2018), failure to acknowledge that 100% circular economies are impossible (De Decker, 2018), neglect of social sustainability (Blomsma & Brennan, 2017), and for its neglect of the economic sustainability (von Mitschke-Collande & Narberhaus, 2017). Corvellec, Stowell and Johansson, (2021) conclude that the circular economy, as currently conceived, has many shortcomings to be addressed.

3.3.3.3 Integrated Thinking Principles

The Integrated Thinking Principles (ITP) were developed by the Value Reporting Foundation, which merged into the International Financial Reporting Standards Foundation (IFRSF). This entity is also the governing body of the International Sustainability Standards Board (ISSB) which oversees the Task Force on Climate Related Financial Disclosures (TFCD) and Sustainability Accounting Standards Board (SASB), two frameworks in this study. The ITP has been critiqued as imitative and failing to define sustainability.

3.3.3.4 International <IR> Framework

The <IR> Framework provides 7 principles of guidance for companies to disclose both financial and sustainability performance in a single report. The authors claim this will lead to integrated thinking and decision-making and companies will not have to produce numerous reports (IIRF, 2021). Critics question if the <IR> Framework can bring about change (Stubbs & Higgins, 2014) or promote sustainability (Flower, 2015; Thomson, 2015) and they claim the <IR> Framework focuses on financial capital (Flower, 2015) and investors (Alexander & Blum, 2016) while excluding other stakeholders (Flower, 2015). It should be noted that the <IR>

Framework provides no sustainability definitions, but it does address assessment of economic, social, and environmental capitals.

3.3.3.5 Natural Capitalism

Natural capitalism advances four principles (Hawken et al., 1999; Lovins et al., 2007) that call for businesses to quantify and value ecosystem services as an additional capital that is managed and to close loops in industrial systems. Its authors argue that natural capitalism will protect the biosphere and improve profits and competitiveness of businesses (Lovins et al., 2007). Natural capitalism has been criticized for suggesting its adoption will be so profitable that market forces will ensure the transition (Slesser, 2001) and for rebirthing ideas as novel but which have existed for decades (Desrochers, 2003). Birkin (2001) argues that the idea of Natural Capital is not to solve sustainability problems but rather to advance evolutionary thinking about capital.

3.3.3.6 The Natural Step (TNS)

The Natural Step includes four principles of sustainability alongside a 5-level framework for strategic sustainable development and a 4-step methodology to guide thought and behavior for a more sustainable business (Eriksson & Robert, 1991; Robert, 1991). Robert (1991) argues that human activities are devastating ecosystems and leading to an accumulation of pollutants in the biosphere while following the principles of The Natural Step (based upon the laws of thermodynamics) will lead to circular processing of resources more compatible with life and survival of the biosphere. Critics argues that The Natural Step fails to address health of the human species (Nathan, 2018). The theory has only recently attempted to integrate social sustainability (Nathan, 2018), it is more concerned with the needs of organizations than individuals (Thatcher, 2014) and its bias toward science causes it to fall victim to the fallacy of absolutism (Nathan, 2018). Furthermore, (Upham, 2000) argues that The Natural Step is primarily focused on the ecological aspect of sustainability and it is simply a persuasive argument that is not based on science.

3.3.3.7 U.N. Global Compact

The U.N. Global Compact (UNGC) advances 10 principles to guide a company's value system and meet responsibilities in human rights, labor, environment, and anti-corruption. The UNGC claims to be "the world's largest corporate sustainability initiative" that aims to help companies align strategies and operations and take action to advance societal goals (UN Global Compact, 2021). It is argued that following these principles, companies will uphold basic social and environmental responsibilities and set the stage for long-term success (UN Global Compact, 1999, 2021). The UNGC is intended to support company contributions to the Sustainable Development Goals. Criticisms include lack of oversight and enforcement of this voluntary initiative, the U.N.'s shifting ideology toward the interests of corporations, and growing globalization absent growing required corporate responsibilities (Knight & Smith, 2008). It has also been noted that governments facilitate the UNGC principles by setting up regulatory frameworks on a national and supranational level (Rasche, 2009). Furthermore, the UNGC was developed to align with and reinforce the defunct Millennium Development Goals and the current Sustainable Development Goals, thus the same criticisms apply.

Scheme	Author	Description	Critiques
AA1000 Accountability Principles (AA1000AP)	AccountAbility	4 principles to identify, prioritize, and respond to sustainability challenges: Inclusivity, Materiality, Responsiveness, Impact	Promotes communication with and accountability to traditional stakeholder groups, fails to promote meaningful engagement with non-traditional stakeholders, primarily one-way communication (Bepari & Mollik, 2016; Farooq et al., 2021).
Circular Economy (CE)	The Ellen MacArthur Foundation	3 principles to redesign economies, companies, products, and processes: design out waste, keep materials in use, replenish natural systems	Not a novel concept but rather is a rehash and repackage of several pre-existing ideals (Ekins et al., 2020), continued focus on profit (Lemille, 2018), lack of consideration for socio-

			cultural implications (Schröder, 2018), failure to acknowledge that 100% circular is impossible (De Decker, 2018), neglect of social sustainability (Blomsma & Brennan, 2017) neglect of the economic sustainability (von Mitschke-Collande & Narberhaus, 2017)
Integrated Thinking Principles	Initially, the Value Reporting Foundation, now IFRSF	6 principles for a company business model that define activities for value creation: Purpose, Strategy, Risks & opportunities, Culture, Governance, Performance	
International <IR> Framework	International Integrated Reporting Council	7 principles of guidance for companies to disclose both financial and sustainability performance in a single report. Strategic focus and future orientation, Connectivity of information, Stakeholder Relationships, Materiality, Conciseness, Reliability and completeness, Consistency, and comparability	Doubtful it can bring about change (Stubbs & Higgins, 2014) or promote sustainability (Flower, 2015; Thomson, 2015), focuses on financial capital (Flower, 2015) and investors (Alexander & Blum, 2016) while excluding other stakeholders (Flower, 2015), provides no sustainability definitions
Natural Capitalism	Paul Hawken, Amory Lovins, Hunter Lovins; (Hawken et al., 1999; Lovins et al., 2007)	4 principles that call for businesses to quantify and value ecosystem services as an additional capital that is managed and to close loops in industrial systems. Resource productivity, Biomimicry, Service, and flow economy, Restoring or reinvesting in stocks of natural capital	Suggests its adoption will be so profitable that market forces will ensure the transition (Slesser, 2001), rebirths ideas as novel that have existed for decades (Desrochers, 2003), not intended to solve sustainability but rather to advance evolutionary thinking about capital (Birkin (2001)
The Natural Step (TNS)	Karl-Henrik Robèrt; Eriksson & Robèrt, 1991; Robèrt, 1991	4 principles of sustainability to guide thought and behavior for a more sustainable business. Do not extract substances from the Earth's crust faster than it can be replenished. Do not produce concentrations of substances faster than they can be absorbed. Do not degrade the Earth's surface faster than it can be replenished.	Fails to address health of the human species (Nathan, 2018), has only recently attempted to integrate social sustainability (Nathan, 2018), more concerned with the needs of organizations than individuals (Thatcher, 2014), bias toward science causes it to fall victim to the fallacy of absolutism (Nathan, 2018), primarily focused on the ecological aspect of sustainability and it is simply a persuasive argument

		Do not interfere with people's abilities to meet their own needs	that is not based on science (Upham, 2000)
U.N. Global Compact	UN Global Compact, 1999, 2021	10 principles to guide a company's value system and meet responsibilities in human rights, labor, environment, and anti-corruption.	Lack of oversight and enforcement of this voluntary initiative, the U.N.'s shifting ideology toward the interests of corporations, and growing globalization absent growing required corporate responsibilities (Knight & Smith, 2008); governments facilitate the Global Compact principles by setting up regulatory frameworks on a national and supranational level (Rasche, 2009); was developed to align with and reinforce the defunct Millennium Development Goals and the current Sustainable Development Goals, thus the same criticisms apply

Table 10 – Sample of Sustainability Principles

3.3.4 Frameworks

Frameworks are broad flexible conceptual organizational structures that connect various parts of organizational policy and practice to show how they are connected and fit together. A framework is a reusable system that dictates what should be managed and reported (Kobryn, 2000). A sustainability framework is not an index. Frameworks do not involve any quantitative aggregation of data, but rather provide qualitative ways of presenting large numbers of indicators (Mayer, 2008).

This study analyzed 8 frameworks (Table 11): Carbon Disclosure Project (CDP), Climate Disclosure Standards Board (CDSB), Doughnut Economics for Business (DoughnutEcon), Global Reporting Initiative (GRI), Planetary Boundaries (PlanetBound), Sustainability Accounting Standards Board (SASB), Sustainable Development Goals (SDG), and Task Force on Climate-Related Financial Disclosures (TCFD).

3.3.4.1 Carbon Disclosure Project (CDP)

The CDP describes its framework as a global disclosure system for companies (and others) to manage environmental impacts, specifically related to climate change, water security, and deforestation. The Carbon Disclosure Project claims that use of its framework can help companies gain competitive advantage, protect and improve reputation, get ahead of regulation changes, identify risks and opportunities, and track and benchmark progress (Carbon Disclosure Project, 2021). Critics point to the fact that while more companies are disclosing carbon impacts, disclosure does not lead to actual reduction in carbon emissions (Marx, 2010).

3.3.4.2 Climate Disclosure Standards Board (CDSB)

The CDSB provides a framework for companies to report environmental and climate change information. The authors claim the framework aligns with financial reporting, standardizes environmental reporting, integrates environmental information into mainstream reporting, adds value to reports, helps investors in decision making, supports compliance with reporting requirements, and supports assurance (Climate Disclosure Standards Board, 2019). Critics point out that companies are still falling short of meaningful disclosure (Climate Disclosure Standards Board, 2020). It should be noted that the CDSB offers no definition of sustainability and only focuses on environmental aspects.

3.3.4.3 Doughnut Economics for Business

Doughnut Economics is a framework that integrates the ecological limits, or planetary boundaries, of the world to maintain life as humanity knows it and the social foundations, drawn from the Sustainable Development Goals, for human flourishing within societies. Doughnut Economics suggests maintenance of social systems and people below the ecological limits and above the social foundation. The goal of operating within the doughnut is to keep environmental systems below the ecological ceiling and to maintain people above the social floor. The doughnut concept has been operationalized for use at the national and municipal level, and it

is currently being adapted specifically for use at the business level (Milanovic, 2018). In the meantime, businesses are adopting Doughnut Economics concepts as an internal facing tool for improving sustainability practices. Doughnut Economics has been criticized for the promotion of western concepts of development and a repackaging of old ideas (Gudynas, 2012) and for its contradiction in continuing to promote global GDP growth, holding up companies that have made minimal improvements as exemplars, and the flawed assumption that global capitalism is becoming more cooperative (Milanovic, 2018).

3.3.4.4 Global Reporting Initiative (GRI) Universal Standards

The GRI is the most widely adopted framework for sustainability reporting on economic, environmental, and social impacts and how they are managed (Governance & Accountability Institute, 2020). The authors claim “It is important to note that the GRI Standards do not set allocations, thresholds, goals, targets, or any other benchmarks for good or bad performance” (Global Reporting Initiative, 2022). The use of the universal standards will help organizations understand their impacts which will increase accountability and enhance transparent (GRI, 2018). The GRI has been criticized for following weak sustainability (Landrum & Ohsowski, 2018), specifically that it only focuses on internal company performance while ignoring external company social and environmental performance (Azcárate et al., 2011; Fonseca, 2010; Milne & Gray, 2013) and that absent environmental thresholds and allocations, the GRI only measures incrementalism, not sustainability (McElroy, 2018). Moneva et al., (2006) points out an imbalance across the three realms of sustainability with more than 50% of the GRI criteria focused on the social dimension. The GRI standards documentation does not provide an explicit definition of corporate sustainability.

3.3.4.5 Planetary Boundaries

The concept of planetary boundaries was first introduced by (Rockström et al., 2009) and (Steffen et al., 2015) of the Stockholm Resilience Center. This framework identified and quantified nine planetary boundaries that are critical to

support life on Earth. While work continues to quantify three of the boundaries, of the remaining six, humanity is within the safe zone of two boundaries, in a zone of uncertainty for two boundaries, and in the high-risk zone extending beyond two boundaries (Steffen et al., 2015). Although initially operationalized at a national and regional level, businesses are adopting the tenets to improve sustainability performance. Critiques include questions surrounding the limits as too generous, definitions as inadequate, orientation as too long, a weak selection of control variables, the omission of some boundaries, failure to consider inequality, and controversial threshold values assigned to each boundary (Biermann & Kim, 2020).

3.3.4.6 Sustainability Accounting Standards Board (SASB)

SASB identifies environmental, social, and governance (ESG) issues relevant to financial performance and guides companies to report on these factors. SASB is flexible in that organizations can select the ESG issues that are applicable. The main critique of the SABS is that the target audience is “financially motivated mainstream investors” (Allison-Hope, 2018). This skews SASB reporting to attract investors, protect an organization’s image, and cover liabilities rather than address sustainability issues.

3.3.4.7 Sustainable Development Goals (SDG)

The SDGs (2015-2030) are the outgrowth of the earlier Millennium Development Goals (2000-2015). The 17 Sustainable Development Goals, or Global Goals, address economic, social, and environmental goals to create a sustainable future. Although the Goals were developed at a nation-state level for government commitment, businesses around the globe are adopting the SDGs as part of a sustainability strategy. The SDGs have been widely critiqued. Regarding business adoption of the SDGs, Hickel, (2019) points out that the SDGs continue to promote global economic growth, even at the expense of the planet, while (Kramer et al., 2019) state that the SDGs are a “massive global public relations charade” for companies and adoption appears to be primarily cosmetic.

3.3.4.8 Task Force on Climate-Related Financial Disclosures (TCFD)

The TCFD is a reporting framework for companies to disclose risks and opportunities related to climate change. The authors define sustainability as the ability of companies and organizations (not the planet, environment, or society) to be “long-lasting or permanent based on social, governance, economic, and environmental capitals.” This is a weak, Business-as-Usual, sustainability positions.

Scheme	Author	Description	Critiques
Carbon Disclosure Project (CDP)	(Carbon Disclosure Project, 2021)	Global disclosure system for companies to manage environmental impacts, specifically related to climate change, water security, and deforestation.	Disclosure does not lead to actual reduction in carbon emissions (Marx, 2010)
Climate Disclosure Standards Board (CDSB)	(Climate Disclosure Standards Board, 2019)	Framework for companies to report environmental and climate change information.	Companies are still falling short of meaningful disclosure (Climate Disclosure Standards Board, 2020), no definition of sustainability, only focuses on environmental aspects.
Doughnut Economics	Kate Raworth	Framework that integrates the ecological limits, or planetary boundaries, of our world to maintain life as we know it and the social foundations, drawn from the Sustainable Development Goals, for human flourishing within societies. The goal of operating within the doughnut is to keep environmental systems below the ecological ceiling and to maintain people above the social floor.	Promotion of western concepts of development and a repackaging of old ideas (Gudynas, 2012), contradiction in continuing to promote global GDP growth, holding up companies that have made minimal improvements as exemplars, and the flawed assumption that global capitalism is becoming more cooperative (Milanovic, 2018).
Global Reporting Initiative (GRI)	Global Reporting Initiative	The most widely adopted framework for sustainability reporting on economic, environmental, and social impacts and how they are managed.	Follows weak sustainability (Landrum & Ohsowski, 2018), only focuses on internal company performance while ignoring external company social and environmental performance (Azcárate et al., 2011; Fonseca, 2010; Milne & Gray, 2013), without

			environmental thresholds and allocations, only measures incrementalism, not sustainability (McElroy, 2018), imbalance across the three realms of sustainability with more than 50% of the GRI criteria focused on the social dimension (Moneva, Archel and Correa, 2006), does not provide an explicit definition of corporate sustainability.
Planetary Boundaries	Rockstrom et al. (2009); Steffen et al. (2015); Stockholm Resilience Center	Identifies and quantifies nine planetary boundaries that are critical to support life on Earth.	Questions surrounding the limits as too generous, definitions as inadequate, orientation is too long, selection of control variables, the omission of some boundaries, failure to consider inequality and the Global South, the threshold values assigned to each boundary (Biermann & Kim, 2020).
Sustainability Accounting Standards Board (SASB)	Sustainability Accounting Standards Board	Identifies environmental, social, and governance (ESG) issues relevant to financial performance and guides companies to report on these factors.	Aligns with left-wing agendas and gives ammunition to anti-corporate activists (Morrison, 2020).
Sustainable Development Goals (SDG)	United Nations	17 Global Goals to address economic, social, and environmental goals to create a sustainable future.	Continue to promote global economic growth, even at the expense of the planet (Hickel, (2019), a “massive global public relations charade” for companies and adoption appears to be primarily cosmetic (Kramer et al., 2019), does not explicitly define sustainability.
Task Force on Climate-Related Financial Disclosures (TCFD)	Financial Stability Board	Reporting framework for companies to disclose risks and opportunities related to climate change.	Lack of integration of climate risk into company strategy, lack of coherence in reporting, little discussion of opportunities, still no reporting on climate risk, weak use of scenario analysis (Chinyenze, 2021), company-centric definition of sustainability

Table 11 - Frameworks in the sample

3.3.5 Guidelines

Guidelines are qualitative general recommendations that are not mandatory and are flexible. Guidelines do not lead to certification or accreditation and can be adopted by any company. Guidelines identify what a company “should” do but not “how” to do sustainability. This study included 4 guidelines (Table 12): British Standards 8001, International Organization for Standardization 26000, Organization for Economic Co-operation and Development and SDG Compass (SDGCompass).

3.3.5.1 British Standards 8001:2017 (BS 8001)

The authors state that its purpose is to “develop a framework standard for ‘implementing the principles of the circular economy in organizations” (BSI, 2021). The authors claim that BS 8001 can help organizations “capitalize on cost savings; unlock new revenue streams; and make themselves more resilient to external shocks and disruption” (BSI, 2021). Critics argue that it is too inclusive and broad to promote change and it fails to identify effective approaches to reduce environmental impacts (Pomponi & Moncaster, 2019). Pauliuk (2018) also state the BSI8001 is unspecific, fails to provide guidance, does not clearly link circular economy with sustainability, guidance is generic, and a weak link to monitoring, accounting, and assessment. It should be noted that the official document defines sustainability (BSI, 2021 sec 2.69) with the Brundtland definition but there is no explicit definition of corporate sustainability

3.3.5.2 International Organization for Standardization 26000 (ISO 26000)

The ISO 26000 is a voluntary guideline of what a company should do to be more socially responsible. Although issued by the International Organization for Standardization, the ISO 26000 document is voluntary and does not lead to certification. The authors state that the document provides 7 principles of social responsibility and actionable guidance on how to integrate social responsibility into the organization (International Organization for Standardization, 2010). One critique is that it is a non-certifiable and voluntary document and thus not enforceable, which

could lead to greenwashing (Camilleri, 2019). Moratis (2016) notes that the ISO 26000 definition of corporate social responsibility is missing some important themes like addressing the needs of future generations, and specification of actions and expectations. Others suggest that standardization of social responsibility is costly (Toppinen et al., 2015) thus standards will never be a complete solution to social and environmental problem (Rasche, 2010). Adherence to ISO has been criticized for permitting a disconnect between organizational change, and simple compliance. Organizations look to simply “pass the exam” of the ISO rather than garner an understanding of it (Boiral, 2012; Sandholtz, 2012).

3.3.5.3 OECD Guidelines for Multinational Enterprises (OECD Guidelines)

The OECD Guidelines are voluntary principles and standards to guide responsible business conduct within a global context; a code of conduct for multinational enterprises that were developed as recommendations from governments. The authors claim the Guidelines help companies contribute to positive global economic, environmental, and social progress (OECD, 2011). The OECD Guidelines have been criticized for omitting key themes, such as climate change, land governance, biodiversity, and more (Mulder & Scheltema, 2018). King (2018), notes that for the Guidelines to effect change, they must address corporate governance models and business models at the source, specifically shareholder primacy, rather than address impacts of these models. One of the Guidelines’ weaknesses is that it is voluntary, not legally binding, and unenforceable (Černič, 2008), therefore, they are inadequate for improving multinational operations (Oldenziel et al., 2010).

3.3.5.4 SDG Compass

The SDG Compass is a 5-step framework to help companies align strategies to achievement of the Sustainable Development Goals.

Scheme	Author	Description	Critiques
British Standards 8001:2017 Circular Economy (BS 8001)	British Standards Institution	Guidance on implementing the principles of the circular economy.	Too inclusive and broad to promote change and it fails to identify effective approaches to reduce environmental impacts (Pomponi & Moncaster, 2019); it is unspecific, fails to provide guidance, does not clearly link circular economy with sustainability, guidance is generic, and a weak link to monitoring, accounting, and assessment (Pauliuk, 2018); uses Brundtland definition of sustainability but no explicit definition of corporate sustainability
International Organization for Standardization 26000:2010 (ISO 26000)	International Organization for Standardization	7 principles of social responsibility and actionable guidance on how to integrate social responsibility into the organization.	A non-certifiable and voluntary document, not enforceable, could lead to greenwashing (Camilleri, 2019), definition of corporate social responsibility is missing some important themes: addressing the needs of future generations, organizational governance does not specify actions and expectations (Moratis (2016), standards will never be a complete solution to social and environmental problem (Rasche & Kell, 2010), permits a disconnect between real organizational change, and simple compliance (Boiral, 2012; Sandholtz, 2012)
OECD Guidelines for Multinational Enterprises (OECD Guidelines)	Organization for Economic Co-operation and Development	Principles and guidance for responsible business conduct within a global context; a code of conduct for multinational enterprises that were developed as recommendations from governments.	Omits key themes, such as climate change, land governance, biodiversity, and more (Mulder & Scheltema, 2018), do not address corporate governance models and business models at the source (King, 2018), voluntary, not legally binding, and unenforceable (Černič, 2008), inadequate for improving multinational operations (Oldenziel et al., 2010).
SDG Compass	United Nations	5-step guide to help companies align strategies to achievement of the Sustainable Development Goals	Too complex for SMEs (Dalton, 2020); vague with limited direction; shares same critiques at the Sustainable Development Goals

Table 12 - Sustainability Guidelines

3.3.6 Standards

Standards represent best practices, are rigid with no room for flexibility, identify mandatory activities that are clearly defined, and are concise, specific,

measurable, and quantitative. Standards offer specific mandatory actions that companies must achieve and report to an oversight authority. They are rules that are decided upon by a third party (Brunsson et al., 2012) that focus on both "what" to do and, more importantly, "how" to do it. Standards often lead to certification or accreditation within the realm of the certifying or accrediting body's authority. Standards address the principles based on what a framework dictates are the path to managing and measuring sustainability. This study included 3 standards (Table 13): Certified B Corporation, EU Eco-Management and Audit Scheme, and SA8000 Social Accountability.

3.3.6.1 Certified B Corporation (B Corp)

Certified B Corps issue and verify standards for environmental, economic, and social performance of companies. The author states that "Certified B Corporations are a new kind of business that balances purpose and profit" (B-Lab, 2021) and claim it is the "only certification that measures a company's entire social and environmental performance" (B-Lab, 2021). Companies complete a self-assessment of five key areas by following the appropriate standards for company, industry, location, size, and revenues, submit the documentation to B-Lab for verification, and become B Corp Certified. Critics claim the standards are not legally enforceable, B-Lab presents no compelling reasons for certification, because B-Lab is simply a cash-generating machine, and certification simply pacifies consumers and attracts investor (O'Regan, 2019). "The B Corp certification recognizes high social and environmental performance in business. This performance is measured in five pillars—Governance, Workers, Community, Environment, and Customers—but with no minimum threshold per pillar. This allows companies to choose those impact areas where they want to perform well" (Liute & De Giacomo, 2022).

3.3.6.2 EU Eco-Management and Audit Scheme (EMAS)

The EMAS is a voluntary environmental management system to help companies evaluate, report, and improve environmental performance. The authors claim that the use of EMAS will enhance credibility, transparency, environmental risk

management, financial performance, and employee motivation. The tool is built upon four management principles and follows ten steps. Upon completion, the company completes an internal audit, reports results to EMAS for verification, and becomes an EMAS registered organization. EMAS is available globally and is not restricted to EU companies. Early adopters reported difficulties with terminology, found the scheme to be confusing and misleading, and expensive to implement (Strachan et al., 1997). Wenk (2009) notes that EMAS is inefficient, impractical, and has devolved into obscurity while (Tourais & Videira, 2016) point out that existing research does not find a clear linkage between EMAS adoption and improved corporate environmental improvement.

3.3.6.3 SA8000 Social Accountability (SA8000)

The SA8000 is a social accountability standard to promote international standards for human rights and labor laws. The authors claim that SA8000 follows a continuous improvement approach, not a checklist, and holds companies to the highest social and human rights standards. A company completes a self-assessment then undergoes a third-party audit to become SA8000 certified. Among the criticisms of the SA8000 are that there has been no improvement in labor conditions and, in fact, has failed to protect workers, certified companies are not properly monitored, violations are often concealed from auditors, workers do not participate in the standard setting and decision-making process, companies have no responsibility for paying living wages, and the SA800 offers “cheap and commitment-free social responsibility” (WSR Network, 2018). This sentiment is echoed in the critiques from Boiral, Heras-Saizarbitoria and Testa (2017) of the SA8000 as a greenwashing tool. Murmura et al. (2017) note the SA8000 does not define sustainability.

Scheme	Author	Description	Critiques
Certified B Corporation (B Corp)	B Lab	Standards for environmental, economic, and social performance of companies that balance purpose and profit	Standards are not legally enforceable, B Lab presents no compelling reasons for certification, B Lab is simply a cash-generating machine, and certification pacifies consumers and attracts investors (O'Regan, 2019; O'Regan & Choe, 2019).
EU Eco-Management and Audit Scheme (EMAS)	European Commission	The EMAS is a voluntary environmental management system to help companies evaluate, report, and improve environmental performance. The authors claim that the use of EMAS will enhance credibility, transparency, environmental risk management, financial performance, and employee motivation. The tool is built upon 4 management principles and follows 10 steps; upon completion, the company completes an internal audit, reports results to EMAS for verification, and becomes an EMAS registered organization. EMAS is available globally and is not restricted to EU companies.	Early adopters reported difficulties with terminology, found the scheme to be confusing and misleading, and expensive to implement (Strachan et al., 1997), is inefficient, impractical, and has devolved into obscurity (Wenk, (2009), existing research does not find a clear linkage between EMAS adoption and improved corporate environmental improvement (Tourais and Videira (2016)
SA8000 Social Accountability (SA8000)	Social Accountability International	A social accountability standard to promote international standards for human rights and labor laws.	Use has resulted in no improvement in labor conditions, has failed to protect workers, certified companies are not properly monitored, violations are often concealed from auditors, workers don't participate in the standard setting and decision-making process, companies have no responsibility for paying living wages, and the SA800 offers "cheap and commitment-free social responsibility" (WSR Network, 2018). A greenwashing tool Boiral, Heras-Saizarbitoria and Testa (2017)

Table 13 - Sustainability Standards

3.3.7 Data Collection

The documentation collected for the sustainability schemes was acquired through resources available online (Table 14).

Scheme Name	Scheme "official" site	Scheme Origin Date	Revision Year of document in our Study	Scheme Type
Carbon Disclosure Project	https://www.cdproject.net/CDPResults/CDP-2010-G500.pdf	2000-2002	2021	Framework
Climate Disclosure Standards Board	https://www.cdsb.net/	2007	Jul-05	Framework
Doughnut Economics	https://doughnuteconomics.org/	2012	2022	Framework
Global Reporting Initiative Universal Standards 2021	http://www.globalreporting.org; (https://www.academia.edu/2522036/GRI_and_the_camouflaging_of_corporate_unsustainability)	2001	2021	Framework

Planetary Boundaries	https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries.html	2009	2015	Framework
Sustainability Accounting Standards Board	http://www.sasb.org	2011	2018	Framework
Sustainable Development Goals (SDG)	https://sdgs.un.org/goals	2015	2017	Framework
Task Force on Climate-Related Financial Disclosures (TCFD) reporting framework (climate only)	https://www.fsb-tcfd.org/	2015	2015	Framework
British Standards Inst. 8001 Circular Economy	http://www.bsigroup.com.au/en-au/Assessment-andCertification-services/Management-systems/Standards-and-schemes/OHSAS-18001/	2015-2017	2015-2017	Guideline
OECD Guidelines for Multinational Enterprises	http://www.oecd.org/environment/indicators-modelling-outlooks/24993546.pdf	1977	2011	Guideline

SDG Compass Guide	https://sdgcompass.org/	2015	2015	Guideline
Circular Economy	https://ellenmacarthurfoundation.org/	2009-2010	2021	Principle
International Integrated Reporting Council	https://www.integratedreporting.org/	2013	2021	Principle
Natural Capitalism	https://natcapsolutions.org/	2002	2002	Principle
The Natural Step	https://www.naturalstep.ca/five-level-framework	1989	2012	Principle
UN Global Compact	http://www.unglobalcompact.org/AboutTheGC/TheTenPrinciples/index.html	2000	2021	Principle
International Organization for Standardization	https://www.iso.org/iso-14001-environmental-management.html	2015	2015	Standard

Certified B-Corporation	https://bcorporation.net/	2006-2007	2021	Standard
EU Eco Management and Audit Scheme	http://ec.europa.eu/environment/emas/index_en.htm	1993-1995	2013	Standard
Sustainable Development Performance Indicators	https://www.unrisd.org/en	2022	2022	Guideline

Table 14 – List and basic information of the sustainability schemes sampled.

3.3.8 *Statistical Analysis and Results*

Each of the schemes was examined with a quantitative method of content analysis via the technique of text mining. Keywords (Appendix 1) were replicated from prior studies of sustainability strength (Landrum & Ohsowski, 2017, 2018) in which the authors used two iterations of citation pearl growing (Hawkins & Wagers, 1982; Schlosser et al., 2006). Citation pearl growing assesses relevant research to determine keywords through an iterative search process. Using the standardized keywords, sustainability strength was assessed in accordance with the Stages of Sustainability model.

Structural topic modeling provided guidance for the text mining methodology (Roberts et al., 2014). An unsupervised approach was used, as computer software automated the process of counting keyword frequency in each document. The concept of fully automated clustering was applied in the text mining process, meaning no algorithms were used in the software to induce data beyond word count (Grimmer and Stewart, 2013; Lucas et al., 2015).

Each of the sustainability scheme documents were transformed from original formats (either pdf or txt) to a standardized text format, encoded as UTF-8 with xPDFreader (version 4.03). Text mining and statistical analyses were performed with

R (version 4.2.1) (R Core Team, 2022) in R-Studio (version 2022.07.02). Text mining was conducted in R with Text Mining Package (*tm*) (version 0.7-9) (Feinerer & Hornik, 2022). R-script for the text mining and statistical analysis was written by the authors.

The standardized keywords were used to obtain quantitative data for corporate sustainability strength from sustainability scheme documents. Keyword counts related to the Stages of Sustainability model were collected for each scheme and totaled by stage. Each keyword count for the five stages was divided by total document word count and converted to a percentage for each stage to standardize keyword count regardless of document size. These percentages of keywords from each stage served as output variables.

Data were statistically analyzed using Type I ANOVA models with the aov() function from the base R stats package (R Core Team, 2022). Type I ANOVA models were utilized to test variance of the means among groups of keywords that were text-mined from the sustainability scheme documents. Categorical factors in the models were determined to be statistically significant when $p \leq 0.05$. For all analyses, data were log10 transformed to meet the assumptions of the Type I ANOVA test.

Using the BiodiversityR package (version 2.14-1) (Kindt, 2022), rank abundance curves were created for each stage by comparing the percentage of keywords per document in each document. Rank abundance curves are generated by numerically ranking the percentage of keywords counted per document from highest to lowest (Table 1). The scheme documentation with the highest percentage of keywords is designated a rank of 1, the second highest is designated a rank of 2, etc. The rank abundance curves allow for simple visualization of the keyword percentages for each stage, for all documents. The schemes can be assessed as a group by examining the entire rank abundance curve and assessed individually by looking at the data points. Steep curves indicate that one or more documents exhibit a large difference in percentage of keywords per document compared to other documents in the dataset. Flatter curves indicate a relatively more equal distribution of percentage of keywords per document.

3.3.9 Statistical results

The five stages of corporate sustainability (Landrum & Ohsowski, 2018) were examined to compare the sustainability scheme language. Each stage was significantly different from all other stages, indicating no similarity in stage keyword percentage ($p < 0.001$) (Figure 17). Mean ± standard error keyword percentages were highest in, Business-Centered, Stage 2 (1.32% ± 0.19%), Systemic, Stage 3 (1.08% ± 0.16%), and Compliance, Stage 1 (0.84% ± 0.13%). Mean ± standard error keyword percentages were lowest in Coevolutionary, Stage 5 (0.31% ± 0.10%) and Regenerative, Stage 4 (0.28% ± 0.06%). Significance in the main effects of the model was determined by Type I ANOVA.

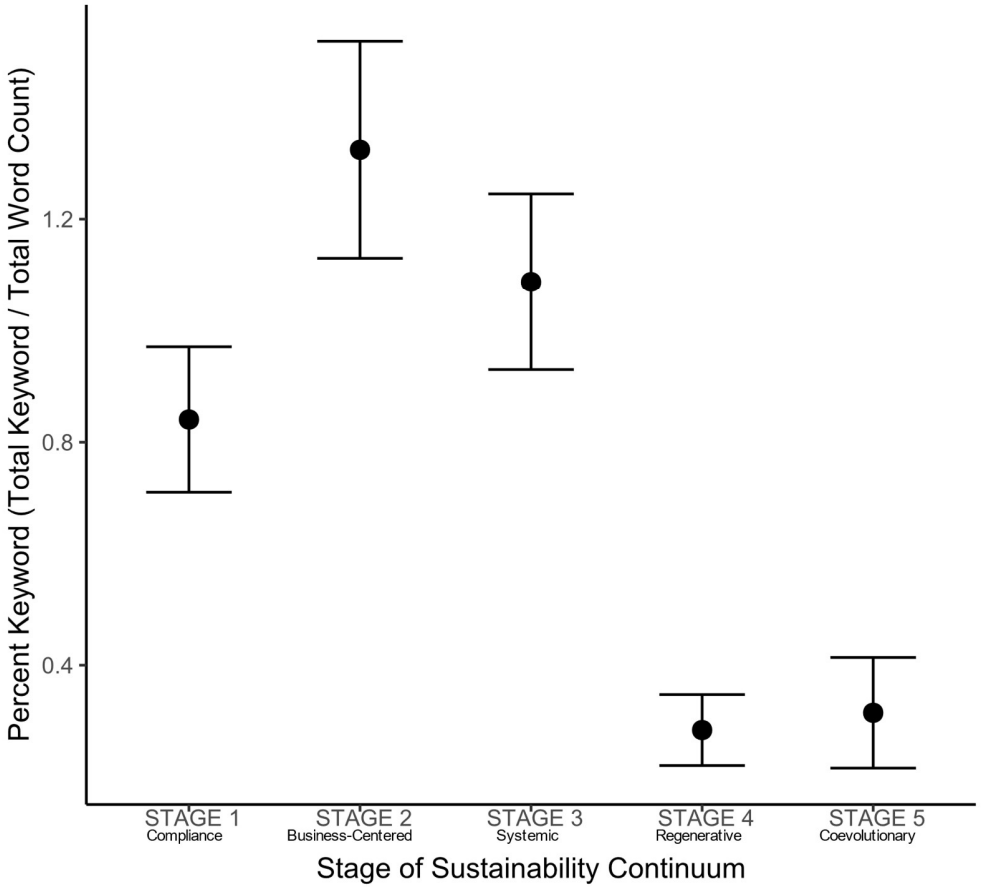

Figure 17 - Means and standard error of keyword percentage of the sample for each Stage of Sustainability.

($p < 0.001$) N=22.

Sustainability Spectrum Sustainability Stage	Very Weak Compliance - Stage 1	Weak Business-centered - Stage 2	Intermediate Systemic - Stage 3	Strong Regenerative - Stage 4	Very Strong Coevolutionary - Stage 5
Scheme	**Rank**				
AA1000	17	13	16	20	11
Bcorps	10	16	18	16	16
BS8001	16	4	6	4	2
CDP	4	12	22	5	9
CDSB	6	10	20	11	13
CircularEcon	19	8	5	6	3
Doughnut	20	11	3	14	1
EMAS	2	20	9	15	19
GRI	15	19	21	17	15
<IR>	7	3	11	7	17
ISO26000	14	18	14	12	12
ITP	13	1	1	3	18
NatCap	21	2	15	8	7
OECD	9	17	13	18	20
PlanetaryBound	11	22	2	1	4
SA8000	5	21	12	22	20
SASB	3	5	7	10	14
SDG	12	9	10	2	6
SDG_Compass	18	6	8	9	10
TCFD	1	7	19	19	8
TNS	22	14	4	13	5
UNGC	8	15	17	21	20

Table 15 - Rank of percentage of keyword abundance in each scheme for each stage

Rank range is from 1 to 22.

The Rank Abundance data was arranged alphabetically by scheme, and in order from Compliance, Stage 1 through Coevolutionary, Stage 5 (Table 15). The data are rankings of keyword percentage by stage, calculated by the percent of keywords divided by document total word count. Color coding was used to highlight the four (top and bottom 20%) highest- and lowest-ranked schemes in keyword representation within each stage. Grey was used to highlight the four lowest-ranked (lowest 20%) schemes in Stages 1-3, and the four highest-ranked (top 20%) in Stages 4-5. Black was used to highlight the four highest-ranked schemes in Stages 1-3, and the four lowest-ranked in Stages 4-5. Thus, grey indicates a sustainability desired by proponents of strong sustainability of the schemes, while black indicates undesired results.

Compliance, Stage 1 (very weak sustainability). The Compliance stage suggests legal or regulatory compliance as the primary rationale for adopting sustainability. The top four schemes in the data set that are most closely aligned with Compliance, Stage 1 sustainability (Figure 18) are, respectively, TCFD, EMAS, SASB, and CDP. The bottom four schemes in the data set that are least aligned with Compliance, Stage 1 sustainability (Figure 18) are, respectively, TNS, NatCap, DoughnutEcon and CircularEcon. The slope of the rank abundance curve for Compliance, Stage 1 sustainability (Figure 18) suggests that the first three schemes are most representative of this stage. There is a large difference between these three schemes and the fourth scheme, and the remaining schemes are even less representative of the stage.

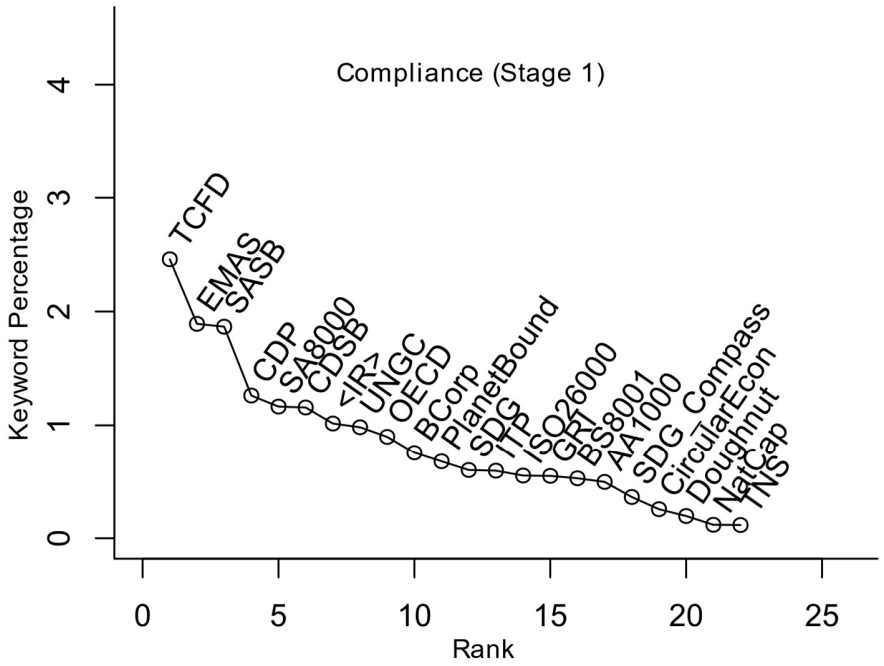

Figure 18 - Rank abundance curve of Compliance sustainability (Stage 1).

Business-Centered, Stage 2 (weak sustainability). The Business-Centered stage suggests the business case as the primary rationale for adopting sustainability. The top four schemes in the data set that are most closely aligned with Business-Centered, Stage 2 sustainability (Figure 19) are, respectively, ITP, NatCap, <IR> and BS8001. The bottom four schemes in the data set that are least aligned with Business-Centered, Stage 2 sustainability (Figure 19) are, respectively, PlanetBound, SA8000, EMAS and GRI. The slope of the rank abundance curve for Business-Centered, Stage 2 sustainability (Figure 19) suggests that the first four schemes are most representative of this stage. There is a large difference between the top four schemes and the fifth scheme, and the remaining schemes are even less representative of the stage.

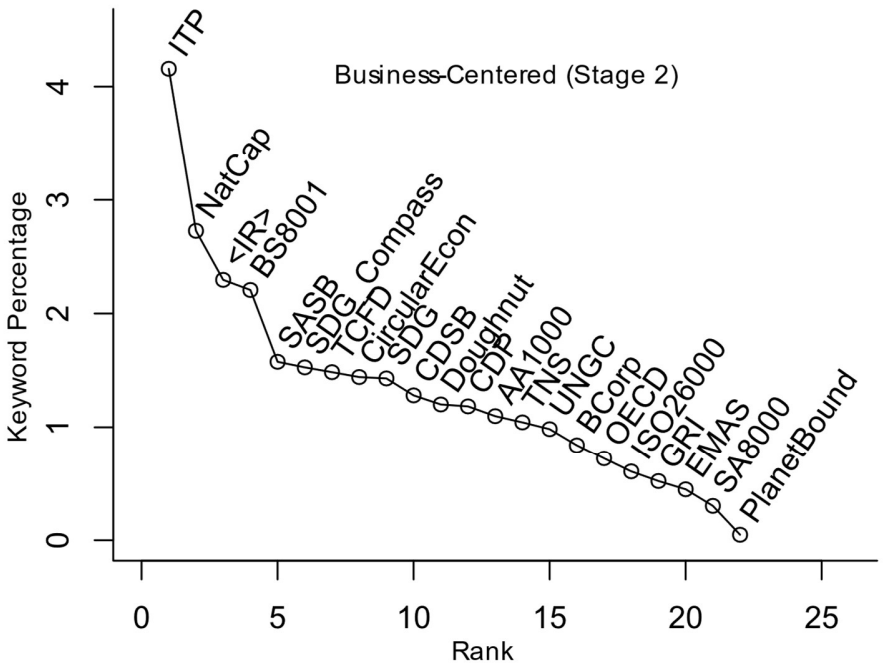

Figure 19 - Rank abundance curve of Business-Centered sustainability (Stage 2).

Systemic, Stage 3 (intermediate sustainability). The Systemic stage suggests systems change as the primary rationale for adopting sustainability. The top four schemes in the data set that are most closely aligned with Systemic, Stage 3 sustainability (Figure 20) are, respectively, ITP, PlanetBound, DoughnutEcon, and TNS. The bottom four schemes in the data set that are least aligned with Systemic, Stage 3 sustainability (Figure 20) are, respectively, CDP, GRI, CDSB, and TCFD. The slope of the rank abundance curve for Systemic, Stage 3 sustainability (Figure 20) suggests that the first three schemes are most representative of this stage. There is a large difference between these three schemes, and the fourth scheme and the remaining schemes are even less representative of the stage.

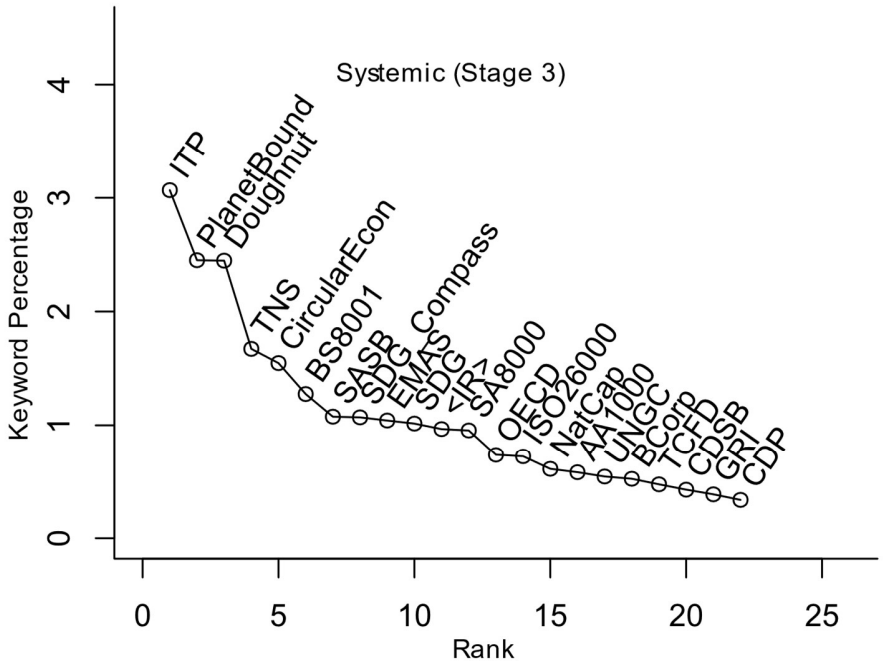

Figure 20 - Rank abundance curve of Systemic sustainability (Stage 3).

Regenerative, Stage 4 (strong sustainability). The Regenerative stage suggests restoring the damage caused to natural and social systems as a result of practices adopted during the Industrial Revolution and the need to protect or maintain the habitat as the primary rationale for adopting sustainability. The top four schemes in the data set that are most closely aligned with Regenerative, Stage 4 sustainability (Figure 21) are, respectively, PlanetBound, SDG, ITP, and BSI8001. The bottom four schemes in the data set that are least aligned with Regenerative, Stage 4 sustainability (Figure 21) are, respectively, SA8000, UNGC, AA1000, and TCFD. The slope of the rank abundance curve for Regenerative, Stage 4 sustainability (Figure 21) suggests that the PlanetBound is most representative of this stage and then there is a large difference with the remaining schemes.

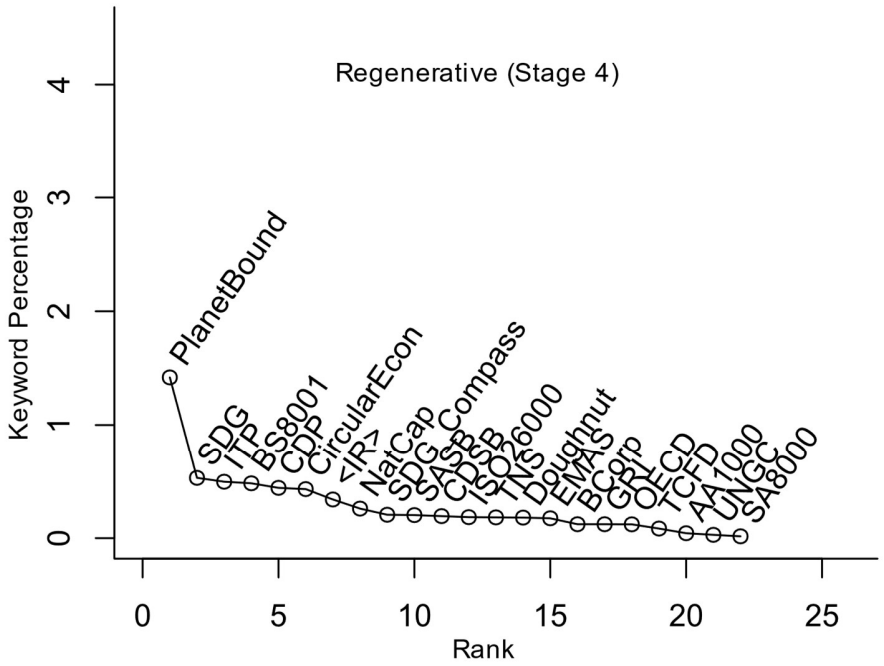

Figure 21 - Rank abundance curve of Regenerative sustainability (Stage 4).

Coevolutionary, Stage 5 (very strong sustainability). The Coevolutionary stage suggests developing symbiotic relationships with natural systems to support a flourishing habitat and respecting humanity's place as only one part of nature as the primary rationale for adopting sustainability. The top four schemes in the data set that are most closely aligned with Coevolutionary, Stage 5 sustainability (Figure 22) are, respectively, DoughnutEcon, BSI8001, CircularEcon, and PlanetBound. The bottom four schemes in the data set that are least aligned with Coevolutionary, Stage 5 sustainability (Figure 22) are, respectively, UNGC, SA8000, OECD, and EMAS. The slope of the rank abundance curve for Coevolutionary, Stage 5 sustainability (Figure 22) suggests that the first four schemes are most representative of this stage.

There is a large difference between these four schemes, and the remaining schemes are even less representative of the stage.

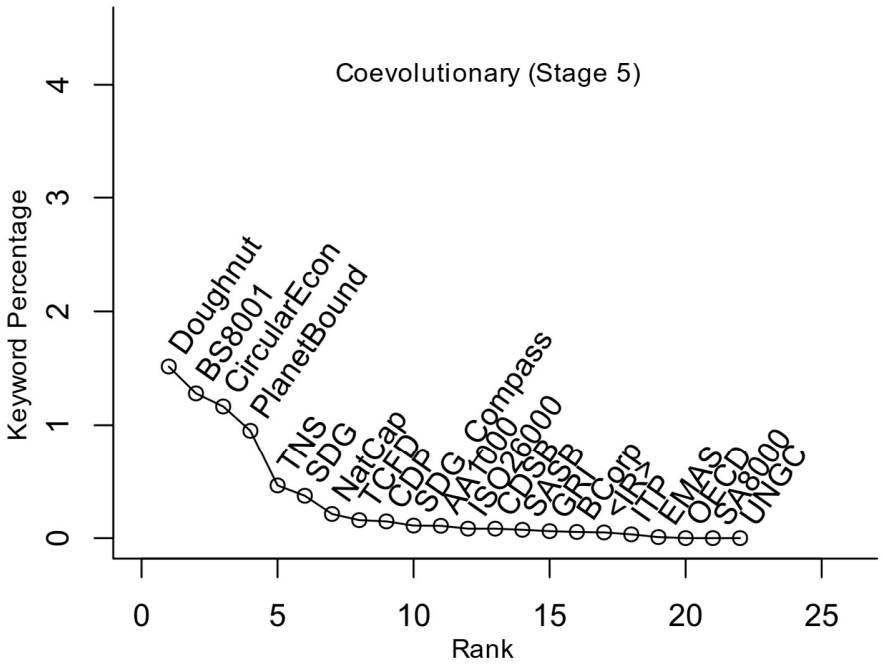

Figure 22 - Rank abundance curve of Coevolutionary sustainability (Stage 5).

The prior rank abundance curves (Figures 18, 19, 20, 21, & 22) show us how the schemes performed relative to one another by stage. As an indication of which stage each individual scheme most represented, where each scheme scored highest in keyword percentage was also identified. Table 16 shows us those results. The stage in which each scheme had the highest keyword percentage determines the scheme placement as the most representative stage.

Sustainability Spectrum **Sustainability Stage**	**Very Weak** **Compliance - Stage 1**	**Weak** **Business-centered - Stage 2**	**Intermediate** **Systemic - Stage 3**	**Strong** **Regenerative - Stage 4**	**Very Strong** **Coevolutionary - Stage 5**
Schemes	CDP EMAS GRI OECD SA8000 SASB TCFD UNGC	AA1000 Bcorps BS8001 CDSB <IR> ITP NatCap SDG SDGCompass	CircularEcon DoughnutEcon ISO26000 PlanetaryBound TNS		

Table 16 – Each schemes strongest alignment with a sustainability stage

Based upon keyword percentage of each individual scheme, 8 (36.4%) of the 22 schemes most represent Compliance very weak, sustainability; 9 (40.9%) of the schemes most represent Business-Centered weak sustainability; 5 (22.7%) of the schemes most represent Systemic intermediate sustainability; 0 (0%) of the schemes most represent Regenerative strong sustainability, and 0 (0%) of the 22 schemes most represent Coevolutionary very strong sustainability. In other words, 17 (77.2%) of the schemes are on the weak and very weak sustainability side of the spectrum and none (0%) of the schemes are on the strong and very strong sustainability side of the spectrum. Only 5 (22.8%) of the schemes most promote systemic sustainability.

4 Chapter 4: Discussions and Implications

To construct the thesis that application of strong sustainability theory is needed to further understand and enact positive organizational sustainability behaviors, two separate lines of research were created. The first line of research sought knowledge of relationships between organizational culture and strong sustainability theories. The second line of research line investigated applied strong sustainability theory to corporate sustainability schemes. The support for the hypotheses of each line of research will now be presented. First, discussion and implications from each line of research will be addressed. Then the results will be discussed in consideration of the thesis, along with implications for strong sustainability theory. Next, limitations and future research will also be acknowledged in each section. Finally, the dissertation thesis will be addressed based on these results.

4.1 Organizational Culture and Strong Sustainability Theory

The aim of the first line of research was to investigate the existence of relationships between organizational culture and strong sustainability theory. Relationships between the two concepts were observed via empirical data that measured organizational culture via the Competing Values Framework types and strong sustainability theory via the Stages of Sustainability model. Based on the results of statistical analysis, the hypotheses have been assessed, implications have been considered, and advisement for organizations orientated towards each of the four Competing Values Framework types has been produced.

4.1.1.1 Organizational Culture and Strong Sustainability Theory – Hypothesis support

Four hypotheses were presented, each linking one of the Competing Values Framework types to a stage of sustainability. Empirical evidence from 197 data

points gave way to statistical analysis. Whether the statistical analysis supported or did not support the hypotheses will now be discussed.

4.1.1.2 Hypothesis 1 – Adhocracy

Organizations with proclivity toward Adhocracy typologies were hypothesized to positively relate to Regenerative (Stage 4) and Coevolutionary (Stage 5) sustainability. The Adhocracy type did not significantly relate to any stage of sustainability. This hypothesis was not supported.

Adhocracy oriented organizations are considered leaders of innovation and change (Cameron & Quinn, 2011). Among the four Competing Values Framework types, the Adhocracy type was expected to relate to strong sustainability most positively and relate to weak corporate sustainability most negatively because Adhocracy oriented organizations are characterized by the dimensions of external focus and high flexibility. These dimensions align with appeasing external stakeholders and fostering the innovative changes needed for employing corporate sustainability. The results suggest this is not necessarily true. Organizations strongly oriented towards the Adhocracy type were not significant purveyors of strong nor weak corporate sustainability. One reason for this may be that the strong presence of the Market type in these organizations overwhelms the Adhocracy type. Prior research has suggested that when one Competing Values Framework type is too dominant, the imbalance can stifle the characteristics of another Competing Values Framework type (Linnenluecke & Griffiths, 2010; Soares et al., 2018). Since the R2 values were low for the models that did have significance, it may be necessary for adhocracy organizations to be supported by other concepts of organizational behavior that foster behaviors needed for strong sustainability, like leadership (Pasricha et al., 2018) or knowledge management (Rai, 2011).

The Adhocracy type did not relate to any stage of corporate sustainability, but to improve the likelihood of achieving strong corporate sustainability, there are recommendations to make for Adhocracy oriented organizations based on links found among the other three types. One adjustment prescribed to Adhocracy

organizations relates to their structure. The Hierarchy and Market types strongly relate to weak corporate sustainability. Both types are oriented towards a structure of high control and inflexibility. It is possible that Adhocracy organizations that manage the structure dimension toward increased freedom and flexibility might achieve strong corporate sustainability. Additionally, the Clan type was found to decrease weak sustainability. While the Adhocracy type is flexibly structured like the Clan type, the focus differs. It is advisable for Adhocracy organizations to shift more towards an internal focus to reduce weak corporate sustainability.

4.1.1.3 Hypothesis 2 – Clan

Organizations with proclivity toward Clan typologies were expected to positively relate to Business-Centered (Stage 2) and Systemic (Stage 3) sustainability. The results showed the opposite is happening. The Clan type has a negative relationship with Business-Centered corporate sustainability (Stage 2). No significant relationship was found between the Clan type and strong corporate sustainability. This hypothesis was not supported.

Clan organizations value strong relationships between the organization's members, customers, and suppliers (Cameron & Quinn, 2011). Additionally, Clan organizations are flexible, positioning the organization to be open to new innovations, policy, and procedure required by corporate sustainability (Linnenluecke & Griffiths, 2010). Based on prior literature, it was surprising for data to show Clan organizations were repellent of weak sustainability. One explanation is that Clan-oriented organizations avoid weak sustainability to satisfy relationships with stakeholders. This aligns with research that suggests the intention of sustainability is about managing relationships with economic, environmental, and social capitals. If the organizations members, suppliers, and customers find sustainability important, Clan oriented organizations will adjust to satisfy these relationships (Hartnell et al., 2011; Wijethilake et al., 2023). The empathetic, relationship-based nature of Clan organizations aligns with these intentions of sustainability. Another reason Clan organizations reduce weak corporate sustainability may be related to the need for a capable leader. Past research showed

Adhocracy and Clan organizations are both capable of integrating corporate sustainability, but the Adhocracy type relied on ethical leadership more than Clan organizations (Pasricha et al., 2018). This finding aligns with the low R^2 values in the results, which suggest other factors besides culture are important influences on sustainability strength.

In practice, Clan organizations should continue pursuing a structure that promotes flexibility, rather than the strict, controlling structure found in the Hierarchy and Market types. Weak corporate sustainability is expected to be reduced when doing so. Clan-oriented organizations are advised to manage a strong internal focus, as the results showed only this typology reduced weak sustainability. This suggests the internal focus on means and ends in Clan organizations fosters a better environment than organizations with an external focus.

4.1.1.4 Hypothesis 3 – Market

Organizations with proclivity toward Market typologies were expected to positively relate toward Business-Centered (Stage 2) and Systemic (Stage 3) sustainability. The statistical analysis in this research finds that the Market type is positively related to Business-Centered (Stage 2) sustainability. No relationships with strong corporate sustainability were found. This hypothesis was partially supported.

The Market type was expected to be a purveyor of weak corporate sustainability, and analysis proved this to be true. Market leaning organizations value transactional relationships and competition (Cameron & Quinn, 2011). Market type organizations achieve goals when an advantage is gained from methodically vetting new external foci to gain competitive advantages (Cameron & Quinn, 2011). Since the Market type behavior is fixated on results, undertaking corporate sustainability is viewed as an investment that will pay off when it is meticulously scrutinized and ready to sell (Linnenluecke & Griffiths, 2010). This research shows that Market type organizations engage in Business-Centered (Stage 2) sustainability to gain achieve goals. Market organizations will not relate to strong corporate sustainability until

Regenerative (Stage 4) and Coevolutionary (Stage 5) prove to be profitable or advantageous. This is a symptom of the Market organization's strict and controlling structure.

Recommendations for Market organizations are apparent. Practical application suggests Market oriented organizations should alleviate tendencies of strict control to allow more freedom and adaptability. Market type organizations are naturally competitive, thus a shift in behavior to be more flexible should also be managed to align with competitive advantages compatible with the tenets of strong corporate sustainability.

4.1.1.5 Hypothesis 4 – Hierarchy

Organizations with proclivity toward Hierarchy typologies were expected to relate to Compliance (Stage 1) and Business-Centered (Stage 2) sustainability. The Hierarchy type negatively related to Regenerative (Stage 4) corporate sustainability. The hypothesis was not supported.

While the Hierarchy type was not found to relate to weak corporate sustainability, it was unsurprisingly found to inhibit strong corporate sustainability. Hierarchy organizations value stability, predictability, and efficiency . Previous literature predicts Hierarchy organizations are capable of strong corporate sustainability because there are efficiencies and future stability to be gained from doing so. However, the large and unpredictable changes from a concept like sustainability are in opposition with the nature of the Hierarchy type (Linnenluecke et al., 2009). Hierarchy-oriented organizations limit experimentation and transformation more so than the other types (Ashkanasy et al., 2000; Büschgens et al., 2013). It is even suggested that Hierarchy organizations are imitative in change, incapable of pursuing an endeavor like strong corporate sustainability until other organizations have proven it safe (Naranjo-Valencia et al., 2011). Hierarchy type organizations may be imitating the weak corporate sustainability of other organizations, thus the inhibition to strong corporate sustainability.

Practical changes for Hierarchy oriented organizations are recommended from this research. Organizations oriented towards a Hierarchy culture need to emphasize a structure more welcoming of flexibility. A Hierarchy organization's behaviors that result in rigidity and self-preservation must be relaxed to partake in corporate sustainability more faithfully. The expected result is a reduction in a negative relationship with strong sustainability.

4.1.2 Implications from the relationships found between organizational culture and strong sustainability theory

Previous literature found that Adhocracy-oriented organizations are most correlated with sustainability while Hierarchy, Market, and Clan-oriented organizations lag behind or only support one pillar of sustainability (Liao, 2018; Matzler et al., 2013; Parikh, 2016). This study took a different approach to determine if the Competing Values Framework types were related to sustainability strength, by applying hypotheses developed from the conclusions from the previous research. The lack of full support for the research line's hypotheses has implications for organizational culture and strong sustainability theory.

The first implication is that application of strong sustainability theory yields different results than research that does not consider a range of sustainability outcomes. The literature that contributed to the development of the hypotheses was conducted with approaches inconsiderate of a range of sustainability outcomes. Studies without this consideration of sustainability will falter in cultivating impactful sustainability (Geels et al., 2008; Kennedy et al., 2017; Liao & Zhang, 2020). Advancing organizations towards strong sustainability requires measurements that determine if sustainability in organizations is conducted out of compliance or to preserve the natural environment. This implication aligns with calls from Roome (2011) for past and future sustainability research to be considered or re-considered with strong sustainability. He argues that treating sustainability as a monolithic, single outcome construct, ingrains weak sustainability into research and practice.

A second implication is based on the lack of empirical results in the literature that contributed to the development of the hypotheses. The implication is that previous theoretical literature linking organizational culture and sustainability needs validation to be considered in future research. The non or partial support for the four hypotheses in this dissertation's study of organizational culture and strong sustainability could have been better predicted or more nuanced if studies with empirical data existed. Calls from Yanarella et al., (2009) and Roome (2011) both suggested a lack of empirical evidence might be guiding sustainability literature in the wrong direction.

The third implication is that OC theory needs to be considered alongside other factors of organizational behavior. Although relationships between culture and sustainability in this were statistically significant, the low R-squared values indicate OC has a weak influence. While the importance of culture has been stated, it does not exist in a vacuum. Changing OC in organizations is a formidable process that requires suitable leadership, strategy, and actualization from competent change managers. Concepts grounded in organizational behavior such as leadership (Metcalf & Benn, 2013; Pasricha et al., 2018), knowledge management (Martins et al., 2019; Rai, 2011b), and business models (Inigo, 2019), are known to work in conjunction with OC. Future efforts to explore strong sustainability and green innovation must extend beyond culture. This implication aligns with past research (Begum et al., 2022; Boons et al., 2013; Shahzad et al., 2021).

The fourth implication is that the Competing Values Framework may not be a reliable instrument for assessing culture for strong sustainability. As stated in the theoretical framework, it was selected for this research because it has been validated as a tool to measure OC, and for its ability to guide practitioners. The statistical analysis shows the Competing Values Framework may have faltered because the sample was dominated by a Market orientation. While other research with samples heavily oriented towards the Market type have set precedence in this case, there may be a short-coming in the model when relationships to strong sustainability are sought. Therefore, future research should look towards creating a cultural model that

is compatible with strong sustainability theory. The examples of sustainable cultural models presented in the literature review do not yet meet the criteria for this study. For example, the Integrated Sustainability Organizational Culture model is derived from The Triple Bottom Line sustainability model, which exemplifies weak sustainability (Dragicevic, 2018; Kantabutra, 2021). The Culture of Sustainability and Sustainability Organizational Culture frameworks fail to acknowledge various outcomes of sustainability (Bertels et al., 2010; Ketprapakorn & Kantabutra, 2022). The Model of Culture for Sustainable Quality Management applies sustainability to gain competitive advantage, rather than any preservation of environmental resources (Lagrosen & Lagrosen, 2019).

The fifth implication is that the Stages of Sustainability model can be applied as an outcome dependent on factors outside of the sustainability domain. Previously, it was applied to assess worldviews of sustainability, sustainability schemes, sustainability reporting, and sustainability business readings (Demastus & Landrum, 2023; Landrum & Ohsowski, 2017, 2018). Through this research, it is now demonstrated that the Stages of Sustainability model can relate to other academic disciplines through linear regression modeling. This ramification paves the way for new research exploring how strong sustainability relates with other OC models that may or may not have been established.

4.1.3 Limitations - Organizational Culture and Strong Sustainability Theory

This study has shown there are empirical relationships between organizational culture and strong sustainability theory. However, there are limitations to acknowledge. Both sets of researchers (Fiordelisi & Ricci, 2014; Landrum & Ohsowski, 2018) who created the methods used in this study acknowledge language bias may affect the results. Report wording may be influenced by reporting standards that differ by region, industry, assurances, and standards. Also, report authors are unknown. Language coming from a marketing department, sustainability department, or outside consultancy can influence the words used. Language bias

may even exist because organizations that voluntarily create GRI reports may understand sustainability differently than those that do not (Dyllick & Muff, 2016).

Another limitation is the selection of reports used for analysis. GRI reports are a robust form of communication to understand an organization's sustainability efforts, but other reports could be considered. The Global Compact, Corporate Register, and Datamaran are examples of corporate sustainability reporting that offer alternative approaches to the GRI. Additionally, some of the GRI reports were titled as Corporate Social Responsibility (CSR) reports.

To assess organizational culture, mission statements, investor publications, and even speeches from leadership could be considered as alternative sources to annual reports to shareholders. Furthermore, additional understanding and assessment or sustainability strength and organizational could be gained from direct interaction with organizations through case studies, surveys, and interviews.

The content analysis approach for measuring corporate sustainability and organizational culture may be a limiting factor of this research. While this unobtrusive methodology has been validated in other studies, alternative methods like surveys or interviews may be applicable as well. There is potential for development of better keywords for text mining. In addition to mining text for keywords, key phrases or other indicators of organizational culture can be applied.

The sample's criteria are another limitation of the study. An organization's size, industry, and geography may be important factors in both corporate sustainability and organizational culture. The investigation only included organizations considered large by the GRI database standards. Differing results are possible if medium and small organizations are studied. Organizations across 36 industries (as designated by the GRI database) were studied, but this control variable was not tested because when 197 organizations are divided among the 36 industries there was no industry with a sample size large enough to provide significant results. Previous studies have shown there may be different trends by sector for corporate sustainability and organizational culture. Finally, the sample was restricted to organizations based in the United States of America. It is possible that

firms outside of the USA present differences in sustainability strength and Competing Values Framework type (Golob & Bartlett, 2007; Wilkins & Ouchi, 1983).

4.1.4 Novelty - Organizational Culture and Strong Sustainability Theory

This study marks a novel approach to studying organizational culture and strong sustainability theory for two reasons. First, previous studies relating the two concepts have relied on Triple Bottom Line models to measure sustainability. Baumgartner and Ebner (2010) applied competing values framework types to theoretical predictions about which type would emphasize a particular pillar of sustainability. Likewise, Linnenluecke and Griffiths (2010) also lacked empirical results, when predicting which pillar of sustainability would be emphasized by particular competing value theory types. Dyck et al. (2019) conducted interviews, to similarly approach this research. In each of these efforts, the Triple Bottom Line approach was applied but not justified. The Triple Bottom Line approach has been a prevalent lens for studying corporate sustainability, but as noted in the literature review it is flawed. It represents weak sustainability, where the pillars of sustainability can be substituted. Additionally, the Triple Bottom Line approach was intentioned as a change in mindset for overly capitalist business thinking, but the application of the Triple Bottom Line in academic writing and practice has had the opposite result (Elkington, 2018). Triple Bottom Line approaches also ignore the myriad works that consider numerous new dimensions and spectrums to assess corporate sustainability efforts.

The second novelty of this work is the application of strong sustainability theory into corporate sustainability research. The old idea of strong sustainability has been injected with new life by integrating into research at the firm level. Strong sustainability theory discussions originated in the 1970s (Daly, 1973; Solow, 1974). Economists debated macro ideas about the concept. When sustainability became a more formal concept after the Brundtland Report in 1987, studies of sustainability in business answered questions that could be answered with a “yes” or “no.” The questions generally asked if a driver or factor resulted in corporate sustainability

being present in an organization. There was little regard for the quality of the sustainability being practiced. Seemingly, if an organization announced the word sustainability in a report or business plan, this was good enough to consider the organization as an actor of sustainability. It was not until researchers questioned this in the 1990s (Pearce, 1993; Turner & Pearce, 1993) and followed up in the 2000s if this was the right approach (Landrum, 2018; Roome, 2011; Yanarella et al., 2009). This research extends this overlooked and ignored concept of strong sustainability theory. By applying strong sustainability theory into corporate sustainability research, novel ideas and viewpoints in practice and research begin to unfold. This directly addresses the second problem of The Big Disconnect, which claims corporate sustainability research fails to incorporate new research streams.

The third novelty from this research is empirical measurement of sustainability strength applied to empirical measurement of another theoretical model. The previous major works on this topic were qualitative, theoretical studies (Baumgartner & Ebner, 2010; Dyck et al., 2019; Linnenluecke & Griffiths, 2010). Research that quantitatively measures sustainability is notoriously difficult, and measuring sustainability strength is even more so. There are differing opinions on the definition of sustainability and various models to apply. Additionally, sustainability is practiced across different industries, geographies, political landscapes, eras, and circumstances. Each of these variables mean that a one-size-fits-all solution requires an out-of-the-box thought. The application of content analysis to study the communications of businesses that have embarked on sustainability is just that. The novel approach of using text mining to determine the sustainability strength of organizations is a resolution to a methodology problem that has plagued researchers in sustainability.

4.1.5 Future Research - Organizational Culture and Strong Sustainability Theory

As this research is novel in empirically measuring sustainability strength and its relationship with business science, there are ways to advance knowledge with future research. First, this study measured organizational culture by applying the

Competing Values Framework, which assesses the dimensions of structure and focus. Alternative frameworks to assess organizational culture exist (Reader et al., 2020). Future studies can explore possible relationships between sustainability strength and organizational culture frameworks based on ethics (Biggerstaff et al., 2013) or social responsibility (Di Giuli & Kostovetsky, 2014). Frameworks that consider dimensions like time management, risk aversion, or congruency to local culture are all valid candidates for expanding the knowledge between organizational culture and sustainability strength.

Second, organizational culture is a field nested within the larger science of organizational behavior. The significant findings in this study also had low R-squared values, suggesting other variables may bolster an understanding as to why organizations are embedded in weak sustainability. Concepts of organizational behavior, such as leadership, human resources, knowledge management, innovation, and change strategy, have similarly been studied for a relationship to corporate sustainability, but research applying strong sustainability theory is lacking. These fields are interconnected, each influencing the others (Krapfl & Kruja, 2015). There should be future efforts to study the combination of strong sustainability theory, organizational culture, and other organizational behavior concepts.

Third, an organization's transformation in sustainability is not a single moment. It is a process that takes place over time (Mohrman & Worley, 2010; Verhulst & Lambrechts, 2015). Likewise, organizational culture also shifts over time. An organization's corporate sustainability strength at the time of study may have resulted from organizational culture changes implemented prior to GRI report publication. Therefore, a longitudinal study between the two concepts could pinpoint more specifics for understanding organizational culture to advance on the journey to strong sustainability.

Fourth, organizational decoupling is a disconnect between the image an organization presents of itself and the reality of its actions. Exploration in this field may explain why organizations adopt CS publicly, but decouple the focus and structure from actual ongoing practices because of uncertainty (Westphal and Zajac,

2001). It is possible organizations desire the appearance of legitimacy but fear the uncertainty brought about by change.

Fifth, research has tangentially or theoretically connected strong sustainability theory and innovation novelty (incremental vs radical innovation). More focused research between these two concepts is needed to verify their link (Arundel & Kemp, 2009; Kennedy et al., 2017; Liao & Zhang, 2020; Shevchenko et al., 2016). Studies that thoroughly explore the specific dimensions of sustainability strength and their nuanced relationship to different novelty degrees of green innovation are ripe for investigation.

4.2 Sustainability Schemes and Strong Sustainability Theory

The schemes in this study primarily promote weak sustainability. A business applying any combination of a principle, framework, guideline, and standard from this study will be primarily directed toward weak sustainability. In the literature review, the CDP, GRI, TCFD, SASB, SDG, and <IR> were noted as the most commonly adopted schemes currently utilized by businesses in the USA (Governance & Accountability Institute, 2020; McCalla-Leacy et al., 2022). Evidence from this study indicated the CDP, GRI, TCFD, and SASB primarily promote Compliance, Stage 1 (very weak) sustainability, while the SDG and <IR> primarily promote Business-Centered, Stages 2 (weak).

The schemes did not promote strong or very strong sustainability. A business applying any combination of a principle, framework, guideline, and standard from this study will not be directed towards strong sustainability. Systemic sustainability (mixed weak and strong sustainability) was the most representative stage of five schemes (CircularEcon, DoughnutEcon, ISO 26000, PlanetBound, and TNS) suggesting there is an encouraging transition from weak sustainability to strong sustainability among some schemes, however, continued advocacy for weak sustainability within these schemes hinders them from maturing towards strong sustainability.

These results are consistent with critiques of the schemes that met the inclusion criteria for this study and help explain why businesses that follow these schemes continue to adopt weak sustainability. In further assessment of the 22 schemes, the following themes were noted in critiques.

4.2.1 Sustainability Scheme critiques

Existing ideas represented in the schemes in the sample have persisted for decades, resulting in recirculated, reprocessed, and repackaged approaches to sustainability. The introduction of the CircularEcon and NatCap were presented as original ideas but were in fact imitative of already existing concepts (Desrochers, 2003; Ekins et al., 2020; Kirchherr et al., 2017). The GRI and AA1000 have been revised multiple times without major changes (Bepari & Mollik, 2016). Had these schemes been successful in their first iteration, the global sustainability challenges would be significantly addressed. Instead, imitative ideas allow the perpetuation of business-as-usual weak sustainability.

The schemes in this study fail to motivate organizations towards significant changes. Organizations applying current schemes will likely fall short in trying to reach goals required in efforts to combat climate change, like the Paris Agreement and Intergovernmental Panel on Climate Change recommendations (Flower, 2015; Pomponi & Moncaster, 2019; Rasche, 2010; Stubbs & Higgins, 2014; Thomson, 2015; Upham, 2000). The most popular scheme, the GRI, states, “The Global Reporting Initiative (GRI) Standards do not set allocations, goals, targets, thresholds, or any other benchmarks for good or bad performance” (Global Reporting Initiative, 2022, section 1.1). This claim confirms “voluntary reporting and previously existing standards are not fit for purpose or they leave a lot of room for interpretation” (Reuters Events, 2022, p.4). Furthermore, schemes align with corporate interests (growth, profit, etc.), rather than social or environmental interests, which is a mindset of risk avoidance, resulting in a lack of adequate change (Hickel, 2019; Knight & Smith, 2008; Thatcher, 2014; Tourais & Videira, 2016). Thus, many of the schemes have been declared as greenwashing tools (Camilleri, 2019; Coen et al., 2022).

Critics state that there is no evidence that adoption of the schemes in this study's sample results in improved implementation or outcomes (Climate Disclosure Standards Board, 2020; WSR Network, 2018). Some schemes are bound to internal use, which limits their effectiveness in sustainability beyond a business' walls (Bepari & Mollik, 2016). Other schemes are restricted to managing the financial impacts of sustainability, rather than preservation of environmental, social, and economic capitals (Flower, 2015). In fact, the primary impact of the UN SDGs has been a change in rhetoric but not action (Biermann et al., 2022). This study suggests that the schemes in the sample limit sustainability efforts.

Defining corporate sustainability is notoriously difficult (Montiel & Delgado-Ceballos, 2014). In the documents studied, many schemes do not clearly define sustainability, or they implement a definition at odds with the concept. The CDP assessment asks businesses to identify sustainable activities but does not clarify the definition of sustainability or the specific actions in question. The TCFD defines sustainability as the ability of business to be long-lasting, rather than management of environmental, social, or economic capitals. Many of the schemes in this study vaguely refer to the framework of the 17 UN SDGs as a definition of sustainability but the actual documentation of the SDGs does not formally define sustainability. Thus, practitioners would need to be savvy enough to know the SDGs have roots in the Brundtland definition of sustainability. When business and schemes fail to define sustainability, the misaligned idea that sustainability is a continuation of internal economic success is promoted (Biely et al., 2018). This results in schemes like the SDGs becoming a public relations tool rather than a sustainability tool (Kramer et al., 2019).

In the United States, pursuit of any of the sustainability schemes is voluntary. Adherence to the schemes has been deemed "soft law" (Gilbert et al., 2011). Oversight only exists with certification standards (which are still voluntary), thus amplifying the possibility of greenwashing (Delmas & Blass, 2010; Knight & Smith, 2008; O'Regan & Choe, 2019). Grabosky (2013) warns privatized self-regulation is a dangerous path that may result in a lack of accountability, and no improvement to

existing regulations. King and Lenox (2000) found that industry self-regulation does not work, and government regulation is necessary to achieve change.

4.2.2 Applicable Theories

Established academic theories may also help explain why the efforts of business and researchers result in little progress toward strong sustainability. Five theories that have previously been related to strong sustainability theory are discussed.

4.2.2.1 Deep Ecology Theory

Deep ecology theory tries to understand the value of living beings regardless of their instrumental utility to human needs. The application of deep ecology is an attempt to develop modern societies in a way that prioritizes nature (Naess, 1973). There are elements of environmental ethics, social movements, human supremacy, and economic growth considered in deep ecology. The lens of deep ecology theory is focused on the wellbeing of the Earth's resources rather than the human-focused perspectives. Solutions in the field try to develop systems that prioritize nature.

Modern ideas of sustainability that culminated in the seminal Brundtland Report were influenced by deep ecology (Naess, 1986; Witoszek, 2010). The ethical principles of deep ecology are relevant to business management because the issues sustainability is charged with solving are primarily the responsibility of businesses. Like sustainability, deep ecology perspectives are long-term, which contrasts against the short-term perspectives of most organizations (Fox, 2003). Policy change is also a key component of deep ecology theory that is vital to sustainability. Both seek to change the view of governments and industries in their mindsets about valuing natural resources. Also, both concepts are committed in their approaches to improving the quality of life. Despite the commonalities between the two concepts, the main divergence is that deep ecology applies its principles to all life, including flora and fauna. Sustainability approaches natural resources from a "humanity first" perspective.

Weak and strong sustainability perspectives have roots in deep ecology theory. Naess (1973) divided ecological issues into deep or shallow. Deep ecology is an approach that prioritizes the preservation of nature, without any substitution of other capitals. Shallow ecology allows for degradation of natural resources, or replacement with some sort of known or unknown technology. The depth of ecology practiced is like the study of sustainability strengths, where weak sustainability allows substitution of capitals while strong sustainability does not. The main difference is that the goal of deep ecology is protection of the planet first, while sustainability prioritizes humanity's needs. Sustainability has established a standard on development. Although sustainability is anthropocentric, there are areas of crossover that can be applied to deep ecology through acknowledgement of humanity's problems that are political and economic. Likewise, sustainability scholars would be better off to pay attention to deep ecology's skepticism of science and technology being breakthroughs to controlling the world.

Sustainability schemes are developed by various governmental organizations, civil society organizations, and interest groups. As the schemes are developed, it must be considered if they apply the principles of deep ecology that are relevant to sustainability as well. The first principle of deep ecology is that the well-being and flourishing of human and nonhuman life on Earth have value in themselves. Sustainability implies similar ideals that natural capitals have value. Strong sustainability suggests these capitals are not substitutable, whereas weak sustainability would suggest natural capitals are substitutable. Since the schemes are aligned with weak sustainability, they are more aligned with shallow ecology.

The second deep ecology principle is that diversity of life forms contributes to the realization of these values and are also values in themselves. Again, sustainability does not explicitly state the same principle, but it can be applied that the diversity of natural resources is important. Strong sustainability positions would suggest the diversity of life cannot be substituted, while weak sustainability positions would allow this. Since the schemes are aligned with weak sustainability, they would not align with this second principle of deep ecology.

The third principle of deep ecology theory states the flourishing of human life and cultures is compatible with a substantial decrease of the human population. Degrowth is a part of sustainability that not only applies to production and consumption, but populations as well. Strong sustainability positions would support population degrowth while weak sustainability positions would encourage population increases to allow for the development of more production and consumption. Since the schemes are aligned with weak sustainability, they would not align with this third principle of deep ecology.

The fourth principle of deep ecology theory states present human interference with the nonhuman world is excessive. Strong sustainability theory would support this notion, while weak sustainability would not. Since the sustainability schemes are aligned with weak sustainability, they would not align with this fourth principle.

The fifth principle of policy of deep ecology states that policy must change. Political, economic, technological, and ideological structures are the general policies referred to by this principle. Strong sustainability would align with this principle, as it seeks for change in mentality from business-as-usual to idea of regeneration and adaptation. Since the sustainability schemes are aligned with weak sustainability, they would not align with this fifth principle.

The sixth principle of deep ecology is that change must prioritize life quality (dwelling in situations of inherent value) rather than adhering to an increasingly higher standard of living. Life quality in this principle applies not only to humanity, but all living beings. Strong sustainability respects this principle as it applies sustainability without regard to organizations, but to the environment. Weak sustainability backs an opposite sentiment, that sustainability is to be applied to improve an individual's or corporation's quality of life. Therefore, the sustainability schemes and their general alignment to weak sustainability do not align with this sixth principle.

The seventh principle of deep ecology is that humanity has an obligation to implement the necessary changes to apply the other principles. Strong sustainability ideals value pro-action and self-awareness in changes to policy and practice, which

aligns with this principle. Weak sustainability positions are taken out of drivers of compliance or competitive advantage. Since the sustainability schemes are aligned with weak sustainability, they do not align with this principle.

The eighth principle of deep ecology is not compatible with sustainability. It states humans have the right to exploit life forms to satisfy vital needs. Strong sustainability is incompatible with this principle because it seeks co-evolution with natural resources, but not necessarily a policy in restricting the use of natural resources.

In summation, the eight principles of deep ecology have relationships to sustainability strength. Seven of the principles are relatable to strong sustainability theory. The findings of this research show that if sustainability schemes conform to or align with weak sustainability, they will not be compliant with deep ecology. The relevance of this is that deep ecology is based on a set of principles devoted to saving and providing a flourishing future for all life forms on earth. Sustainability schemes do little to comply with this notion.

4.2.2.2 Paradox Theory

In management and business studies, paradox theory speculates contradicting forces or tensions are always present in organizations, and rational choices are made to deal with them (Schad et al., 2016). Paradox theory can be applied to analyze relationships and understand the competing forces that drive sustainability schemes and business towards weak sustainability. Paradox theory approaches seek long-term solutions by synthesizing the divergent needs and concerns of businesses and stakeholders (Smith & Lewis, 2011). These tensions manifest in decisions that organizations must make that have potential positive and negative effects on the achievement of organizational goals. These choices might affect business factors like profitability, risk, timing, or competitiveness.

Through the lens of paradox theory, actors are investigated and considered for divergent perspectives within an organization. Studies frame conflicting paradoxical tensions to understand how they are manageable. The goal of applying

paradox theory is to address contrasting challenges that businesses face, to promote innovation and change. (Smith & Lewis, 2011) address paradox theory as “contradictory yet interrelated elements that exist simultaneously and persist over time."

Paradox theory notes that competing tensions exist between multiple sustainability outcomes (Hahn et al., 2018; Jennings & Hoffman, 2016). For example, sustainability schemes rooted in weak sustainability may be preferred among businesses because they present a path of least resistance towards appeasing shareholders, regulators, and public perception. Prior research supports this, as businesses have been observed to explore sustainability for competitive advantages (Porter & Kramer, 2006; Walls et al., 2011) and business models are chosen to focus on building shareholder wealth while minimizing exposure to sustainability risks (Brozovic, 2020; Upward & Jones, 2016).

Paradox theory is an approach to apply the complexity of sustainability beyond weak, business-case, sustainability. The business-case for sustainability is still widely applied in academia, business, and business education despite numerous cases that have declared it unfit (Ergene et al., 2021; Figge & Hahn, 2021). The complications businesses face in sustainability make it a challenge that goes unconfronted or relegated to a later agenda.

This grand problem in sustainability described by Dyllick and Muff (2016) as “the big disconnect” is an outcome of corporate reactions to the dilemma of growth. As there are some small signs of aspirations for strong sustainability the reality is that the “big disconnect” is expanding. A reconnection would entail business growth to be reliant on flourishing environmental and social capitals with regenerative and degrowth perspectives.

The environmentalist’s paradox states that as natural capitals from ecosystems have been degraded, the overall well-being of humanity has improved. This debate is based in discussions of strong sustainability theory (Ang & Van Passel, 2012). The drive towards economic growth is a double-edged sword as corporations are beholden to generate profit and positive economic returns, which in

turn improves living standards, and begets innovation. However, unfettered pursuit of growth negative externalities that affect environmental, social, and economic capitals (Steffen et al., 2015)

The UN Sustainable Development Goals are exemplary of this. For example, Sustainable Development Goal 8 is “sustained and inclusive economic growth can drive progress.” This goal can be considered business-friendly and contradictory to sustainability (Hickel, 2019). Banerjee et al., (2021) note that academia is entrenched in discourses focused on sustainability but cannot seem to escape reinforcing growth narratives.

Businesses are not the only actor facing paradox dilemmas in sustainability. Governments measure success with growth of GDP and production. Business schools promote growth and profit as the most important measure of success (Elvidge et al., 2009). International financial institutions make investments based on growth prospects and expected returns. According to Ahlstrom (2010), perpetual growth is rewarded and degrowth is lambasted. Even slow growth or paused growth is deemed unacceptable or troubling. As social responsibility and sustainability is now a part of business strategy in many corporations, the tensions between business growth and sustainability are heightened. The solutions are rare.

Within businesses, sustainability professionals find themselves in conflicting roles, where competing discourses are dominated by the demands of shareholders over those of stakeholders (Goodman et al., 2017). Ergene et al (2021) point out that scholarly research is deeply embedded in the business case (weak sustainability) for sustainability because institutional norms are in greater demand than activist oriented work. Businesses, researchers, and scheme developers face competing tensions between weak sustainability that maintains the status quo and transformational strong sustainability that would require significant change. To date, weak sustainability has prevailed.

The application of some schemes faces challenges. As noted in the literature review, academia and civil society organizations note slow uptake of sustainability ideals (Babbitt et al., 2018; Parida et al., 2019). De Angelis (2021) writes that the

regulatory, technical, cultural, and organizational challenges of sustainability is at odds with normal business activity, creating tensions of what stakeholders want and what is achieved. Through a paradox theory lens, these tensions are examined in the perspective of business models by De Angelis (2021).

Another perspective from paradox theory considers four different ways in which these paradox tensions manifest: belonging, performing, organizing, and learning (Ozanne et al., 2016). Belonging tensions occur when businesses strive for profits, but also affiliation to a movement. In this case, the movement is sustainability, which requires changes and innovation that might affect profits. Since sustainability schemes are primarily aligned with weak sustainability, it makes sense that the schemes guide organizations to “belonging” in the group of sustainability but without the need to push major changes. The schemes are angling their approach to sustainability to make it easy for their patrons to belong.

Performing tensions occur when stakeholders of a corporation demand competing strategies and goals. The spectrum of stakeholders ranges from shareholders to those merely in the presence of an organization’s physical activities. As evidenced in the wide adoption of sustainability schemes, there is a desire from shareholders to embark on sustainability. However, as the sustainability schemes align with weak sustainability, the demands for what organizations get from sustainability are fixed in positions that do little to address the issues of sustainability.

Organizing tensions occur when organizational structures, processes, and practices compete for desired goals. Established, reliable strategies are challenged by sustainability. The nature of sustainability is to invoke changes to policy and practice to ensure future prosperity. Businesses resist changes because they present unknown futures and risks. The sustainability schemes align with weak sustainability, thusly providing a way for businesses to create the perspective they are invoking change, but without the actual risk or uncertainty.

Learning tensions occur when organizational knowledge falls behind modern changes. Organizations must acquire new knowledge of sustainability policy and practice, but they are resistant because this takes effort that might be a sunk cost.

Most organizations are unaware of what sustainability truly entails, or what it means beyond competitive advantage. The sustainability schemes back the weak sustainability positions by not defining sustainability, and not emphasizing any education or knowledge about what sustainability is.

4.2.2.3 Decoupling Theory

Decoupling theory (Meyer & Rowan, 1977) notes that gaps exist between the formal or symbolic policies of an organization and its actual practices. In theory, decoupling allows businesses to maintain a balance between external and internal demands. In practice, businesses externally espouse values, beliefs, and goals that are contradictory to internal values, beliefs, and goals. In business, decoupling theory applies systematic views for enabling new strategies, like sustainability. That is, businesses as businesses grow and change, they decouple from old views and recouple with new ideas (Peter & Swilling, 2014).

In sustainability, decoupling is applied to distinguish increased economic production and decreased environmental quality (Vadén et al., 2020). As production and consumption of goods and services uses resources, decoupling theory is applied to understand if the espoused intentions of limiting resource use are disconnected from growing use of resources. Most sustainability and decoupling theory discussions propose action and strategy that decouple growth (e.g., production, consumption, GDP measures as success, increasing profits, population) from abuse of capitals (Fischer-Kowalski & Swilling, 2017). There is a push to understand how production tools like material flow, supply chain management, and life-cycle analysis can be drivers for degrowth rather than being applied for competitive advantages that lead to growth and profit. Bromley & Powell (2012) point out that decoupling theory explains why business initiatives like sustainability are highly touted to the public but deprioritized or manipulated to maintain business-as-usual. Similar conclusions are made about business schools decoupling sustainability promise from action (Snelson-Powell et al., 2016). The misdirection via decoupling is a driving force of weak sustainability (Biely et al., 2018).

Decoupling highlights the sustainability strength of businesses. When corporations allow substitutability amongst economic, ecological, and social capitals, while communicating strategy and plans that are the opposite, weak sustainability is being applied (O'Rourke & Lollo, 2015).

A benefit of decoupling theory is that it is very empirical. Measuring applies measures of growth of profits or the economy and compares that to the number of resources used by the unit of study, like a business. Measurements can be global or local, relative or absolute, territorial- or footprint-based, longitudinal or a snapshot, and all applied in respect to various sustainability indicators. An increase in resources used per production represents a disconnect of espoused values from a firm, while a decrease in resources used per production represents a harmony in espoused values. Often, corporations espouse the adoption of sustainability policy and practice, but the actual changes are immaterial to any sustainability results (Marquis & Qian, 2014). Crilly et al. (2016) established that it was possible to perform text analysis on firms to empirically measure if sustainability espousals match sustainability activities. They determined firms that espouse sustainability without modifying strategy or practice can hide this in their reporting thanks to clever use of language or deflecting short-comings as other issues. They even validate that firms deliberately confuse, or outright trick stakeholders about their activities (Graffin et al., 2011)

There are many considerations for why decoupling happens in business (Desha et al., 2009). Whether decoupling is intentional is a frequent discussion. Some researchers believe decoupling is not deliberate, but also not fully inadvertent. Bromley & Powell (2012) suggest firms have their attempt at sustainability without truly understanding what it means or applying a misunderstanding of the concept's premise. As businesses apply and communicate a concept that they do not understand, they purposely use vague language to convey their message. Report users rarely understand the concept of sustainability well enough to even question what they read, but they do recount more positive image of the firm (Fiss & Zajac, 2006).

The actions of decoupling align with weak sustainability. Decoupling is related to manipulation of definitions, weak oversight, double-speak, and image management. The sustainability schemes in this study align with weak sustainability, as they fail to define sustainability, impose grand changes needed, align with business interests rather than scientific interests, and comply with shareholder desires rather than stakeholder ideals. While decoupling is an unwanted result in business, the sustainability schemes in this study align with sustainability policy and practice that allows businesses to get away with it.

4.2.2.4 Sensemaking theory

Sensemaking Theory suggests that we organize the unknown, in this case, sustainability, in a way that we can act upon it by defining our experience and knowledge (Ring & Rands, 1989; Weick, 1995). Corporate sustainability is an equivocal concept that causes a disturbance to micro-economic views of business (Onkila et al., 2018; Schouten & Remmé, 2006). This means the actors of sustainability apply their own meanings to make sense of sustainability so that normal behaviors can address the ideas of sustainability. Therefore, crafters of sustainability schemes apply their own meanings to construct how behaviors related to sustainability cope with the uncertainty of pursuing sustainability (Angus-Leppan et al., 2010; Hahn et al., 2014).

Sensemaking is the act of making meaning from past events; it is an interpretive act to understand and explain events (Weick, 1995; Weick et al., 2005). Sensemaking is also a socially constructed collaborative process in which actors interact with other actors in devising meaning of the event; it helps give meaning to actions and helps rationalize and justify ongoing action (Weick et al., 2005). In an era of shareholder primacy, the purpose of the organization was to maximize shareholder value. With the rise of stakeholder theory, the purpose of the organization transitioned toward a maximization of stakeholder value. As sustainability has dispersed throughout the business community, it has disrupted organizational purpose, meaning, and action and has led to new sensemaking efforts to understand the sustainability transition.

Sensemaking can explore how the drafters of sustainability schemes are trying to interpret and express what they know about businesses and sustainability. Various sources of information affect how corporate sustainability is perceived, which means the creation of sustainability schemes depends on authors' experience. Additionally, direct external demands and embedded understandings of sustainability shape the schemes (Seidel et al., 2018). The culmination of these inputs shapes the schemes through various interpretations which eventually influence businesses (Basu & Palazzo, 2008). Therefore, studying sustainability schemes through the lens of sensemaking is justified to explain how the schemes interpret corporate sustainability corporate behaviors (Busch et al., 2020). The ambiguity of sustainability is incommodious to businesses, thus weak sustainability that perpetuates business-as-usual may be the dominate response rather than sustainability that requires radical changes.

Because sensemaking is a socially constructed and emergent collaborative process that requires communication, organizations that pursue and communicate a particular worldview of sustainability validate internally and externally how sustainability is to be defined and enacted, thus a volley exists between sensemaking and sensegiving in which organizations make sense of the changing landscape (the sustainability transition) and communicate that understanding back to others as an act of sensegiving. As a particular worldview grows in popularity and adoption, the alternating sensemaking-sensegiving exchange creates an echo chamber, provides self-validation, and evolves into the dominant worldview of corporate sustainability. The dominant worldview of corporate sustainability then becomes codified in models and practices, such as sustainability schemes.

Early adopters of sustainability (e.g., Ben & Jerry's, The Body Shop, Tom's of Maine, Seventh Generation) enacted a worldview of sustainability that actions were for the protection and preservation of environmental and social systems. However, these companies were viewed as outliers and anomalies, highly specialized niche players. When WalMart adopted sustainability in 2005, the company's influence moved sustainability into mainstream corporate strategy. Consistent with WalMart's

low-cost leader strategy, WalMart realized cost savings and other business benefits from its sustainability initiatives. WalMart's leadership reframed sensemaking of sustainability away from a worldview of social and environmental protection to a new worldview of social and environmental actions for the purpose of the business case (image, reputation, profit, market share, etc.).

In a study of sensemaking of sustainability in institutions of higher education, Bien and Sassen (2020) determined that sensemaking occurred at a level of organizational identity, image, and issue interpretation, further solidifying the view of sustainability for its business case. Bien and Sassen's (2020) research also points to the fact that collectives prefer some sensemaking over others and power is established in repeated discourse of the sensemaking-sensegiving worldview.

that sustainability is the act of making social and/or environmental changes that produce benefit for the organization. This dominant business-centered worldview then tends to become codified in models and practices, creating a rational myth that this is the path to sustainability. Unfortunately, science does not support this worldview as being sustainable, but rather acknowledges that it is a worldview that prolongs unsustainability (Landrum, 2023).

Research has linked sensemaking to corporate sustainability behaviors. Prior research utilizing a methodological approach replicated in this article found that business education texts (Landrum & Ohsowski, 2017) and corporate sustainability reports (Landrum & Ohsowski, 2018) apply sensemaking to define sustainability in both rhetoric and action that is aligned with weak sustainability. Businesses may even use sensemaking of sustainability to validate ethical and moral decisions (Reinecke & Ansari, 2015). As a result, businesses manipulate the definitions and actions of sustainability (Wright et al., 2012). This leads to repurposing the concept for image management practices, like greenwashing (Coen et al., 2022; Kramer et al., 2019). Sensemaking has also been used to understand corporate sustainability paradoxes in business to explain why compliance oriented, weak sustainability, is at the opposite end of pro-active, strong sustainability (Menon, 2022). Sensemaking theory has been applied to understand the ways organizations cope with managing

sustainability (Angus-Leppan et al., 2010; Kearins & Collins, 2012; Reynolds & Holt, 2021; Tisch & Galbreath, 2018). Studies have also shown businesses apply sensemaking to validate ethical and moral decisions regarding sustainability (Reinecke & Ansari, 2015).

The previous thoughts on sensemaking can be applied to consider the sensemaking applied to sustainability schemes. The government, civil society, and private organizations that develop the schemes in this study conform to weak sustainability. This suggests they are making sense of sustainability as tactic or tool for gaining competitive advantage or at least some image management. The sustainability schemes that would align with strong sustainability would be developed to prohibit organizations from manipulating the ideals of sustainability. Stricter, and enforceable guidance that aligns with strong sustainability needs to be applied in the scheme's creation and dissemination.

4.2.2.5 Critical theory

Critical Theory seeks to explain behavior with investigations of the actual and empirical domains, and by developing knowledge of how nature and society are related. The theory tells us what reality is and how to change structures and processes through individual and collective action. The authors of critical theory believe business decisions may be based on false or distorted interpretations. The experiences, processes, events, and structures developed may have unintended consequences.

A large swathe of critical theory examines the manipulation of constructs, e.g., sustainability, for specific purposes. Basically, critical theory suggests that those with power will control the narrative (Fuchs, 2017). This research shows that the mutual power of businesses and standard setting organizations control the narrative of sustainability to be business-centric and require little meaningful change. The narrative is communicated through sustainability schemes, sustainability reports, and business actions. Other voices are powerless to change the narrative toward strong sustainability. As a result, capitalist business interests take precedence over

sustainability interests that preserve environmental, social, and economic capitals. The current discourse of those in power is to sustain economic development not natural capital development (Castro, 2004).

As the results of the study show, even though the sustainability schemes are well-intentioned, they align with weak sustainability and business-as-usual mantras. It is possible to argue that the developers of sustainability schemes disregard the academic and UN definitions of what sustainability is, so they can push an alternative ideology of sustainability. Fuchs (2017) illustrates this point by contrasting the idea of economic sustainability between United Nations and businesses. The UN, through the sustainable development goals and indicators have suggested economic sustainability pertains to items like fair wages, debt freedom, transparent taxation, and no lobbying or government interference. Businesses state economic sustainability is profitability in the firm.

Some research has found that the manipulation of sustainability has deemed the term irrelevant or meaningless. In current academic discussions, sustainability has become a meaningless buzzword espoused by organizations to comply with non-binding regulations (Farley & Smith, 2020). Mulligan (2014) further agrees, stating, sustainability discussions invoke terminology that is applied ambiguously and safely for business, so that the appearance of change can be portrayed but the reality is business-as-usual. Critical scholars note that this haziness accompanying sustainability is often disseminated, through various efforts of green-washing (Rose & Cachelin, 2018).

Further, critical theory suggest that corporate sustainability has become linked with individual consumers rather than producers (Rose & Cachelin, 2018). For example, British Petroleum coined the term and concept of “carbon footprints” as a way for consumers to blame themselves for petrol consumption, rather than the oil giant for not innovating, changing, or complying with sustainability. This sentiment applies to recycling, buying fuel-efficient vehicles, double-sided printing, dietary changes, smart thermostats, and turning off the lights when going out. Each is a helpful action for the environment, society, and economy, but are quite irrelevant

compared to industrial practices. The powers in control of the sustainability narrative have convinced consumers that sustainability is separating papers and plastics in recycling, rather than the development of new systems that ensure future prosperity in the prospect of an unknown future. The sustainability schemes mirror this idea, in that some of them ensure competitive advantages to their business audiences before there is any mention of actual changes for sustainability.

Those who study and apply sustainability as it is intended seek fully innovate changes to policies and practice. Critical theory suggests the underlying messages observed in the sustainability schemes effectively undermines such changes (Turner & Pearce, 1993). Critical theory suggests that the control of the sustainability narrative by business is the cause of unsustainability. The monolithic, misguided, faulty sustainability concepts that have been ingrained in sustainable business practices, sustainability education, sustainability research, and sustainability schemes are partially bolstered by critical theory perspectives (Ferreira, 2017).

Since businesses generally prioritize profitability and certainty, it makes sense that the sustainability schemes in this study align with weak sustainability. Businesses are often advisors and complicit in the creation of sustainability schemes, thus they have the critical power to dictate what goes in the schemes. If there is a scheme not influenced by business, it is looking to gain market share, thus the critical power of business once again is highly influential in what constitutes the sustainability schemes. Strong sustainability schemes that emphasize degrowth, regeneration, and other major changes to production and consumption are absent, because they would lack business partnerships or market share.

4.2.3 Implications for Sustainability Schemes and Strong Sustainability Theory

There are four important implications from this study that apply to organizational sustainability efforts of businesses. First, there is a critical need to develop strong sustainability schemes. Academic consensus already accepts the current system based on weak sustainability is unsustainable (Biely et al., 2018).

Scholars have warned that humanity has entered the Anthropocene era, in which humanity's impact on the planet will compromise prosperity for future generations. Global warming is accelerating (Carbon Disclosure Project, 2017; United Nations, 2014) and unmet goals to reduce carbon output are delayed (WBCSD, 2018). As the need to preserve environmental, social, and economic resources becomes more critical, waiting for rewritten sustainability schemes becomes less of an option (Alcott, 2008; Krysiak, 2006). Strong sustainability scheme development needs to be prioritized by scheme developers, practitioners, academia, and policy makers (André, 2020).

Second, this research indicates a need for businesses to apply schemes that are more ecologically science-driven rather than economics science-driven. Weak sustainability adheres to economic science, while strong sustainability adheres to ecological science. Schemes in this study which promoted strong sustainability more than the others (CircularEcon, DougnutEcon, TNS, and PlanetBound) are based in natural sciences, but they are simultaneous promoters of weak, profit-driven, growth-oriented messages. Schemes that promote business-driven sustainability at the same time as eco-driven sustainability force businesses to choose between certainty or change. Evidence shows that businesses will gravitate toward business-as-usual, or weak sustainability (Wright & Nyberg, 2017). This finding should be noted in the current development of circular economy-based schemes, such as the *European Committee for Electrotechnical Standardization*, *Comité Européen de Normalisation*, the Afnor XP X30-901, the ISO/TC 323, the ISO/WD 59004, and *Deutsches Institut für Normung*.

The third implication is a recommendation for which schemes to use to achieve sustainability. Although CDP, GRI, TCFD, SASB, SDG, and <IR> were noted as the most commonly adopted schemes utilized in the USA (Governance & Accountability Institute, 2020; McCalla-Leacy et al., 2022), the empirical evidence confirms they promote Compliance, Stage 1 (very weak) and Business-Centered, Stage 2 (weak) sustainability and should be avoided. While no scheme in this study primarily promoted strong or very strong sustainability, five schemes primarily

promoted Systemic (Stage 3), or intermediate, sustainability in which businesses still measure success by financial growth, but are aware of the importance of managing environmental, social, and economic capitals. This stage represents a transitional phase, as the schemes evolve from weak Business-centered sustainability to strong Regenerative sustainability. Four of these 5 schemes showed a stronger than average propensity for Regenerative (Stage 4) and Coevolutionary (Stage 5) sustainability, and lower than average propensity for Compliance (Stage 1) and Business-Centered (Stage 2) sustainability. Therefore, from this study, the currently available schemes recommended for businesses are The Circular Economy, Doughnut Economics for Business, The Planetary Boundaries, and The Natural Step. The use of these four schemes as tools of transition to begin the journey toward strong sustainability are recommended, but there is caution against use of these schemes over the long-term, as further explained.

Our fourth and most profound implication is that based upon the content analysis, the strong sustainability schemes needed to avert climate disaster, ecological collapse, social collapse, and other grand sustainability challenges have not yet been created. Researchers, practitioners, reporting groups, and policy makers applying the current schemes will further embed business in weak sustainability; that is, use of any of the 22 schemes in this study will not achieve sustainability. Calls for business to push beyond weak sustainability towards an approach that is more “just and regenerative” requires “a different way of thinking and acting” (Forum for the Future & WBCSD, 2021, p.5). Caution is advised for the development of future standards, particularly those developed by bodies with weak sustainability schemes or that integrate existing weak sustainability schemes. In the United States during September 2020, the CDP, CDSB, GRI, <IR>, TCFD, and SASB announced a collaboration to create the International Sustainability Standards Board (ISSB) which will develop one comprehensive reporting format, called the International Financial Reporting Standards (IFRS) Sustainability Disclosure Standards (SDS). A message in the IFRS’s comprehensive plan exemplifies a dedication to weak sustainability, stating, “… the increasingly clear connection between sustainability performance and financial risk and return are driving a sense

of urgency" (Impact Management Project et al., 2020, p.28). In other words, the IFRS recommends that organizations apply sustainability to ensure profitability as impending crises mount. Additionally, there are already concerns that the new IFRS SDS has ignored the academic body of research on social and environmental accounting while taking a narrow focus on investors and capital markets (Professors of Accounting, 2020). Scheme development is rapidly evolving. In the United States, the IFRS and Securities and Exchange Commission mandatory climate disclosures are in development. In Europe, the EU Taxonomy and Corporate Sustainability Reporting Directive has been launched. Globally, the UN has released the Sustainable Development Performance Indicators (SDPI), and the Task Force for Nature-Related Financial Disclosures (TFND) is in development. All of these efforts to develop new sustainability schemes need to be carefully re-evaluated, challenge the status-quo, and have divergent interests (Jellema et al., 2022; Wijen & Chiroleu-Assouline, 2019). Simply combining and reprocessing weak sustainability schemes into one standard for convenience will not result in new schemes aligned with strong sustainability.

4.2.4 Limitations - Sustainability Schemes and Strong Sustainability Theory

There are several limitations to this study. First, only schemes that already exist, and which claim to lead to sustainability were analyzed. The after-the-fact analysis shows that the schemes in this study do not lead to sustainability. The presence of no schemes in the sample that primarily promote strong sustainability is notable, as there may be a scheme that does promote strong sustainability but was not included. Therefore, bias is possible in the results because schemes presenting evidence contrary to the findings are missing from the sample.

Second, the documents of the schemes were inconsistent in formatting and structure. Some documentation was written in narrative format, some as research, and others as instructions. The most recent documents created by the purveyor of the schemes were assessed, but this study has avoided further developments and contributions to the schemes from other practitioners and researchers. Some of the

schemes in this study are aided by years of critique and development from outsiders, which have created further documentation that could have been included.

Third, the classification system of principles, frameworks, guidelines, and standards is subjective. However, the focus of this research is on the content analysis and not the categorical classification of the documents. The classification of the documents was simply an organizational template used for the data set to justify which schemes were acceptable for inclusion in the sample, and to exemplify how researchers and organizations might perceive the landscape of corporate sustainability schemes.

Fourth, language bias is a limitation of content analysis via text mining. From the aspect of document creation, the authors of the schemes may have used weak sustainability rhetoric to entice practitioners. Additionally, the specific authors of the documents come from various backgrounds in the fields of sustainability science, corporate sustainability, business, marketing, auditing, and reporting. Each of those fields provokes different language use. The standardized keywords used to text mine the schemes are oriented toward environmental and economic sustainability; social sustainability may not be adequately captured (Landrum, 2018).

4.2.5 Future Research - Sustainability Schemes and Strong Sustainability Theory

There is a need to expand the sample of the study by geography, and business size. Sustainability schemes utilized in other regions of the world should be assessed for their sustainability strength because it is widely noted that sustainability is perceived and acted upon differently in other regions of the world (Dong et al., 2019; Miralles-Quiros et al., 2017). Additionally, schemes utilized by small and medium sized businesses should be observed since they are more flexible and attuned to the evolving sustainability landscape (Gomes et al., 2015).

Many schemes in this study were observed to have shared the same institutions, auditors, businesses, individuals, and governing bodies. Is this a case of business influencing the standard setting governing bodies or vice versa?

Unveiling ever-present actors behind the development of schemes could explain the perpetuation of weak sustainability in business. A social network analysis to determine relationships between authors and the direction of influence could explain many of the critiques, such as the claim that that the schemes are imitative and inadequate (Ingold & Balsiger, 2015).

Further research should investigate if business-friendliness explains why the most widely utilized schemes gravitate towards weak sustainability. Are the most adopted sustainability schemes the ones that offer low-risk, minimal change, and cost-effective options for operationalizing sustainability? As stated in the literature review, the GRI, SASB, CDP, and TCFD are popular in the USA. Each primarily promotes Compliance, Stage 1 sustainability, based on the findings presented in Table 2. It may be possible that as a scheme becomes less business-friendly and requires more substantial change, it will align with strong sustainability, and therefore be less utilized by businesses.

Another possibility for future study could investigate the strategic sustainability behavior of progressive businesses widely known for Regenerative and Coevolutionary sustainability (i.e., Patagonia, Veta la Palma, Unilever, etc.) but which follow few, or none, of the most used schemes included in this study. Studying these companies' sustainability behavior and understanding the decision-making process for selection of sustainability initiatives could provide insight regarding specific actions and criteria necessary for inclusion in the development of future sustainability schemes oriented toward strong sustainability.

Finally, further exploration of strong sustainability theory and sustainability schemes is needed in the field of organizational behavior. Business actions as explained by culture, leadership, knowledge management, innovation capacity, and business models may lead to the perpetuation of weak corporate sustainability schemes. It is possible organizational culture may result in proclivities leading to the use of schemes that promote weak sustainability (Demastus et al., 2024; Young et al., 2015). Some leadership styles may foster the transformations required for organizations to progress past business-centric sustainability, while others negate

changes (Muff et al., 2021; Shahab et al., 2020). Some business models that incorporate sustainability are starting to populate the corporate sustainability landscape, but motivations and application are still rooted in weak sustainability (Ritala et al., 2018).

4.2.6 Putting it all together

The dissertation's thesis states Application of strong sustainability theory in research will create new understandings in sustainability. Conferring this thesis is derived from two distinct research lines which have each contributed knowledge to sustainability by testing hypotheses that apply strong sustainability theory. The results from this research have a direct impact on The Big Disconnect problem in corporate sustainability theory and sustainability theory.

In corporate sustainability theory, The Big Disconnect is characterized by three main problems. The first problem contributing to Big Disconnect is that businesses' understanding and focus on sustainability may be misdirected. Application of strong sustainability clearly provided meaning of what different sustainability entails. Additionally, the stages of sustainability provided a progression in what sustainability means in business, thus redirecting organizations and research towards sustainability that will be more impactful. The two research lines applying strong sustainability theory to organizational culture and sustainability schemes contributed a solution to this problem. Organizational culture can now be considered as a factor in corporate sustainability, and the direction organizations can be guided by aligning with weak or strong sustainability. A similar result was found in the study of sustainability schemes, as it was shown that the sample of schemes align with weak sustainability. Scheme developers, providers, and researchers can apply strong sustainability theory to give definition and direction to future schemes.

The second problem contributing to Big Disconnect is that various literature streams are not being integrated into corporate sustainability. The literature review highlighted that strong sustainability studies are rare in corporate sustainability

studies. Thus, by applying strong sustainability theory to organizational culture and sustainability schemes contributed to this problem was addressed.

The third problem contributing to Big Disconnect is that there has been little integration between micro- and macro- level understandings of sustainability. While origins of strong sustainability theory were discussed in macro-economic settings, the subject made very slow progress into micro-economic discussions. The two research lines applying strong sustainability theory to organizational culture and sustainability schemes contributed to this problem applying the Stages of Sustainability model, which incorporates both macro- and micro- level discussions into corporate sustainability.

5 Chapter 5: Conclusions

This dissertation embarked on an investigation motivated by acquiring knowledge that contributes to the construct of sustainability. The approach of the research was to focus on sustainability until a narrower scope of investigation became clear. First, broad observations of sustainability were made and then a more focused look at corporate sustainability was considered. From there, the research lens was further focused on strong sustainability theory. This concept was applied in two different research lines, each narrowly focused on specific aspects of business. The application of strong sustainability theory drove each of the studies.

The “inputs-processes-outputs” framework guided two distinct research lines with research problems, questions, and goals that focused on sustainability strength. Corporate sustainability was considered as the input. Organizational culture and sustainability schemes represented the two process factors for two different research lines. The output for each research line was sustainability strength. The research problems, questions, and goals were positioned with respect to the grand problems facing sustainability, and then the research was focused on specific research problems, questions, and goals. This research will be impactful because refocusing of future research towards strong sustainability is predicted to foster the development of and adoption of strong sustainability in organizations. The research thesis addressed strong sustainability theory in a broad manner, and then applied two narrow research lines to test the thesis.

Sustainability strength and organizational culture were investigated in the first research line. This research was set in motion by observing that sustainability in business is less impactful than desired. Organizational culture was chosen as a factor because the concept serves as a foundation for understanding organizational behaviors, values, and goals. If organizational culture can be leveraged to bolster the sustainability strength of organizations, green innovation that results in impactful changes can be expected.

An experiment was designed to test if there are relationships between OC and CS so that academic and practical implications could be derived. The concepts

were first defined by previous literature. Then models for studying each concept were justified based on alignment with research goals. The four Competing Values Framework types were assessed for relationships with an organization's positioning in the Stages of Sustainability model. Using the method of content analysis, empirical data was derived, which is novel in studying CS strength and OC. Hypotheses were tested, and statistical analysis indicated significant relationships exist between OC and CS strength.

Sustainability strength and the sustainability schemes that influence businesses were investigated in the second research line. This research was inspired by a grand problem that acknowledges as businesses increasingly employ sustainability, the desired results are not manifesting. Prior research confirmed the schemes are influential to corporate sustainability behavior, but they have flaws. These observations lead us to posit that current sustainability schemes align with weak sustainability. The Stages of Sustainability model was utilized to assess the sustainability strength of the schemes through strong sustainability theory, and then used to explain the results through sensemaking theory. The results empirically found the schemes align with weak sustainability because the experiences and understandings of the actors in sustainability relate sustainability to competitive advantages or compliance rather than regeneration of the environment. In reaching this finding, two research goals were achieved. First, practitioners are aware that the schemes employed from the sample are unlikely to guide business behavior towards strong sustainability. Second, academia is justified in considering the sustainability strength of sustainability schemes in future studies.

The causes of this phenomenon are numerous and complicated, but that also means there are abundant opportunities to change the mindset of weak sustainability as the norm (Etzion, 2018). Future sustainability schemes need oversight, innovative ideas, and development focused on ecological, science-driven, strong sustainability. Additionally, sustainability schemes alone are not enough to address complex environmental and social challenges. They must be part of a broader approach that addresses policy changes, sustainability education, and research. Many actors bear

the responsibility of answering this call, including practitioners, academia, researchers, industries, and governments. The time has come to move beyond rhetoric and incrementalism, towards bold action and a flourishing future.

The research problems, questions, and goals followed the same approach of starting with a broad look at the construct of sustainability, and then adjusting the lens of the construct to a narrower focus strong sustainability theory. Arguments for this approach were justified in observations that sustainability at the global level, corporate sustainability level, and in sustainability research was not resulting in impactful outcomes. Prior research too often assumed any sustainability activity or policy invoked by a business was being conducted in such a way that results would be meaningful towards fixing the problems of environmental, social, and economic resources. To contribute to solving these issues, this dissertation applied strong sustainability theory because corporate sustainability is disparate rather than monolithic. While this idea was not a secret or new, prior investigations to address this issue in corporate sustainability were scarce.

Research problems, research questions, and research goals were established in the introduction. A hypothesis considerate of strong sustainability was established, which was to be supported by two lines of research, each with a hypothesis related to strong sustainability. This conclusion will address how each of these research components were addressed in this dissertation, along with the discussion of the key contributions of the research.

5.1 Restatement of the Research Problems

To review the results of solving the research problems, the narrowest focus of the investigation, two distinct research problems will be discussed. Then a wider focus towards the corporate sustainability problem of the Big Disconnect will be considered. Finally, the contribution towards solving the grand, wicked problem of sustainability will be discussed. The approach was applied to assist in solving grand problems of sustainability by working from a narrow focus to a wide one.

The first line of research tackled the problem that the relationship between organizational culture and strong sustainability theory is unknown. The findings of this research contributed to solving this problem by creating models that uncovered relationships between organizational culture and strong sustainability theory. This research empirically shows there is a relationship between the two concepts. However, the problem cannot be considered fully solved. The contribution to solving the problem was limited by the models applied and the data available. Additionally, the relationships found between the two concepts were weak, meaning that solving the problem should take other courses of investigation.

The second line of research was directed to the problem that the relationship between sustainability schemes and strong sustainability theory is unknown. The findings of this research contributed to solving this problem by empirically measuring the sustainability strength of principles, framework, guidelines, and standards that direct organizations in sustainability. In solving the problem, this research found that a clear alignment of the sustainability schemes with weak sustainability. While limitations exist in this research, these findings are clearly a step towards understanding the sustainability strength of sustainability schemes.

Addressing these two very targeted problems through different research lines problems contributed knowledge that served a broader research problem in corporate sustainability, The Big Disconnect. This phenomenon is characterized by three main problems, each of which received contribution to their solution from the contributions of the two narrow research lines that investigated organizational culture and sustainability schemes. The common approach between the two research lines was the application of strong sustainability theory.

The first Big Disconnect research problem is that businesses' understanding and focus on sustainability may be misdirected. Previous arguments noted that defining sustainability and corporate sustainability contributed to this problem. Application of strong sustainability theory in two lines of research defined and directed corporate sustainability through five dimensions of the Stages of Sustainability model. Now it is known that there are organizational culture types that

relate to the stages of sustainability, and that sustainability schemes are aligning with interpretations of weak sustainability.

The second Big Disconnect research problem is that there are various literature streams that have not been effectively integrated by business. Strong sustainability theory is a literature stream that was shown to have very little presence in academic literature, especially in journals that focus on corporate responsibility. Numerous calls to incorporate strong sustainability theory into the literature exist, but the difficulty in defining the concept and the lack of methodologies to measure strong sustainability have stunted progress in addressing this problem. This research replicated application of the Stages of Sustainability model and associated keywords to measure and understand strong sustainability. The research proved that strong sustainability literature can be injected into business.

The third Big Disconnect problem in corporate sustainability is that there has been little integration between micro- and macro- level understandings of sustainability. This research applied a model that was based on macro-economic discussions and converted these to micro-economic traits of businesses. The macro-economic understanding of sustainability focuses on resources substitution, degrowth, and co-evolution with nature. These concepts are addressed in the Stages of Sustainability model by translating their meanings to the micro-level. The methodology applied considered the ideas of the model with specific dimensions that reflect business values towards weak or strong sustainability. Thus, the knowledge gained from the research contributed to solving this problem.

Finally, addressing the Big Disconnect problem in corporate sustainability contributed knowledge to the wider, wicked problem of sustainability. This problem acknowledges environmental, social, and economic resources are deteriorating, which threatens the potential prosperity for future generations. Strong sustainability theory was applied in two narrowly focused lines of research, which also contributed to problems in corporate sustainability. Contribution of knowledge to corporate sustainability theory is also a contribution to the wicked problem of sustainability because.

5.2 Restatement of the Research Questions

To review the results of answering the research questions, the narrow and focus of the investigation, the two distinct research lines considering organizational culture and sustainability schemes will be considered first. Then the more broadly focused research questions regarding the Big Disconnect in corporate sustainability will be reviewed. Finally, the contribution to solving the wicked research problem of sustainability will be discussed.

The narrowest foci of the investigation were two distinct research lines, each with key research questions. The first asked, “what is the relationship between strong sustainability and organizational culture?” This question was answered by applying the Stages of Corporate Sustainability model and the Competing Values Framework. The research answered this question by empirically showing there are distinct relationships between organizational culture and strong sustainability. However, more research questions were raised, because the relationship was found to be weak.

The second line of investigation asked, “what is the sustainability strength of sustainability schemes?” The research answered this question by applying the stages of sustainability model to 22 different sustainability schemes. The results showed that the schemes are aligned with weak sustainability. While there are many schemes not included in the study, this research answered this question for 22 of the most applied schemes in corporate sustainability.

Answering the two very targeted research questions contributed to broader research questions in corporate sustainability, which come from The Big Disconnect problem in corporate sustainability theory. Three main research questions characterize this phenomenon. The first asks, “can application of strong sustainability theory in research help to understand the misunderstandings of sustainability in business and corporate sustainability research?” This research answered this question by applying strong sustainability theory that defined different stages of sustainability. This approach contributes to discussions about misunderstanding of corporate sustainability by defining different stages of

sustainability observed in sustainability artifacts like businesses applying corporate sustainability and sustainability schemes. The myriad approaches of corporate sustainability were unified into five different sustainability strength stages to answer this research question.

The second Big Disconnect Research question asks, “can the application of new literature streams identify integration of sustainability in business?” The scarce application of strong sustainability theory qualifies it as a literature stream that is rarely integrated into business and academic investigations. Application of strong sustainability theory in the research provided answers to questions asked about the integration of sustainability in the business. The clear answer to this question is “yes.” New and rarely applied literature was key in answering the research questions of the two lines of research.

The third Big Disconnect research question asks, “can the gap between micro- and macro- levels in corporate sustainability theory be bridged by applying strong sustainability theory?” This question was answered in the affirmative because the stages of sustainability model applied in the research considers both macro- and micro- levels of sustainability. Additionally, strong sustainability theory has origins in macro-level discussions, and the concept has advanced to consider micro-level dimensions. The Stages of Sustainability model addresses both macro-level and micro-levels of corporate sustainability. The research was successful in answering this question.

Finally, the ultimate research question in sustainability asks, “what can be done to mitigate resource deterioration so that future generations can prosper?” This question was answered by each of the two lines of research providing specific answers in corporate sustainability regarding organizational culture and sustainability schemes. From there, answers to questions in corporate sustainability were provided as well. The answers to questions from the narrowest scopes of the research fed into broader views of sustainability.

5.3 Restatement of the Research Goals

To review the results of achieving the research goals, the two distinct research lines considering organizational culture and sustainability schemes will be considered first. Then the more broadly focused research goals regarding the Big Disconnect in corporate sustainability will be reviewed. Finally, the contribution to achieving the research goals related to the wicked problem of sustainability will be discussed.

Starting from the narrowest focus of the investigation, two distinct research goals were stated. The first research goal was to address the link between organizational culture and strong sustainability so that academic and practical implications could be derived. This goal was achieved. Academic implications for the findings in the research suggest that researchers need to be considerate of organizational culture to achieve corporate sustainability goals. Additionally, researchers must consider other factors beyond organizational culture because the relationship between organizational culture and strong sustainability was weak. Practitioners are also provided knowledge which mirrors the application of academic findings. Corporations can apply these findings to adjust corporate culture to achieve sustainability goals.

The second research goal was to address the sustainability strength of corporate sustainability schemes so that academic and practical implications could be derived. This goal was achieved. Academic implications suggest that researchers need to consider that the utilization of the schemes in this research align with weak sustainability. In practice, corporations applying the schemes will be aware that they are directed towards weak sustainability rather than strong sustainability.

Achieving the two narrowly focused research goals contributed to achieving broader research goals in corporate sustainability that addresses The Big Disconnect. There are three main goals associated with the Big Disconnect. First, the misdirection taken by organizations and researchers needs to be altered. This research achieves this goal by presenting strong sustainability as a clear progression for organizations trying to achieve sustainability. The second goal in researching The

Big Disconnect is to incorporate neglected lines of sustainability literature. This goal was achieved, as strong sustainability theory has been infrequently applied in corporate responsibility journals. The third goal in research of The Big Disconnect was to incorporate micro- and macro- level sustainability discussions. This goal was achieved because the stages of sustainability model utilized in this research is based upon both micro and macro levels of sustainability.

From the broadest viewpoint, another research goal was achieved. As observations consistently show that environmental, social, and economic resources are deteriorating, and threatening the prosperity for future generations, a goal to solve this wicked problem is to contribute knowledge that will help solve the many facets sustainability.

5.4 Summary of Key Findings

There were key findings in this research that impact academic theory and practice. The first is that strong sustainability theory has an empirical relationship with organizational culture. This research suggests that orientation towards a typology from the competing values framework will relate to sustainability. This is important for researchers and practitioners. Researchers can acknowledge these results in future discussions about organizational culture and other fields of organizational behavior. Practitioners can apply these results to cultural shifts in business to progress in sustainability. While cultural shifts take time and are not easy, these results can serve as a guide for shifting culture.

A caveat must be acknowledged from the relationships found between strong sustainability theory and organizational culture. The strength of the relationship between the two concepts was found to be weak. This means there are other factors that contribute to sustainability strength of organizations. It also implies that past research that attempted to link a competing values framework type to either environmental, social, or economic sustainability without empirical evidence may not be the avenue researchers want to go down.

The second key finding is that sustainability schemes align with weak sustainability. This is an important discovery, because the schemes studied in this research are among the most widely utilized in the world. Implications for researchers and practitioners exist. Researchers incorporating these schemes into research can now acknowledge that progress in sustainability might be hindered by schemes that are aligned with weak sustainability. Practitioners can apply these results to selecting schemes that gravitate more towards strong sustainability.

Another key finding is that some of the sustainability schemes in the study are deeply entrenched in weak sustainability, while others have progressed towards intermediate sustainability. The Circular Economy guidelines from the Ellen MacArthur Foundation, Doughnut Economics, the ISO 26000, the Planetary Boundaries, and The Next Step can be viewed as the most progressive schemes in the study. The Carbon Disclosure Project, Global Reporting Initiative, Taskforce for Climate-related Financial Disclosures, and Sustainability Accounting Standards Board should be viewed as examples of compliant schemes which perpetuate business-as-usual.

5.5 Overall Contribution

The thesis that application of strong sustainability theory can further understand and enact positive organizational sustainability behaviors, is supported by the research in this dissertation. Implications for future research and practice exist. Strong sustainability theory is an important research line that has not been well integrated into sustainability studies. The research in this dissertation shows that it is possible to do so. Past research was hindered because strong sustainability is misinterpreted, multi-faceted, varies at different units of analysis, lacks data, and has a dynamic nature. Sustainability has been constricted by research and practice that views it as a single achievement, rather than a progressive journey. This research contributes to a change in these mindsets. The lack of tools was overcome by the development of strong sustainability definitions and models that apply to corporate sustainability.

The difficulty of measuring strong sustainability was also an obstacle that needed to be overcome. Across the many schemes and businesses, there is no one size fits all solutions to sustainability. Measuring carbon footprints of an oil refinery makes sense, but doing so for a real estate developer or bank does not. There is no one size fits all solution. This research applied content analysis methodology that examined the communications of organizations and sustainability schemes, thus finding a way to overcome this obstacle. Sustainability strength can be measured empirically.

Academia can confidently consider organizational culture as a factor in sustainability strength. Practitioners can consider managing organizational culture as part of their strategy for integrating sustainability in business, and thus, there is a higher likelihood that corporate sustainability will start to make significant advancements. Furthermore, the developers, crafters, and influencers of sustainability are now enlightened that current sustainability schemes align with weak sustainability. Future endeavors in research and practice can knowingly target progress in the sustainability strength of the schemes they assess and develop.

This research has set a novel precedent in studying sustainability strength as an organizational outcome that can be affected by organizational behavior. It is confidently concluded that organizations that acknowledge and understand their organizational culture can make progress in their sustainability efforts. Organizations inconsiderate of organizational will be destined to a faltering relationship with sustainability, thus perpetuating business-as-usual green innovation.

Previous research between organizational culture and corporate sustainability theory approached the problem through weak sustainability positions, based on critical analysis. Empirical data in this research showed that these positions were not necessarily supported. Additionally, prior research between organizational culture and sustainability took a position that organizational cultures align with one of the environmental, social, and economic pillars of sustainability. This research shows that organizational cultures align with a sustainability strength, representing mentalities and mindsets in sustainability. The organizations in this

study primarily align with weak sustainability, thus organizations perceive that sustainability is a way to either comply with regulatory requirements or a tool to increase profitability.

5.6 Final Thoughts

This dissertation and my PhD journey were motivated by a wicked problem that needs to be solved. Environmental, social, and economic resources face depletion and deterioration that threatens the potential for future generations to prosper. Sustainability is the construct created to address the adverse effects caused by overshoot of resources, but it is also a very complex concept. It is a discipline that seems to consider "*everything*." As an academic discipline, the subject is still young, and the ontology is still malleable. In practice there is constant evolution that requires leadership and management to be attentive. The concept is globally accepted and is increasingly practiced by business. However, businesses prefer consistency and certainty rather than change. They resist sustainability with pushback and manipulation of the construct. Businesses are averse to the risk of changing business models, strategy, and innovation for the sake of sustainability. This is why the problem that inspired this research, The Big Disconnect, exists.

Academia and civil society organizations define and acknowledge sustainability differently than business does. Too often, academic research acquiesces to business mentalities, and the resulting research also fails to produce knowledge that significantly impacts sustainability.

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Appendix A

Sustainability Strength Keywords

Weak Stage 1 – Compliance	Weak Stage 2 – Business-Centered	Weak Stage 3 – Systemic	Strong Stage 4 – Regenerative	Strong Stage 5 - Coevolutionary
complian	biotechnolog	collaborat	carrying capacity	circular
compliance	biotechnology	collaborate	consumption	coevol
compliant	biotechnologies	collaborates	degrowth	coevolve
legal	business as usual	collaborated	holistic	coevolving
legalized	business model	collaborating	interdependen	coevolution
legally	competitive advantag	collaborative	interdependent	ecocentri
legality	competitive advantage	collaboratively	interdependence	ecocentric
regulat	Competitiveadvantage	cooperat	interdependencies	ecocentrics
regulate	Cost	cooperate	natural system	ecocentrism
regulated	costs	cooperated	natural systems	ecoethic
regulates	costly	cooperating	planetary boundar	ecoethics
regulation	costing	cooperation	planetary boundary	ecolog
regulatory	costed	cooperative	planetary boundaries	ecological
risk	cost–benefit	cooperatives	preservation	ecology
risks	cost-benefits	ecoefficienc	redistribution	ecosystem
	customer	ecoefficiency	repair	ecosystems
	customers	ecoefficiencies	repairs	flourish
	demand	game chang	repairing	flourished
	demands	game changer	repaired	flourishes
	demanding	game changing	restor	flourishing
	efficienc	global citizen	restore	no growth
	efficiency	global citizens	restored	regenerat
	efficiencies	global citizenship	restores	regenerate
	expens	humanity	restoring	regenerated
	expense	industry	restoration	regenerating
	expenses	Integrat	restorative	regeneration
	growth	integrate	science	regenerative
	market	integrates	sciences	resilien
	markets	integrating	scientific	resilience
	marketing	integration	steady state	resilient
	market share	integrative	steady states	
	market shares	partnership	zero growth	
	market value	partnerships		
	market values	system		
	money	systems		
	profit	systemic		
	profits	transform		
	profited	transform		
	profiting	transforms		
	profitable	transformed		
	profitability	transforming,		
	public relations	transformation		
	retention	transformations		
	return on investment	transformative		
	ROI			
	sales			
	strateg*			
	strategy			
	strategies			
	strategic			
	strategical			
	strategically			
	technolog			

	technology			
	technologies			
	value chain			
	value chains			

Landrum & Ohsowski (2018)

Appendix B

Competing values framework keywords

Adhocracy Create	Clan Collaborate	Hierarchy Control	Market Competition
adapt	boss	capab	achiev
begin	burocr	collectiv	acqui
chang	cautio	commit	aggress
creat	cohes	competenc	agreem
discontin	certain	conflict	attack
dream	chief	consens	budget
elabor	collab	control	challeng
entrepre	conservat	coordin	charg
envis	cooperat	Cultur	client
experim	detail	decentr	compet
fantas	Document	employ	customer
freedom	efficien	empower	deliver
futur	error	engag	direct
idea	fail	expectat	driv
init	help	facilitator	excellen
innovat	human	hir	expand
intellec	inform	interpers	fast
learn	logic	involv	goal
new	ethod	life	growth
origin	outcom	long-term	hard
pioneer	partner	loyal	invest
predict	people	mentor	market
radic	predictab	monit	mov
risk	relation	mutual	outsource
start	qualit	norm	performance
thought	regular	parent	position
trend	solv	partic	presur
unafra	share	procedur	profit
ventur	standard	productiv	rapid
vision	team	retain	reputation
	teamwork	reten	result
	train	skill	revenue
	uniform	social	satisf
	work group	tension	scan
		value	succes
			signal
			speed
			strong
			superior
			target
			win

(Fiordelisi and Ricci, 2014)