ABSTRACT
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Innovation’s Changing Landscape:
Do Innovative Firms Engage in Sustainability-Inspired Innovation?
(Under the direction of Dr. Carol Hee)

Innovation fuels new horizon growth. However, little research exists on whether firms that are innovative engage in sustainability-oriented innovation compared to sustainability-centered firms. Through content analysis of sustainability reporting, this study provides information on how many B Corps and Forbes Most Innovative companies (Forbes companies) use proxies that could indicate the presence of sustainability-oriented innovation in their sustainability reporting.

From our research, it is clear that many companies that are traditionally good at sustainability may not be expanding this core competency into an innovation driver. More than half B Corps did not have proxies indicating the interaction of innovation and sustainability within their sustainability reporting. Comparatively, more of the Forbes companies had proxies indicating interactions between sustainability and innovation. From our results, innovation capabilities among a firm type seemed to indicate that firm type would display larger percentages of firms with interactions between sustainability and innovation.
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I. INTRODUCTION

Sustainability offers firms different paths to achieve innovation that creates shareholder value. Sustainability relates to our ability to maintain environmental and social conditions that will support the economic, social, and environmental value of the future (Network for Business Sustainability, 2012). Understanding how sustainability and innovation relate can create insights on new ways to grow business revenue. Since innovation aims to build new businesses, improve processes, and improve products, “smart companies now treat sustainability as innovation’s new frontier” (Nidumolu, Prahalad, & Rangaswami, 2009). Because of this, it is important to understand how companies communicate about sustainability and innovation.

Innovation makes sustainability more likely to succeed and sustainability provides new ways to innovate (Nidumolu et al., 2009). However, when it comes to defining how the two come together, there have traditionally been some gaps. In 2007, The Centre for Sustainable Design stated that “there [was] no precise or established definition for sustainable innovation, reflecting the more general difficulty in defining the concepts of sustainability and sustainable development” (Charter & Clark, 2007). Some have recognized openly that sustainability is the next space where innovation will drive profits. Epstein and Buhovac acknowledge that “sustainability is no longer about risk and
compliance. It is about innovation and opportunity to simultaneously achieve excellence in sustainability and financial performance” (2015).

Thus, it is pivotal that we understand how innovation and sustainability are being connected. Language provides us the ability to observe the presence or dearth of this integrative and innovative mindset. For firms trying to be more intentional about sustainability and innovation, looking at the distribution of innovation and sustainability rhetoric for these sample firms provides a way to understand future strategies to tackle innovation and sustainability in tandem.

Using sustainability to innovate could create competitive advantages for firms that use sustainability to plan ahead. Therefore, connecting sustainability and innovation could be important for predicting future firm success. Innovative sustainability that is forward thinking can push firms towards ideas that create future revenues. These concepts matter now more than ever. In order to mitigate divisive consumers, many firms who have previously viewed sustainability as a PR management strategy or toed the line with a do no harm philosophy will need to find new ways to be transformative with their sustainability to achieve robust customer capture.

A. Research Question

If the sustainability lens is a key driver of innovation, one may hypothesize that companies focused on sustainability would be innovative and that companies renowned for their innovation prowess are focused on sustainability. To explore this hypothesis, we examined publically available sustainability-related communications of companies known for sustainability and companies known for their innovation prowess. Companies
certified by B Lab as “B Corps” were selected as companies focused on sustainability; a subset of the Forbes 100 Most Innovative companies for 2016, (referenced as “Forbes companies”), were selected as companies with innovation proficiency. As an indication of whether the companies were connecting the concepts of sustainability and innovation, we looked to see the extent to which their sustainability-related communications also included concepts related to innovation.

Specifically, this research sought to answer the following questions:

1. In their sustainability communications, do B Corps include language that indicates they are focused on innovation?

2. In their sustainability communications, do Forbes Most Innovative companies include language that indicates they are focused on sustainability and innovation?

In order to address these questions, a subset of companies certified as B Corps by B Lab were selected as the firms focused on sustainability, due to their certification of sustainability, and a subset of the Forbes 100 Most Innovative companies for 2016 were selected due to their recognition for innovation. Communication of sustainability reporting was selected as a means to determine whether or not these companies report on sustainability-oriented innovation in order to gain insights on how they present these concepts to stakeholders. In the case companies analyzed did not publish a standalone report, the companies online reporting of sustainability was used for the purpose of this comparison. The goal of the study overall was to look for potential differences in the presentation of sustainability and innovation. Once the sustainability-related communication was analyzed, we found that both innovation proxies and innovation
related to sustainability proxies were present in more of the Forbes companies than the B Corps.

**B. Importance of the Research Question**

Social sustainability is a focus for many actors in today’s business arena and pressure on firms to be socially proactive will only continue to grow. In fact, rather than becoming obsolete, “the social and environmental issues at the center of today’s agenda will still be relevant – and probably more prominent or intense – in the next decade” (Global Reporting Initiative, 2015).

This research is focused on specifically examining how B Corps approach sustainability and innovation compared to Forbes companies. The study aims to create value for firms looking to innovate through sustainability and help academics better understand the presentation of these two concepts to the public. The combination of sustainability and innovation are increasingly important in business as successful implementation of innovative sustainability concepts will be of vital future significance to business strategy in competitive firms. We see that “[the quest for sustainability] has already begun to transform the competitive landscape, as companies redesign products, technologies, processes, and business models. By equating sustainability with innovation today, enterprises can lay the groundwork that will put them in the lead…” (Nidumolu et al., 2009). A competitive, innovative, stance on sustainability has the added benefit of helping firms innovate in new growth areas. A relevant consideration given that “more than 70% of [these] senior executives… say innovation will be at least one of the top three drivers of growth for their companies” (Barsh, Capozzi, & Davidson, 2008).
C. Key Takeaways from the Research

This research study concludes that though some companies are “equating sustainability with innovation” (Nidumolu et al., 2009), for the innovative-centered firm types sampled, more firms presented sustainability and innovation proxies together compared to sustainability-focused firms. Additionally, among innovation-centered firms, more of them displayed innovation proxies than the sustainability-focused firms sampled.

D. Defining B Corps

A company can become a B Corp through assessment and certification by the non-profit B Lab, the company that delivers B Impact assessments and is responsible for the B Corp firm type (B Lab, 2017). The certification process starts with the B Impact assessment, contains a meeting with B Lab staff, then “the company…agrees to meet the expectations of a Certified B Corp, which includes the fee structure” (Wilburn & Wilburn, 2015). The audit process includes “10 per cent of B Corps [that] are randomly selected each year for an on-site review” (Wilburn & Wilburn, 2015).

B Corp assessment “requires companies to have goals in five Impact areas: accountability, employees, consumers, community and environment” (Wilburn & Wilburn, 2015). This tailors the certification process to the individual firm. These expectations are designed to be monitored by B Lab in order to create a more explicit social contract around corporate responsibility.
II. LITERATURE REVIEW

The following chapter provides a focused overview of the importance of sustainability-oriented innovation, followed by background on the development of academic sustainability concepts.

A. Defining Value in Business

Porter and Friedman represent two of the strongest, yet opposing voices on the type of corporate value businesses should exhibit. Friedman famously argues that “there is one and only one social responsibility of business - to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game” (2002, p. 133). For Friedman, value is profit, where value of the firm is driven by exchange of goods and services. Conversely, strategist Michael Porter, contends that benefit or value exists when companies work actively on solving social problems. Porter highlights how frequently, synergistic value is abandoned by elucidating on the timeframe constraint that executives evaluate decisions within:

The deeper work, the new work, the new thinking on the interface between business and social problems is actually showing that there’s a fundamental deep synergy, particularly if you’re not thinking in the very short run. In the very short run, you can sometimes fool yourself into thinking that there's fundamentally opposing goals.

But in the long run, ultimately we’re learning in field after field that this is simply not true. So how could we tap into the power of business to address the
fundamental problems that we face? Imagine if we could do that. Because if we could do, we could scale. We could tap into this enormous resource pool and this organizational capacity (Porter 2013).

Innovative Definitions of Value

While Porter and Friedman defined value through well-known business practices, in their respective time frames, other authors have defined value based on the business practices they would like to see in the future. Additionally, it is worth noting that during the 1990s, “corporate responsibility…arose in its modern form” (Goldschein & Miesing, 2016). During this time, we see a great deal of optimism in evaluating sustainability solutions. In 1997, Hart presented the statement that businesses would one day be generating solutions and positive impacts instead of negative externalities and mitigation strategies (p. 68). Hart’s definition of value derives from both the actions a firm takes presently to reduce impact, as well as the actions they should take in the future, to elicit positive returns environmentally and economically. During this pivotal era of corporate responsibility reframing, McDonough and Braungart, who also define long-term business value as more than sustainability harm reductions, also posited the notion that “Eco-efficiency…is not a strategy for success over the long term” (1998, p. 2). For McDonough, sustainability is integral to the continued use of the environment for business value. McDonough and Braungart actually define eco-efficiency as an “illusion of change,” warning that it will satisfy our need to change, without practically doing so (1998, p. 2).

Though McDonough and Braungart cautioned complacency with eco-efficiency during the wave of innovative thought in the late 90s, they continued to develop their
work into the well-known “cradle to cradle” concept in 2002, which focused on leveraging the waste of one outcome as the input of another (McDonough & Braungart, 2002). In the same span of a few years, Lovins, Lovins, and Hawkens postulated in 1999, that the method of delivering business value to customers should shift to place customer needs over customer purchasing desires (Lovins et al., 1999). Similar to the argument that Porter and Kramer would make twelve years later, Lovins and Lovins defined a new method where “value is instead delivered as a flow of services – providing illumination for example, rather than selling lightbulbs” (1999, p. 5). Interestingly, one method of value creation that Lovins et al. suggest, biological innovation models, is highly related to McDonough’s later work on “cradle to cradle,” a methodology which derives value by mirroring biological production systems in business production (Lovins et al., 1999, p. 5; McDonough 2002).

Porter and Kramer’s definition of value, while futuristic, relies less on revolutionary technology such as Hart and McDonough discuss (Hart, 1997, p. 71; McDonough & Braungart, 1998, p. 5) and more on strategic alignment of business and profits within the strategy of the firm. Twelve years later, Porter and Kramer notably contended that the way we define value is changing, that we are on the cusp of a shift, and that “shared value,” the idea of aligning business and social value as one, “opens up many new needs to meet, new products to offer, new customers to serve, and new ways to configure the value chain.” (Porter & Kramer, 2011, p. 76).

The most futuristic definitions of business value in this research stem from the era of the 90s, an unsurprising reality due to the lasting significance this period had in shaping modern corporate responsibility (Goldschein & Miesing, 2016).
**Sustainability as a Defensive Strategy**

Attitudes about the role of sustainability as a reputation maintenance issue vary by firm almost as much as the nomenclature surrounding green practices. In discussing green strategies, Ginsberg and Bloom discuss customer segmentation and perception management as an integral part of any sustainability strategy (2004). They segment customer percentages based on interest or lack of interest in sustainability and discuss reasons why companies choose to strategically position themselves as more or less green, including “the risk that all [a firm’s] products would be pigeonholed as green.” (Ginsberg & Bloom, 2004, p. 81). Other strategists are highly critical of using sustainability “as a precautionary measure” or what Ginsberg and Bloom would refer to as “defensive green” firms, that are only engaged with sustainability insofar as it protects them from backlash (2004, p. 81). Even as far back as 2011, Porter and Kramer challenged this notion of reputation-driven sustainability, specifying in their nomenclature, the distinction between “creating shared value” and “CSR programs [that] focus mostly on reputation and have only a limited connection to the business” (2011, p. 76). Porter and Kramer contrast CSR which they deem as “hard to justify and maintain over the long run” with shared value which “leverages the unique resources and expertise of the company to create economic value by creating social value.” (2011, p. 76).

**B. How Sustainability-Oriented Innovation Creates Value**

The process of integrating sustainability and innovation together holds high rewards in terms of cross-fertilization of ideas as well as strong financial implications. As a report from NBS describes it:
It’s a virtuous cycle. Whether you produce a bicycle made of 100 per cent post-consumer content that biodegrades at the end of its useful life (innovation motivated by sustainable goals) or develop a clean-burning fuel additive in an effort to improve vehicle performance (sustainability motivated by innovation), the result is the same: financial gain for your organization and better relationships with people and the natural environment (Network for Business Sustainability, 2012).

Moreover, it is important for both stakeholders and firms alike to pay attention to when and where companies are combining innovation and sustainability as the firms that are doing could be poised for better financial and intellectual capital returns. For companies looking to maintain or position themselves competitively in the market, a focus on intentionally thinking about sustainability and innovation together can be a helpful way to move sustainability strategy, as well as other pieces of the firm, forward.

One of the reasons innovation in sustainability can yield new innovation at large ties back to the concept of strategic innovation. When we think of creative ideas, they are frequently a combination of other ideas, so the more diversity of thought we are exposed to, the more our ideation process (and business) thrives. This concept is well documented in “The Innovator’s DNA” by Jeffrey H. Dyer, Hal Gregersen, and Clayton M. Christensen. In the HBR article based on their book of the same title they state that:

Associating, or the ability to successfully connect seemingly unrelated questions, problems, or ideas from different fields, is central to the innovator’s DNA. Entrepreneur Frans Johansson described this phenomenon as the “Medici effect,” referring to the creative explosion in Florence when the Medici family brought together people from a wide range of disciplines—sculptors, scientists, poets, philosophers, painters, and architects. As these individuals connected, new ideas blossomed at the intersections of their respective fields, thereby spawning the Renaissance, one of the most inventive eras in history (Dyer, Gregersen, & Christensen, 2009).
Thus, we can see that the association of innovation and sustainability benefits companies not only by helping them communicate with their stakeholders in a more positive way, but by actually drives the innovation found within their firm by allowing them to think about sustainability outside of constraints and in a context likely to generate profits.

When connecting business to sustainability, many firms and academic authors have focused on mitigating the negative rather than using sustainability to build their business. Sustainability is sometimes narrowly viewed as a balancing act of reducing waste or achieving cost savings, but still creating enough waste to achieve profitability. This focus on sustainability excludes the social element inherent in sustainability in addition to neglecting the value that sustainability drives when companies employ sustainability-oriented innovation. The following section will discuss sustainability-oriented innovation and the different avenues through which it can create value.

Sustainability-oriented innovation (SOI) offers firms pathways to achieve future returns by “making intentional changes to an organization’s philosophy and values, as well as to its products, processes or practices, to serve the specific purpose of creating and realizing social and environmental value in addition to economic returns.” (Adams, Jeanrenaud, Bessant, Denyer, & Overy, 2016). At first glance, innovation driven by sustainability seems no different than normal business innovations. Innovation is a critical yet elusive element of business. In a fast-paced global economy, innovation is key for companies to create revenue generating activities for future revenue streams. The close connection between innovation and SOI has been noted by researchers. “SOI and conventional innovation have much in common. Both address technological change and
involve evolutions in processes, practices, and business models” (Network for Business Sustainability, 2012). Sustainability-oriented innovation has the potential create revenue streams of the future for businesses willing to invest in the cultivation of its returns (Network for Business Sustainability, 2012). A strong sustainability strategy, like a strong business strategy, must take into account current practices and innovating for future growth to insulate the firm from obsolescence. However, “because the sustainability orientation incorporates social and environmental dimensions alongside economic ones, it introduces new challenges. Especially as it progresses, SOI requires more integrated thinking.” (Network for Business Sustainability, 2012). Because of this increased complexity, businesses looking to reap the benefits of sustainability-oriented innovation (SOI), should be strategic. They should consider whether or not they are integrating sustainability into existing innovation, supplementing innovative processes with sustainability, or looking to bridge isolated innovation and sustainability efforts. Smart firms are already capitalizing on this way of thinking and “more progressive firms are looking to ensure that sustainability practices are embedded in all decisions and processes throughout the business.” (Network for Business Sustainability, 2012).

Products

Incorporating SOI into product design takes into account both reducing harm and contributing to innovations that revolutionize product use. Such innovations include things such as using less packaging, creating services for things that were once sold as products, and taking into consideration what the product will be when it is no longer used for its primary function. (Network for Business Sustainability, 2012). Incorporating SOI within product development can help firms to leverage existing innovation capital within
the firm to achieve better products for their consumers and products that are better for the world. One example of this is the shared ride economy. While the car sales business is still producing individual products for sale, the rise of companies like Uber, Lyft, and even Zipcar have changed what used to be a predominately product-based economy into one focused on shared services. When looking at examples like this, it is easy to see that value added to the business by the nature of SOI. “Zipcar isn’t a car rental company with environmental objectives – sustainability is at the root of the value it provides” (MIT Sloan Management Review and The Boston Consulting Group, 2013). Rather than designing a product and then thinking about how to make it slightly less harmful, companies like Zipcar are tackling the inherent pain point of hurting the environment with a service that provides both short term and long term solutions. In order to create solutions such as this when designing products, “many firms adopt sustainability-oriented design tools (SODTs), integrating them into existing processes to ensure environmental and social considerations become routine” (Network for Business Sustainability, 2012). Academically, the idea of considering a product’s full life cycle is not new. Lovins et al., and McDonough both focused on the importance of creating self-sustaining value as part of the business strategy, with Lovins et al., focusing on the importance of “closed loop production systems” and McDonough discussing the importance that the resources we use are returned to the production process. (Lovins et al., 1999, p. 5; McDonough, 2002). Lovins et al., also focused on the strategic importance of a solution-driven business model in achieving this closed loop system, and underscored the need to replace technology with more productive methods (1999, p. 7). Firms that are proactively integrating SOI measures are capitalizing on better methods to create long term utility out
of products that used to be valuable only for their short term usefulness. By extending product life cycles, companies take on an economic and social stewardship advantage.

Processes and Practices

SOI has the ability to impact the processes firms undertake as part of their everyday business operations. Innovating processes can help firms improve both their efficiency and their sustainability. Attention to sustainability pain points in these areas can also provide new ways for firms to undertake their typical processes in an improved manner. Firms can use “such tools as eco-design, environmental management systems and life cycle analysis…to integrate SOI into their organizational thinking and practice (Network for Business Sustainability, 2012). By using such tools, sustainability becomes integrated within the firm’s processes and creates value for the firm that will help them to continue thinking about how to improve their processes in the future, which can be a significant driver of performance improvement and profit.

SOI has the opportunity to create transformational value within everyday businesses practices, but also within the larger resource and consumer market value chain. SOI is a priority for preserving the basic supply and demand conditions necessary for businesses to exist as “sustainability innovation ultimately contributes to preservation and restoration of… nature’s carrying capacity” (Larson, 2010). While this type of value is considered outside the immediate interest of some firm’s motivations by some, it ensures the success of businesses in the long term by ensuring the health of product and service markets as well as resources (Larson, 2010).
**Business Models**

Companies that apply SOI to their business model have opportunities to see synergistic results. SOI applied to the business model can help companies find new business opportunities and new ways to help customers. Creating a business model founded on SOI principles seamlessly integrates sustainability into the business, therefore navigating the aforementioned complexity of combining sustainability and innovation practices. This area sees great returns because “business-model innovation is the crux of sustainability profits. Companies reporting that [sustainability] adds to their bottom lines leverage these innovations to translate sustainability opportunities and pressures into business value” (MIT Sloan Management Review and The Boston Consulting Group, 2013). Therefore, the business model represents a value transformation opportunity that impacts both profits and processes directly. Within the existing business models, companies that are considered traditionally innovative are set up well to expand their innovation to include sustainability drivers, as “their already-developed innovation capability is an important antecedent of their capability for SOI” (Network for Business Sustainability, 2012). Because of the complexity associated with the integration of sustainability and innovation, a previous focus on innovation might make the implementation of SOI easier for firms.

**What makes a product, process, or business model change SOI?**

While these tactics can also be used to simply reduce sustainability harms, the distinction between normal business changes and SOI is whether or not the sustainability driven change drives new business returns. In order to gain a better understanding of
what SOI value looks like compared to other social value creations, let’s examine three different examples of business changes and how they were able to drive future business.

A strong example of product improvement as a driver of business value is the Grameen Bank’s partnership with Danone to create yogurt that met the needs of the children of Bangladesh (Coster, 2010). The food company partnered with the Grameen bank in order to provide yogurt with micronutrients to a market with different preservation requirements and customer needs (Coster, 2010). This is obviously a social-driven innovation but it was also a way of accessing a new market that would previously not be consumers of yogurt.

An example of SOI process improvement can be found in how Ben and Jerry’s sources their brownies and baked goods. Ben and Jerry’s sources from Greyston Bakery in New York “which… hire[s] ex-convicts, the homeless, recovering addicts, and anyone with a rough past who has had trouble finding work.” (Bertrand, 2015). This provides social value because in many cases the company is giving new purpose to the lives of these workers. This social benefit then contributes to the bottom line because of the loyalty, productivity, and strong brand promotion power found in these employees.

An example of SOI and business model transformation can be found with Xerox. Xerox “advises companies on how to save money on document handling”, a change which, though different than their traditional model, gives them inroads to new business models and builds lasting customer relationships (Winston, 2011). This switch to services ties into sustainability and creates social value by increasing the lifespan of their products and reducing consumption, but is also innovating around customer desires to create profit
in a new way that creates closer engagement with customers and increases customer satisfaction.

Due to the focus on sustainability as a tool for innovation by some but the continued focus on sustainability as a defense mechanism by others, the interaction of sustainability and innovation requires further research. Hence, there is great value to be found in examining whether or not a schism between academic ideas and innovative implementation exists and whether or not B Corps have been able to combine innovation and sustainability and more successfully than their traditionally innovative counterparts.
III. METHODOLOGY

To examine how the two company types of firms communicate with their stakeholders about innovation within the context of sustainability communications, we compared the sustainability-related communications of companies known for innovation with those known for a commitment to sustainability.

For insight into how innovative companies communicate about sustainability-related innovation, we looked at the freestanding sustainability reporting (most commonly available as Portable Document Format files accessible through a sustainability page accessible through the company’s website) for companies listed on Forbes list of the 100 Most Innovative Companies for 2016. As a point of comparison, we also examined the sustainability reporting of sustainability-focused companies. Companies certified by B Lab for their “social and environmental performance, accountability, and transparency” and referred to as “B Corps” were examined as an example of companies focused on sustainability (B Lab, 2017). Globally there are around 2,064 B Corps, a number too large for the type of analysis employed by this study (B Lab, 2017). Consequently, this study focused on the same subset of B Corps that were analyzed in the research of Pileika (2012).

For each company, the content of the sustainability report or online sustainability reporting (for B Corps) was searched to determine the number of times words associated
with innovation occurred and the number of times words associated with sustainability occurred. This was used to determine whether and how frequently words associated with innovation occurred within the same sentence or nearby sentence as words associated with sustainability. The list of innovation-related words (referred to herein as “innovation-proxy words”) was created based on a review of the literature associated with sustainability-oriented innovation and specifically, and in depth review of Hamel & Tennant, (2015). Similarly, the list of sustainability-related words (referred to herein as “sustainability proxy words”) was created by drawing on a review of the sustainability literature. The resulting two lists of proxy words are presented in Columns 1 and 2 of Table 4.1 below. Also identified was a third set of terms comprised of concepts that specifically describe sustainability-oriented innovation in one term. These words are classified herein as “S-I proxies” and listed in Column 3 of Table 4.1. The list of S-I words was likewise created based on a review of the literature on sustainability-oriented innovation. The frequency of S-I words was searched for within the sustainability communications of both business types and was counted as the presence of both an innovation proxy word and a sustainability proxy word. Matches of all proxies were divided by the total number of sentences in the document in order to standardize given different document lengths and provide the relative frequency with which a certain type of word would show up in a given document sentence.
Table 1: Shows the words selected as sustainability proxies, innovation proxies, and S-I proxies. In many cases, root words were selected as proxy terms in order to make sure that all combinations of the word would show up. For example, the root “sustain” would find both instances of sustainable and sustainability.

1 Bottom of the Pyramid
2 Lifestyles of Health and Sustainability
A. Study Design

*Natural Language Toolkit*

The frequency of innovation proxy and sustainability proxy words were enumerated through a series of code run in Python that relied on the imported python Natural Language Toolkit to separate sentences within the program. The program was coded to index the files from the working directory, then create buckets for each of the different proxy categories listed above. A small series of code was included to account for any overlaps in the terms so that no similarities across individual words within the proxy terms would cause counted overlaps in the final data output. Using a `with open` function, the program opened every text file found within the corpus of texts and then ran a `for loop` for that text that would: 1.) Split the blocks of text into sentences through the tokenization portion of the Natural Language Toolkit 2.) Strip out any unnecessary punctuation 3.) Create dictionaries in order to store data in the Comma Separated Values master file 4.) Enumerate the proper dictionaries for innovation proxies, sustainability proxies, and S-I proxies using nested if statements. 5.) Enumerate the proper dictionaries if these proxies were found in the sentences above or below the current lens through `if`, `elif`, and `else` statements to accommodate for the variation present in beginning and ending sentences. 6.) Print the output file and all the related fields.

*Data Analysis*

From these outputs, we compared the frequency of occurrence of innovation proxy words in the sustainability reports of innovative companies with the same counts for sustainability companies to determine whether there was a significant difference
between company types. The frequency of occurrence was normalized by the number of sentences in a company’s sustainability communication to take into account the varying lengths. For S-I proxy words, the final presence of sustainability proxies and innovation proxies was enumerated to reflect their dual representation of an innovation proxy and a sustainability proxy.

We compared the averages of sustainability and innovation proxies being present within the same sentence for both companies. As an additional element of examining both of our research questions, we wanted to include research evaluating the presence of innovation surrounded by sustainability within sustainability communication. In order to do this, we assessed how frequently innovation proxies were present in sentences with sustainability proxies in sentences above or below them. We examined the average again to standardize and keep varying communication lengths from interfering with our data interpretation. We similarly wanted to examine how sustainability is presented in context of innovation for both firm types. Therefore, we looked at how frequently sustainability proxies appeared with innovation proxies in the sentence above or below. Again, we standardized on sentences.

**B. Limitations**

*Companies Without Reports*

This research only holds true for companies that engage in sustainability communication. Because companies without sustainability communication were unable to be analyzed, these results are limited to those with sustainability communication. Companies that were not analyzed in this study may be engaging in SOI but the probability that a firm is engaging in innovative sustainability measures may decrease
with limited sustainability communication. Therefore, this study could be influenced by a lack of representation of firms not engaging in sustainability communication.

Data Format

When examining this study, it is important to acknowledge that many companies maintain their corporate social responsibility reports or sustainability reports in different formats and some do not provide this information in a report format all, but rather report it in another format or include this information in an annual report. For example, some of the B Corps preliminarily examined in this study did include their sustainability information within the annual report. This format might indicate how B Corps’ ideation on financial and social value are intertwined or it might simply reflect how key metrics for the firm are best represented in a different format than standard reporting practices found within other companies.

Firm Selection

In selecting the firms for data analysis in this research, the entire population of B Corps were not analyzed in order to minimize complexity and so that the two firm type samples would complement one another. However, this has the potential to introduce error due to the fact that this subset of B Corps is not a completely random subset. Additionally, the sample size from the selected subset was constrained by the availability of public sustainability reports or text publications. The constraint of communication has the potential to introduce error, however, this is somewhat mitigated by the relative size of the analysis pool and the fact that firms excluded could be excluded because their materials were innovative but presented in a non-relevant data format, or could be
excluded because they do not have strong accessible sustainability information. Where sustainability communication was not available in text form, firms were excluded from analysis.

Sentence Splits

The sentence splits were generated through the Natural Language Toolkit extension for Python because splitting and analyzing the thousands of sentences generated by hand would have taken far too long. Because of this, each “sentence” herein represents the language breaks that the software selected. Of all the methods tested for sentence splitting, this method produced the cleanest sentence splits. Yet, because this software does not have the ability to process sentences in the same way that human writers and readers do, there are some instances of longer and shorter sentences in the raw data outputs. However, this variance is unlikely to impact outcomes as variations occurred randomly throughout and all words included were still analyzed.

Self-Reporting Bias

Within the sustainability-related communication there is the possibility of bias due to the fact that companies are voluntarily reporting on their own sustainability activities in these reports. Comparing between different firm types and across a relatively large sample of firms helps to mitigate this but there is the potential that the data represented would represent a slight bias towards sustainability-oriented innovation that might not necessarily be recognized in firm implementation. Though it is outside the scope of this study, further research comparing firm communication of sustainability-oriented innovation to implementation could help further elucidate on this.
IV. RESULTS

A. Average frequency of proxy words in a company’s sustainability communication

Only 59%, of the B Corps in our sample had innovation proxies present, compared with 97%, of the Forbes companies. Only 20 out of 34 sampled B Corps contained innovation proxies; the average number of the innovation proxies/sentence was 0.0473 proxies/sentence. 33 out of 34 of the sampled Forbes companies had innovation proxies present; the average of the innovation proxies was 0.0337 proxies/sentence.

Average Frequency of Innovation in Sentences Per Company – B Corps

Figure 1: The average innovation proxy words per B Corp. Each dot represents the innovation proxies for that firm standardized on communication length.
Figure 2: The average innovation proxy words per Forbes company. Each dot represents the innovation proxies for that firm standardized on communication length.

B. Average frequency of words indicating sustainability and words indicating innovation per sentence.

We found that roughly 44% of B Corps in our sample were communicating using both innovation and sustainability proxies in the same sentence, compared to 85% of the Forbes companies. Only 15 out of the 34 sampled B Corps contained any sustainability and innovation matches; the average number of sustainability and innovation matches was 0.0214 matches/sentence. 29 of the 34 sampled firms Forbes companies had sustainability and innovation matches present; the average of the sustainability and innovation matches was 0.01178 matches/sentence.
When comparing the combination of innovation and sustainability proxies between B Corps and Forbes companies, the following graphs also display different distributions around the median. For the B Corps, we see a larger concentration around the median and the bottom half of the interquartile range is condensed due to this clustering. However, for the Forbes companies, we see a much wider interquartile range. Additionally, we see a larger spread of companies within the lower half of the interquartile range due to the fact that less of these companies had no proxy match present.

The fact that fewer of the B Corps included innovation concepts in their sustainability communications as compared to the Forbes companies is reflective of the observation in the literature that innovation-oriented firms often have innovation competencies to support the integration of sustainability-oriented innovation in their business models (Network for Business Sustainability, 2012).
**Figure 3:** The average matches of sustainability proxy words to innovation proxy words within sentences per B Corp. Each dot represents the matches for that firm standardized on communication length.
C. Average frequency of innovation words in a sentence surrounded by sustainability words in the sentence above or below

We found that 44% of the sample B Corps had proxies of innovation with nearby sustainability, compared with 88% of the Forbes companies sampled. Only 15 out of the 34 did have matched innovation and sustainability proxies; the average of sustainability and innovation matches was 0.0214 matches/sentence. For the Forbes company samples, 30 of the 34 sampled firms did have proxies of innovation with nearby sustainability; the average number of matches/sentence was 0.0152.

Similar to the combination of innovation and sustainability proxies between B Corps and Forbes companies, the graphs for the combination of innovation and nearby
sustainability proxies show a condensed bottom half of the interquartile range for B Corps, represented below by the lack of the darker shaded region present in the Forbes company graph.

Average Frequency of Innovation and Nearby Sustainability Per Company – B Corps

**Figure 5:** The average innovation proxy matches with nearby sustainability words per B Corp. Each dot represents the innovation proxy matches with nearby sustainability for that firm standardized on communication length.
Average Frequency of Innovation and Nearby Sustainability Per Company – Forbes

**Figure 6:** The average innovation proxy matches with nearby sustainability words per Forbes company. Each dot represents the innovation proxy matches with nearby sustainability for that firm standardized on communication length

**D. Average frequency of sustainability words in a sentence with nearby innovation words in the sentences above or below**

We found that 41% of the B Corps sampled communicated using sustainability proxies with nearby innovation, compared with 88% of the Forbes companies. Only 14 out of the 34 B Corps sampled had sustainability proxies with nearby innovation matches; the average number of sustainability and nearby innovation matches was 0.0218 matches/sentence. 30 out of the 34 sampled Forbes companies had sustainability proxies matched with nearby innovation; the average of the sustainability with nearby innovation matches was .01796 matches/sentence.
Like the combination of innovation and nearby sustainability proxies the graphs for sustainability and nearby innovation proxies also show a condensed bottom half of the interquartile range for B Corps, represented below by the lack of the darker shaded region present in the Forbes company graph.

Average Frequency of Sustainability and Nearby Innovation Per Company – B Corps

**Figure 7:** The average sustainability proxy matches with nearby innovation words per B Corp. Each dot represents the innovation proxy matches with nearby sustainability for that firm standardized on communication length.
Average Frequency of Sustainability and Nearby Innovation Per Company – Forbes

**Figure 8:** The average sustainability proxy matches with nearby innovation words per Forbes company. Each dot represents the innovation proxy matches with nearby sustainability for that firm standardized on communication length.

**E. Overall percentages by firm type**

The following provides a comprehensive overview of the percentage of each firm type with the given proxy combination present.
Percentage of firm type with different proxy combinations

<table>
<thead>
<tr>
<th>Occurrence of innovation proxy words within sentences</th>
<th>B Corps</th>
<th>Forbes Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>59%</td>
<td>97%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occurrence of innovation and sustainability proxy within same sentence</th>
<th>44%</th>
<th>85%</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Occurrence of innovation proxy words and nearby sustainability proxies</th>
<th>44%</th>
<th>88%</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Occurrence of sustainability proxy words and nearby innovation proxies</th>
<th>41%</th>
<th>88%</th>
</tr>
</thead>
</table>

**Table 2:** Percentage of B Corps and Forbes Companies with different innovation and sustainability proxies present.
V. DISCUSSION

A. Presence of proxy words among firm types

When examining the average frequency of our innovation proxy words, we found that innovation proxies were present in a larger percentage of the Forbes companies compared with the B Corps, indicating that sustainability focused companies do not integrate innovation within their sustainability literature as frequently as firms known for their innovation. That B Corps do not include language indicating they are focused on innovation as frequently as highly innovative firms such as the Forbes companies indicates that, while B Corp certification is a relatively new and innovative process, companies obtaining this certification may not be focused on sustainability as a driver of innovation—or, at least, they are not explicating making this connection in their sustainability-related communications.

That almost twice as many of the Forbes companies had sustainability proxies matched in the context of nearby innovation proxies, compared to B Corps, indicates a larger amount of Forbes companies may closely associate sustainability concepts with innovation concepts. This finding could be reflective of a closer association between the Forbes companies’ strategic approach to sustainability and their approach to innovation. The analysis of their sustainability communication may imply that Forbes companies do not view sustainability as an additional portion of firm strategy requiring different skills.
Rather than separating sustainability, they may see the potential for their innovation competencies to advance sustainability objectives, and by doing so, also generate value. This implies that these firms are not viewing sustainability as a simply a risk mitigation or reputation management strategy. One may conclude that innovative companies more frequently represent sustainability in the context of innovation. The relative consistency between these two outcomes and the percentages of both firm types with innovation and sustainability proxies bolsters the conclusion that more innovative companies integrate innovation and sustainability in their sustainability communication than B Corps. The consistent discrepancies in B Corps and Forbes companies between different proxy combinations taken together, may indicate that more innovative companies have sustainability-oriented communication than sustainability focused firms.

Multiple different things could be driving these findings. Companies that are innovative may be using language of innovation to discuss sustainability because that is the language they are familiar with. B Corps may also not be using language of innovation to discuss their sustainability because they don’t feel like they need to explain that they are innovative about sustainability because they are a firm type certified for their sustainability. However, this disparity may also indicate that the lack of SOI communication stemming from B Corps is reflective of a lack of sustainability-oriented innovation within those firms. A lack of focus on innovation in B Corps may be reflective of their overall smaller size, lack of diversity of revenue streams, or age. These differences may impact B Corps’ capacity to invest in innovation. If they are not focusing on innovation, mission-oriented companies such as B Corps may miss opportunities to fuel their long-term profitability.
B. Limitations of Current Research and Recommendations for Further Academic Research

At this point the results do not have a strong enough p-value to claim with 95% confidence that the average of normalized instances of the proxies (sustainability and innovation matches, sustainability and nearby innovation, and innovation and nearby sustainability) are distinctly different between firm types. Therefore, we can point to the percentages of firms without any proxies and draw conclusions based on their lack of integrated communication, but we cannot determine causation from the comparison of the proxy distributions themselves. If we were to conduct a second study on this topic, it could be worthwhile to expand the sample to a larger group of companies and then randomly select samples within those companies from which to analyze measures of sustainability and innovation. Additionally, it would be valuable to include performance metrics to measure the impact of sustainability and innovation efforts in order to draw stronger conclusions on implementation.

From these findings, there is the possibility of additional research to explore the impact of SOI on profits. This study may be used to inform an actionable academic – based guide for executives and marketing teams that helps them understand how to effectively discuss innovation and sustainability with their stakeholders in a more robust manner as well as informing their sustainability strategy to include high innovation capital.

Or, alternative sustainability-oriented and innovation-oriented firm types could be used. One additional way of comparing sustainability-oriented firms with innovation-oriented firms would be using a study that compares Forbes Most Sustainable Companies
with Forbes Most Innovative Companies. This would have the added benefit of containing a standardized third party measure of sustainability and innovation oriented companies.

Research could also explore implementation of SOI. In order to examine implementation, case studies and in depth analysis of B Corps and Forbes Most Innovative Companies could occur through on site visits and practice observation. Given that in general, the B Corps were younger companies, additional research could follow B Corps in their implementation of SOI over time in a case study format to see how SOI changes over the firm’s development. Companies could be compared by their financing in order to examine how financial structure of firms impacts SOI. Research could also explore expanding the sample size to include N-30 samples for different companies and then sectioning them by industry and comparing for the presence of different types of SOI such as product, process, and business model transformation. This would help provide insights into different industry areas in addition to different implementation areas of SOI.

Changes in content analysis could also provide new research opportunities. For example, this study could be modified to focus on either a more expansive or more constricted word list. Or, research could center on only the most common words that showed up in this word list. Additionally, one could analyze different types of corporate communication such as annual reports or email communications for the presence of SOI rhetoric. Comparisons could be made between internal and external facing corporate communication with regards to SOI to see if the language used is significantly different.
C. Implications for Firms

Further academic research on a toolkit for executives could have implications for companies looking to reevaluate their sustainability communication in the context of sustainability-oriented innovation. A toolkit could clarify actionable steps for executives to engage in sustainability-oriented innovation.

B Corps

One potential implication for B Corps could be that they are not communicating with their stakeholders with the same efficacy as the Forbes companies. This could imply that they are not driving profits from their sustainability initiatives compared to Forbes companies. However, it could also mean that they are simply not communicating in the same way about their sustainability, but are engaging in sustainability-oriented innovation nonetheless. Thus, B Corps could be acting in innovative ways but not necessarily talking about the ways that their commitment to sustainability drives their innovation. A reconsideration of the rhetoric they use may help B Corps better convey their sustainability-oriented innovation to stakeholders. Alternatively, a reconsideration of the relationship between sustainability and innovation may improve their profits if this relationship has been previously neglected.

Forbes Companies

One potential implication of this study for Forbes companies could be that they are communicating and effectively engaging in sustainability-oriented innovation. This could imply that the profits of these companies are being driven by their sustainability initiatives. On the other hand, it could mean that the Forbes companies are effectively communicating about sustainability-oriented innovation but not engaging in it. Moreover, Forbes companies could be communicating in the language of innovation because they
are used to it, but not applying it to their sustainability initiatives. Consideration of whether or not their communication matches their sustainability actions could help these Forbes companies determine if their sustainability actions are driving profits or identify opportunities where they could be.
CONCLUSION

In 1997, Hart lamented that “few companies have incorporated sustainability into their strategic thinking” (p. 27). We have progressed from 1997, yet still face a dearth of intentional innovation guiding business sustainability. Sustainability has the potential to be a juggernaut of innovation. Yet, current research has not yet explored whether or not firm types with capabilities in sustainability or innovation communicate about sustainability-oriented innovation in their sustainability reporting. Through content analysis of sustainability reporting, this study provides information on how many companies from each sampled firm type use proxies that would tend to indicate the presence of sustainability-oriented innovation in their sustainability reporting.

From our research, it is clear that many companies that are traditionally good at sustainability may be failing to expand this core competency into an innovation driver. Sustainability-oriented innovation is a great opportunity for firms to learn how to better ideate for the future of sustainability, and achieve future growth.
APPENDIX

Exhibit 1
Method of Identifying Proxies Example

Green – Sustainability Proxy Word

Purple – Innovation Proxy Word

Blue – Sustainability and Innovation Proxy Word

*Quis autem* vel eum iure *reprehenderit* qui in ea voluptate velit esse quam nihil molestiae consequatur, vel illum qui dolorem eum fugiat quo voluptas nulla pariatur?* **FIG 1**

Ut enim ad minim veniam, quis nostrud *exercitation* ullamco laboris nisi ut aliquip ex ea commodo consequat. **FIG 2**

Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat *cupidatat* non proident, sunt in culpa qui officia deserunt mollit anim id est laborum. Sed ut perspiciatis unde omnis iste natus error sit *voluptatem* accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt *explicabo*. **FIG 3**

Nemo enim ipsam voluptatem quia voluptas sit aspernatur aut odit aut fugit, sed quia consequuntur magni dolores eos qui ratione *voluptatem* sequi nesciunt. Neque porro quisquam est, qui dolorem ipsum quia dolor sit amet, consectetur, adipisci velit, sed quia non *nemquam* eius modi tempora incidunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim ad minima veniam, quis nostrum exercitationem ullam corporis suscipit laboriosam, nisi ut aliquid ex ea *commodo* consequatur. **FIG 4**

Sed ut perspiciatis unde omnis iste natus error sit *voluptatem* accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo. **FIG 5**
Exhibit 2
Project Example of a Sentence with Both Innovation and Sustainability Counts

Starbucks_Forbes42

Sentence 17

Sentence Text: “While some environmental targets have been more difficult to achieve than expected, we have learned from these challenges and are working to find innovative solutions.”

Counts:

Innovation, Sustainability, S-I, Nearby Innovation, Nearby Sustainability, Nearby S-I

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Exhibit 3
Original List of B Corps

<table>
<thead>
<tr>
<th>Firm Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREM GROUP</td>
</tr>
<tr>
<td>gBuild Construction Managers</td>
</tr>
<tr>
<td>Pivotal Production LLC</td>
</tr>
<tr>
<td>Green Retirement Plans, Inc.</td>
</tr>
<tr>
<td>Cutting Edge Capital and Katovich Law Group</td>
</tr>
<tr>
<td>DeniseLawrence.Com, LLC (Pandora's Pantry)</td>
</tr>
<tr>
<td>Impact Makers, Inc.</td>
</tr>
<tr>
<td>On Belay Business Advisors Inc.</td>
</tr>
<tr>
<td>IPSOOFACTO, LLC</td>
</tr>
<tr>
<td>Rockstar CPA</td>
</tr>
<tr>
<td>Idealist Consulting</td>
</tr>
<tr>
<td>Azavea</td>
</tr>
<tr>
<td>Eleek, Inc.</td>
</tr>
<tr>
<td>Re: Vision Architecture</td>
</tr>
<tr>
<td>Praxis</td>
</tr>
<tr>
<td>Singlebrook</td>
</tr>
<tr>
<td>Rally Software</td>
</tr>
<tr>
<td>Opticos Design, Inc.</td>
</tr>
<tr>
<td>Green Design, Inc.</td>
</tr>
<tr>
<td>South Mountain Company Inc.</td>
</tr>
<tr>
<td>Naturescapes Landscape Specialists, Ltd.</td>
</tr>
<tr>
<td>Skoodat</td>
</tr>
<tr>
<td>The Joinery</td>
</tr>
<tr>
<td>iContact</td>
</tr>
<tr>
<td>Relevance, Inc.</td>
</tr>
<tr>
<td>Upspring Associates (formerly Social Enterprise Associates)</td>
</tr>
<tr>
<td>Firm Name</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>PREM GROUP</td>
</tr>
<tr>
<td>gBuild Construction Managers</td>
</tr>
<tr>
<td>Green Retirement Plans, Inc.</td>
</tr>
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<tr>
<td>Idealist Consulting</td>
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<td>Azavea</td>
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<tr>
<td>Eleek, Inc.</td>
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<tr>
<td>Re: Vision Architecture</td>
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<tr>
<td>Praxis\Building Solutions, LLC</td>
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<tr>
<td>Singlebrook</td>
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<tr>
<td>Opticos Design, Inc.</td>
</tr>
<tr>
<td>South Mountain Company Inc.</td>
</tr>
<tr>
<td>Naturescapes Landscape Specialists, Ltd.</td>
</tr>
</tbody>
</table>

Table 3: Original list of B Corps considered

Exhibit 4

List of Firms Analyzed
Table 4: List of B Corps Analyzed in Content Analysis

Exhibit 5
Original Forbes Companies

<table>
<thead>
<tr>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tesla Motors</td>
</tr>
<tr>
<td>Salesforce.com</td>
</tr>
<tr>
<td>Regeneron Pharmaceuticals</td>
</tr>
<tr>
<td>Incyte</td>
</tr>
<tr>
<td>Alexion Pharmaceuticals</td>
</tr>
<tr>
<td>Under Armour</td>
</tr>
<tr>
<td>Monster Beverage</td>
</tr>
<tr>
<td>Unilever Indonesia</td>
</tr>
<tr>
<td>Vertex Pharmaceuticals</td>
</tr>
<tr>
<td>BioMarin Pharmaceutical</td>
</tr>
<tr>
<td>Amazon.com</td>
</tr>
<tr>
<td>ARM Holdings</td>
</tr>
<tr>
<td>Naver</td>
</tr>
<tr>
<td>FleetCor Technologies</td>
</tr>
<tr>
<td>Netflix</td>
</tr>
<tr>
<td>Shanghai RAAS Blood Products</td>
</tr>
<tr>
<td>Rakuten</td>
</tr>
<tr>
<td>Asian Paints</td>
</tr>
<tr>
<td>LG Household &amp; Health Care</td>
</tr>
<tr>
<td>Verisk Analytics</td>
</tr>
<tr>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>Amorepacific</td>
</tr>
<tr>
<td>Coloplast</td>
</tr>
<tr>
<td>Marriott International</td>
</tr>
<tr>
<td>Illumina</td>
</tr>
<tr>
<td>Red Hat</td>
</tr>
<tr>
<td>AmerisourceBergen</td>
</tr>
<tr>
<td>Visa</td>
</tr>
<tr>
<td>Sysmex</td>
</tr>
<tr>
<td>Baidu</td>
</tr>
<tr>
<td>Mastercard</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Hindustan Unilever</td>
</tr>
<tr>
<td>Hermès International</td>
</tr>
<tr>
<td>TransDigm Group</td>
</tr>
<tr>
<td>Perrigo</td>
</tr>
<tr>
<td>The Priceline Group</td>
</tr>
<tr>
<td>Adobe Systems</td>
</tr>
<tr>
<td>Cerner</td>
</tr>
<tr>
<td>Ulta Salon Cosmetics &amp; Fragrance</td>
</tr>
<tr>
<td>Chipotle Mexican Grill</td>
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<tr>
<td>Almarai</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Fast Retailing</td>
</tr>
<tr>
<td>Starbucks</td>
</tr>
<tr>
<td>Unicharm</td>
</tr>
<tr>
<td>Sirius XM Radio</td>
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<tr>
<td>Iliad</td>
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<tr>
<td>Magnit</td>
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<tr>
<td>Autodesk</td>
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<td>Tencent Holdings</td>
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<td>BesTV New Media</td>
</tr>
<tr>
<td>Lindt &amp; Sprungli</td>
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<tr>
<td></td>
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<tr>
<td>Reckitt Benckiser Group</td>
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<td>Mead Johnson Nutrition</td>
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<td>Shimano</td>
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<tr>
<td>Kone</td>
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<tr>
<td>Dassault Systemes</td>
</tr>
<tr>
<td>Expedia</td>
</tr>
<tr>
<td>ProSiebenSat1 Media</td>
</tr>
</tbody>
</table>
Table 5: Original list of Forbes companies considered

Exhibit 6
List of Forbes Companies Used for Analysis

<table>
<thead>
<tr>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salesforce.com</td>
</tr>
<tr>
<td>Regeneron Pharmaceuticals</td>
</tr>
<tr>
<td>Unilever Indonesia</td>
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<td>ARM Holdings</td>
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<td>Amorepacific</td>
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<tr>
<td>Coloplast</td>
</tr>
<tr>
<td>Marriott International</td>
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<tr>
<td>Illumina</td>
</tr>
<tr>
<td>Visa</td>
</tr>
<tr>
<td>Hindustan Unilever</td>
</tr>
<tr>
<td>Hermès International</td>
</tr>
<tr>
<td>Perrigo</td>
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<tr>
<td>Adobe Systems</td>
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<tr>
<td>Almarai</td>
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<tr>
<td>Fast Retailing</td>
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<tr>
<td>Starbucks</td>
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<tr>
<td>Unicharm</td>
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<tr>
<td>Autodesk</td>
</tr>
<tr>
<td>Lindt &amp; Sprungli</td>
</tr>
<tr>
<td>Reckitt Benckiser Group</td>
</tr>
<tr>
<td>Cielo</td>
</tr>
</tbody>
</table>
Mead Johnson Nutrition
Kone
Dassault Systemes
ProSiebenSat1 Media
Brown-Forman
Allergan
Oriental Land
Smith & Nephew
Experian
Colgate-Palmolive
Sun Pharma Industries

Table 6: List of B Corps Analyzed in Content Analysis

Exhibit 7

Natural Language Toolkit Script

```python
# import library - keeps it from loading everything, makes it specific
import os
import sys
import string
import csv
from nltk.tokenize import sent_tokenize # pulled in extra kit in order to sep sentences in a better way

#sets default coding to be unicode
reload(sys)
sys.setdefaultencoding('utf8')

#sets the working directory - contains all the files
os.chdir("C:\Users\farrell17\Documents\Spring 2017\Sample Texts\Forbes Reports Text")

txts=[f for f in os.listdir('.') if f[-3:]=='.txt']

with open("_COMPILED_Text.txt","a") as outfile:
    for t in txts:
        with open(t,"r") as txtfile:
            raw=txtfile.read()
        outfile.write(raw)
```
# indexing
# lists out all the files in the directory "list comprehension" for any file with the last 3 chs txt
#txts=[f for f in os.listdir('.') if f[-3:]=='.txt']

# creates sust bucket
sust=[
  "sustain", # = sust[0]
  "environment", # = sust[1]
  "green",
  "ecovision",
  "eco-friendly",
  "eco-friendly",
  "ecosystem",
  "shared value",
  "triple bottom line",
  "corporate social responsibility",
  "stewardship",
  "earth",
  "planet",
  "natural resources",
  "water",
  "carbon",
  "energy efficiency",
  "resource efficiency",
  "waste reduction",
  "recycl",
  "pollution",
  "fossil fuels",
  "greenhouse gases",
  "renewable",
  "footprint",
  "fair trade",
  "fair-trade",
  "life cycle",
  "lohas", # case
  "l o h a s",
  "environmental justice",
  "biodiversity",
  "green building",]
"social equity",
"social enterprise",
"social business",
"social economy",
"microcredit",
"microfinance",
"microfranchising",
"microfranchising",
"micro-franchising",
"base of the pyramid",
"bop",
"gender diversity"
}

# creates innov bucket
innov=[
  "innovative",
  "innovation",
  "innovate",
  "entrepreneur",
  "innovator",
  "creation",
  "groundbreaking",
  "ground breaking",
  "disrupting",
  "disruptive",
  "disruptor",
  "disruption",
  "smart failure",
  "trailblazer",
  "retooling",
  "experiment",
  "hackathon",
  "revolution",
  "visionary",
  "nontraditional",
  "non-traditional"
# creates bucket for distance zero words

```python
d_words = [
    "social innovation",
    "social entrepreneurship",
    "cradle to cradle",
    "c2c",
    "remanufacture",
    "the circular economy",
    "industrial ecology",
    "closed loop",
    "waste equals food",
    "biomimicry",
    "industrial symbiosis",
    "sustainable consumption",
    "collaborative consumption",
    "the shared economy",
    "green bonds",
    "social impact bonds",
    "net positive",
    "restorative business"
]

overlap = ["green", "sustain", "innovation", "entrepreneur"]

for d in d_words:
    for o in overlap:
        if o in d:
            print d
```

d0_sust_overlap = ["sustainable consumption", "green bonds"]
d0_innov_overlap = ["social innovation", "social entrepreneurship"]

# list of column headings for spreadsheet

```python
fields = ['file',
        'corp',
        'sentence_no',
        'sentence',
        'innovation',
        'sustainable',
        'distance zero words',
        'nbr_innov',
        ]
```
'nbr_sust',
# Do we want to enumerate the nbr pairs for d8 words? Maybe
'nbr_d8']

allfile="CompiledOutputs.csv"
with open(allfile, "wb") as csvfile:
    allwriter=csv.DictWriter(csvfile, fieldnames=fields)
    allwriter.writerow()

    #*general note* in python indentation-- organization, so the indents show order of what is
    # one by one opening the text files and pulling out the data and then closing it
    for f in txts:
        with open(f, "r") as txtfile:
            raw=str(txtfile.read().decode('utf-8', "ignore")) # reading in the text file putting into unicode
            sentences=sent_tokenize(raw.decode("utf-8","ignore"))
            s=s.encode("ascii","ignore").replace("\n","\n").strip() # strips out extra white space and newline
            for k in range(len(sentences)):
                s=sentences[k] # becomes sentence under consideration
                d=dict() # starting a blank dictionary to store relevant values
                # all of these will become a row in our output
                d["file"]=[file name]
                d["corps”]=f.rsplit("_",1)[0] # split based on rightmost underscore and pull the first bit of that
                split (the left bit)
                d["sentence_no”]=str(k+1) # adding one bc python starts with 0, makes it a string
                d["sentence”]=s # writing out text of sentence but with punct
                d["innovation”]=0 # initializing those to be zero
                d["sustainable”]=0 # same as innov
                d["distance zero words”]=0 # same for d8
sent=s.translate(table) # strips out punct
sent.replace(" ","
") # replacing double spaces with single spaces
for word in innov: # looks at each word in innov list
    if word in sent.lower(): # checks if it is in sentence
        d["innovation"]+=1 # enumerate if it is there
for word in sust: # doing the same for sust list
    if word in sent.lower():
        d["sustainable"]+=1
for word in d0words: # same for d0
    if word in sent.lower():
        if word in d0_sust_overlap:
            d["innovation"]+=1
        else:
            if word in d0_innov_overlap:
                d["sustainable"]+=1
            else:
                d["innovation"]+=1
                d["sustainable"]+=1
    else:
        d["innovation"]+=1
        d["sustainable"]+=1
output.append(c0)

min_sentences=3
# starting to look for nbr
output2=[]
if len(output)<min_sentences:
    print str("SKIPPED: "+str(len(output)))+")")
else:
    # enumerates which row it should look at
    for k in range(len(output)):
        # takes output from before and brings into into a new bucket to start looking at nbr pairs, carrying over values from output before
        row=output[k]
        # use visual example here to highlight where it is looking in text files
        # adds nbr counts
        if k==0: # first sent
            row["nbr_innov"]=output[k+1]["innovation"]+output[k+2]["innovation"]
            row["nbr_sust"]=output[k+1]["sustainable"]+output[k+2]["sustainable"]
            # if we want nbr d0 enumerated
            row["nbr_d0"]=output[(k-2)]["distance zero words"]+output[(k-1)]["distance zero words"]
        else: # all the other sent
            row["nbr_innov"]=output[(k+1)]["innovation"]+output[(k+2)]["innovation"]
            row["nbr_sust"]=output[(k+1)]["sustainable"]+output[(k+2)]["sustainable"]
            # do we want to have the nbr pairs for d0 words enumerated?
            row["nbr_d0"]=output[(k+1)]["distance zero words"]+output[(k+2)]["distance zero words"]
    output2.append(row)

# list of column headings for spreadsheet
fields=["file",
       "sentence_no",
       "sentence",
       "innovation",
       "sustainable",
       "distance zero words",
       "nbr_innov",
       "nbr_sust",
       "nbr_d0" # if we want d0 pairs to be included
]

# writes out the file, manually changes name of file
outfilename="NLTK_OUTPUT_+filename_+4b+.csv"

for row in output2:
    allwriter.writerow(row)
Exhibit 8
Presence of S-I Proxies Graphs – B Corps

**Figure 9:** The average SI word proxy per B Corp. Each dot represents the SI proxies for that firm standardized on communication length.
Exhibit 9
Presence of S-I Proxies Graphs – Forbes Companies

Figure 10: The average SI word proxy per Forbes company. Each dot represents the SI proxies for that firm standardized on communication length.
REFERENCES


Ginsberg, J. M., & Bloom, P. N. (Fall 2004). Choosing the Right Green Marketing Strategy. 46(1)


