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Sustainability engagement or not? U.S. SMEs approach

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ABSTRACT

In the extant literature on SMEs' sustainability engagement, relatively little research has focused on the US compared to Europe. Our study is based on semi-structured interviews with a large number of manufacturing and services firms (75), from big and small cities in New York state, investigating the major drivers and barriers to SMEs' sustainability and whether such initiatives paid off. Findings show owners/managers' sense of moral obligation to reduce negative environmental impact as well as their levels of sustainability education and awareness have played major roles in driving sustainability. Gaining competitive advantage, need for regulatory compliance or financial incentives offered by governmental agencies were mentioned, but not deemed as key influencers. Major barriers included cost and limited resources, though more than two-thirds of the firms' owners/mangers believed that sustainability engagement had paid off. These results aim to help policy makers learn about the impact of their decisions and adjust them to be more effective. SMEs' owners/managers can also learn about common drivers and barriers in adopting sustainability and plan accordingly.

Introduction

Small and medium sized businesses (SMEs) are the backbone of the U.S. economy in job creation and generation of economic growth. The U.S. Small Business Administration (SBA) (2004) data shows that small businesses (i.e., independent businesses having fewer than 500 employees) represented 99.7% of all employer firms, generating 58.9 million jobs or 47.5% of the total U.S. private payroll in 2015. Furthermore, between 2000 and 2017, they created 65.9% of the new jobs (SBA Office of Advocacy, 2018). Indeed, the most recent SBA report shows that small businesses account for 44% of U.S. economic activity and create two-thirds of the net new jobs. Between 1998 and 2014, the contribution of small businesses to GDP has grown by about 25% in real terms, or 1.4% annually (SBA Office of Advocacy, 2019). Globally, SMEs account for more than half of all formal jobs (IFC, 2013).

While the economic strength of communities is derived from SMEs, their negative environmental performance is alarming. SMEs are held responsible for 64% of pollution in Europe, and account for 60% of carbon dioxide and 70% of all industrial pollution globally (Ashton et al., 2017; Sáez-Martínez et al., 2016; Tutterow, 2014; Walker et al., 2008). Such record calls for urgent need by SMEs to engage in adoption of sustainability solutions, such as energy conservation, use of local resources, and reusing/recycling, to mitigate their negative environmental impact.

Prior research shows firm size usually has a significant effect on the degree of environmental proactivity and that small firms, which have a better record of environmental performance, are also the most successful financially (Aragón-Correa et al., 2008; Clemens, 2008), though the relationship between environmental and financial performance is significantly influenced by the measures used and the sector(s) studied (Albertini, 2013). Majority of large corporations have recently made significant efforts to demonstrate their corporate social responsibility and the environmental plans they are committed to through published annual or semi-annual sustainability reports. Most SMEs, however, have not engaged in such reporting, though efforts are underway to help SMEs in developing countries to understand the benefits of sustainability reporting (GRI, 2018).

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Research on sustainability strategies of SMEs date back to the early 1990s. As shown by Parker et al. (2009) and Wiesner et al. (2017), majority of the published work on SMEs' sustainability is focused on Europe, particularly the UK and Germany, with some studies also on other countries such as the Netherlands, Sweden, Austria, Australia, Canada, Hong Kong, Israel, Japan, New Zealand, S. Korea and Malaysia. While some research has also been done on the U.S. SMEs (Becherer & Helms, 2014; Langwell & Heaton, 2016; Theyel & Hofmann, 2012), the number of the U.S. studies compared to European countries is not adequate or proportional to the size of the SME sector in the U.S. and their contributions to pollution. Becherer & Helms (2014), for instance, conducted a research with 240 small businesses in the U.S. and identified the factors that significantly influenced the small business' environmental goals. Alvarez Jaramillo et al. (2019) analyzed the top 46 most influential studies on SMEs sustainability and reported 60% of those studies focused on Europe while none had been conducted in the U.S. Furthermore, the scope of studies on U.S. SMEs is limited in the type of the sustainability behaviors investigated and are typically industry specific (Ashton et al., 2017).

In earlier research, we queried the participants in the present study on whether the governmental regulations and/or incentives at any level (federal, state or local) played any role in their adoption of sustainability practices (Lamoureux et al., 2019). In this paper, we delved deep into learning the motives and obstacles that NY based SMEs had encountered in their efforts to build or expand their sustainability programs and their perception as to whether such initiatives were rewarding, financially and otherwise.

Our contributions to the literature rest on taking a broader and more comprehensive approach in investigating the major drivers of and barriers to SMEs' sustainability adoption by interviewing 75 such firms in the U.S. Our pool of SMEs come from small towns as well as big cities and across different industries (manufacturing to services such as food, healthcare, etc.). As discussed before, many of studies of the drivers and barriers in the literature are based on SMEs outside the U.S. The purpose of this study is to expand our knowledge of the U.S. SMEs' sustainability drivers and barriers. Since many external drivers such as regulations and standards are specific to each state in the U.S., we decided to limit our focus to one state (NY) and study the variations in SMEs' behavior within a state with different counties that implies different constituencies. Unlike many other similar studies, we have also inquired about the variety of environmental solutions that our participating SMEs had adopted and whether or not their sustainability engagement had paid off in general, and whether it did so through reducing cost and/or increasing the profit in particular. Lastly, since the sheer number of the firms that we interviewed (75) is significantly larger than similar types of exploratory qualitative surveys conducted in this area (e.g, Langwell and Heaton, 2016 study was based on 18 interviews from 8 organizations in Iowa), our findings are likely to be more representative of SMEs sustainability behavior in New York State.

In addition to reviewing the literature in order to validate and enhance the potential contributions of our study, we shared the focal points of our study with four sustainability experts who are very experienced and involved in business sustainability in New York State or at the regional level. These experts were not aware of any previous practice-oriented research like ours, which not only integrates several of these dimensions, but also focuses on the experience of small businesses in this region. Given their feedback, we realized that our research could identify both successes and gaps in the sustainability efforts among small businesses. These experts believed that our study would provide baseline data that could benefit both the owners/managers of such businesses as well as the state and local government agencies in identifying resources and tools that these businesses need for sustainable development.

The rest of this paper is organized as follows. In the next section, we review the literature on sustainability in SMEs followed by the Method section where we describe the process of how we selected the participating firms as well as how we collected and analyzed the data. In the Results and Discussion sections, we report on and discuss some of our key findings and conclude the paper with a discussion of the implications and limitations of our study and suggest directions for future research.

Literature Review

Earlier research on SMEs' motivations for engagement in sustainable business practices has uncovered a range of internal and external factors. For example, in their study of New Zealand SMEs, Lewis and Cassells (2010) found reduction in cost, enhanced profit, and corporate social responsibility as the most important determinants of companies' sustainability engagement, along with the need to comply with regulatory requirements and responsiveness to business customers. Similarly, Baden et al. (2009) and Johnson (2015) found owners/managers' personal values and their social/environmental commitments as their main motivators. Ashton et al. (2017) conducted a survey of 59 SMEs in the tool and dye manufacturing industry in Midwestern U.S. and found a majority of the firms to be more driven by internal motives to implement green practices

than social responsibility considerations; cost and competitiveness seemed to influence sustainability engagement decisions of these firms more than the external coercive pressure from government or customers. Drawing on survey data from SME wineries and vineyards in Italy, France, Denmark, and the U.S, Tyler et al. (2018) found managers' perceptions of competitive pressures to be positively associated with the adoption of environmental practices and improved firm performance.

Among studies focused on developing countries, Agana et al. (2013) surveyed 500 Turkish manufacturing firms and found the most influential driver affecting environmental improvement to be the expected benefits resulting from enhancement in companies' image, reputation, and brand. Chan (2011), surveyed 48 SME hotels in Hong Kong on barriers to the implementation of environmental management systems and found the following factors hindering such adoption: implementation and maintenance costs, lack of knowledge/skills, low sense of urgency, paucity of qualified consultants and ambiguity of standards.

Many meta-analysis studies also analyzed drivers and barriers in the sustainability adoption of SMEs (Johnson & Schaltegger,2015; Parker et al., 2009; Walker et al., 2008). Walker et al. (2008) reviewed 351 publications with a primary emphasis on identifying the main barriers and drivers to environmental management among SMEs. They noted three barriers that prevented such firms from engaging in good environmental practices. First, SMEs' characteristics in general (heterogeneous industry nature, size, urban/rural divide, managers' varying educational and ethnic background/gender) made targeted communication and coordination of technical assistance difficult. Second, resource constraints (financial, human, and time) made perceived cost the most important reason why SMEs did not engage in environmental management. Third, owners/managers' limited knowledge of, interest in, and motivation to adopt environmental management prevented them from viewing environmental issues or the need to act responsibly paramount, sometimes based on the belief that their adverse environmental impact was small or insignificant.

Parker et al. (2009) reviewed nearly 50 journal articles published between 2003 and 2008 with a primary focus on developing environmental improvement intervention strategies that would be most effective for various subsets of SMEs. They listed the following factors as the main drivers/barriers of SME environmental improvement: regulation, environmental commitment, business performance commitment, financial incentives, external demand, environmental knowledge, and assistance/education.

In their analysis of the role of SME suppliers in implementing sustainability, Meqdadi et al. (2012) provided a synthesis of the earlier studies on the barriers and drivers in sustainability initiatives for SMEs vs. their supply network. Among drivers, they listed beliefs, values and sustainability commitment of the top management, environmental awareness, cost savings, competitive advantage, availability of financial and technical resources, and possession of infrastructure for compliances with environmental standards. Barriers included lack of top management commitment, time and awareness, perception that their impact on environment is minimal, high cost of environmental programs, lack of financial resources, lack of skills, know-how and technical expertise.

Drawing on 84 journal articles published between 1987 and 2010, Klewitz and Hansen (2014) found SMEs' strategic sustainability behavior to range from resistant, reactive, anticipatory, and innovation based to sustainability-rooted and identified innovation practices at product, process, and organizational levels. In their review of literature, they refer to most of the major factors listed by the studies referenced earlier.

Johnson and Schaltegger (2015) reviewed 112 studies to identify the specific sustainability management tools designed for SMEs and reasons why they were or were not implemented. They noted the following as the normative considerations for why SMEs should implement these methods: managing legal compliance and stakeholder relationships, performance improvement, organizational learning, and innovativeness. As for barriers, they listed lack of awareness on sustainability issues, absence of perceived benefits, lack of knowledge and expertise, and lack of human and financial resources as major internal obstacles. Insufficient external drivers and incentives, the unsuitability of formal management tools in informal SME structures, the complexity of internationally designed standards and instruments emerged as major external impediments.

Aghelie (2017) explored the drivers and barriers to SMEs sustainable green business practices and uncovered 21 drivers and 35 barriers. The drivers were classified into seven categories among which "social influences", such as improving company's image, having long term relationships with consumers by earning and returning their trust, were the most important drivers. "Training and knowledge" was the least important driver. The barriers were divided into six groups among which "government and legislation" was found to be the most challenging for SMEs to implement. More specifically, the absence of government support and enforcement or limited budget/financial incentives to support green sustainable projects dissuaded firms from engagement in sustainability.

The meta-analysis and primary studies reviewed showed that the number of studies conducted on U.S. SMEs

were only a few compared to many studies conducted in Europe and Asia (Alvarez Jaramillo et al., 2019; Johnson & Schaltegger, 2015; Wiesner et al., 2017). There is a need for much more investigation of U.S. businesses that have a large SME sector and huge sustainability impact, as the U.S. is one of the top polluters in the world.

Method

We selected the interview method as an exploratory approach in our study. Although there are many studies on drivers and barriers on SMEs' sustainability adoption, just a few of them have been done in the U.S. All SMEs are unique and so are their internal and external environments that need to be studied. Interviews allowed the researchers to better gain insights on the potential drivers and barriers in SMEs' sustainable operations in the U.S.

The sample of participating SMEs was constructed from mostly local and regional small businesses that were primarily chosen through referrals within the wider network of contacts with researchers (modified snowball) throughout the New York State region (Atkinson & Flint, 2001). Some businesses were also contacted using information provided by the Chamber of Commerce or online business directories and listings, including The Small Business Administration's Dynamic Small Business Search database. The SBA's (2004) database produced a randomized selection of small business contact information based on location criteria specified by researchers. Seventy-five SMEs participated out of over 100 SMEs invited. The study was conducted over a period of one year and was completed in Spring 2018.

Qualitative methods have been used in many studies of SMEs' sustainability behavior (Aghelie, 2017; Del Giudice et al., 2017; Langwell & Heaton, 2016; Rekik & Bergeron, 2017). Rekik and Bergeron (2017), for example, interviewed 15 SMEs from Canada, Tunisia, and Morocco with less than 45 employees, to assess the motivators for sustainability practice adoption. As shown in the literature, many external factors, such as government regulations and consumer trends, as well as internal factors, such as businesses' culture and values, are shaped by forces within countries, states, and regions. Therefore, studies should focus on certain geographical boundaries to be able to identify the drivers and barriers for SMEs in a region and develop guidelines that are effective for the corresponding constituencies. We focused on exploring SMEs' sustainability behavior and strategies in New York and conducted interviews with SMEs in this area. The NY SMEs come from mega, large, and small cities that broadens the mix of the participants in this study. In addition, the NY government supports sustainable operations and initiatives by SMEs which allows this study to analyze the impact of the government's role. The researchers who conducted this study are also located in NY and had better access to SMEs in this state.

The interview instrument consisted of open-ended questions, which were formally developed after reviewing existing literature along with preliminary discussions with several SME experts, consisting of owners/managers of such companies with long and extensive industry experience as well as industry association and chambers of commerce officials working with such companies. Interview questions prompted owners/managers to discuss topics including: their familiarity with sustainability and how they learned about it, their implementation of sustainable business practices (e.g., renewable energy, recycling, local sourcing, etc.), their motivations for being sustainable (e.g., values, regulations, incentives, consumer behavior, competitors, etc.), barriers preventing adoption of sustainability solutions in their business (e.g., awareness, cost, etc.), future sustainability plans as well as any other relevant information they may have liked to share.

Data was collected via 75 semi-structured interviews with managers/owners of SMEs operating in New York State. SMEs were defined as small to medium-sized enterprises with 250 or fewer full-time employees. To improve generalizability, the interviewed businesses varied across industries to include manufacturing, retail, farming, restaurant, and health. Table 1 shows the sectoral distribution of the 75 participating SMEs.

Table 1
SMEs by industry sector

Industry	Count	%
Retail Trade	15	20%
Accommodation and Food Services	14	19%
Manufacturing	12	16%
Professional, Scientific and Technical Services	10	13%
Construction	5	7%
Healthcare and Social Assistance	4	5%
Administration, Business Support and Waste Management	3	4%
Arts, Entertainment and Recreation	3	4%
Other Services	9	12%

Interviews were conducted over the phone, in person or through video conference and were up to an hour in length depending on how much information the interviewees wanted to or were able to share, their awareness or knowledge of sustainability, or the extent of sustainable

solutions implemented by their business. Prior to the interviews, participants were provided a brief overview of the study, the interview questionnaire and the informed consent forms so that they could acknowledge their understanding of the purpose and the voluntary nature of the participation in our research. Utilizing the interview guidelines that detailed potential responses and follow-up questions, interviews were conducted by researchers.

After interviews were conducted, content analysis of the interview transcripts was completed by the researchers. This was done by carefully reading through the transcripts and coding responses to each question into a spreadsheet, organized into columns for each of the open-ended questions and sub-questions asked in the interviews. MS Excel was used to conduct the content analysis of the interviews.

Using the Grounded Theory approach, researchers identified several categories in the data as they emerged in the interviews themselves to create coded terms (Strauss & Corbin, 1990; Williamson et al., 2006). When researchers discovered a response within a transcript that did not fit any of the already defined terms, they defined a new term to describe the response. Terms were defined by the researchers to match common interviewee statements. For example, many interviewees mentioned that the costs of sustainable solutions were too high, so researchers coded such statements with the term "cost". Researchers mainly identified categories and terms by reviewing the terminology used in prior research regarding business sustainability (Robinson & Stubberud, 2013; Wiesner et al., 2017). Terms were coded on the basis of whether they related to or impacted "environmental sustainability", defined as "being profitable through well-planned, socially, and environmentally sensitive practices" (Wiesner et al., 2017). For instance, the term "feel good" was adopted in the current study to describe sustainable solutions that had paid off for businesses through intrinsic and personal benefits (Robinson & Stubberud, 2013). Each new term and its definition were recorded in a shared list between researchers to improve the inter-rater reliability of the researchers' coding.

Initially, 115 terms were defined to identify recurring concepts within the interviews such as "Family Influence", "Cost", and "Limited Resources". Recognizing the overlap in the definitions of some of the terms, the researchers grouped the related terms into categories, reducing the total number of terms to 85 in an iterative process.

Findings

Types of Sustainability Solutions Adopted

Among the nearly 10 sustainable solutions presented, the most frequently adopted was Recycling / Waste Reduction. In total, 78% of the respondents, 62 engaged in "recycling efforts or took initiatives to reduce waste generation" (Figure 1). Below are a few qualitative remarks from our interviews in this area:

> "We recycle everything. The recycling center here … really helps with that. We don't have to do much sorting (plastic sheeting, paper, cans, plastic jars all go together). And there is composting- we do most of it ourselves, and some of it is brought to the recycling plant."

> "We are always trying to reduce our waste stream, and we've worked with … Solid Waste, to change our practices. For example, wax-cardboard used to not be recyclable, which we have managed to get into the compost stream. So now we are at the point where only 6% of our waste is landfill. Everything else is either composted or recycled. And our facilities manager measures this and keeps track of all of that."

> "I am constantly doing the math on how to reduce waste on my job site. (…) I try to get my guys to take the products out in a way that makes them reusable and salvageable for people."

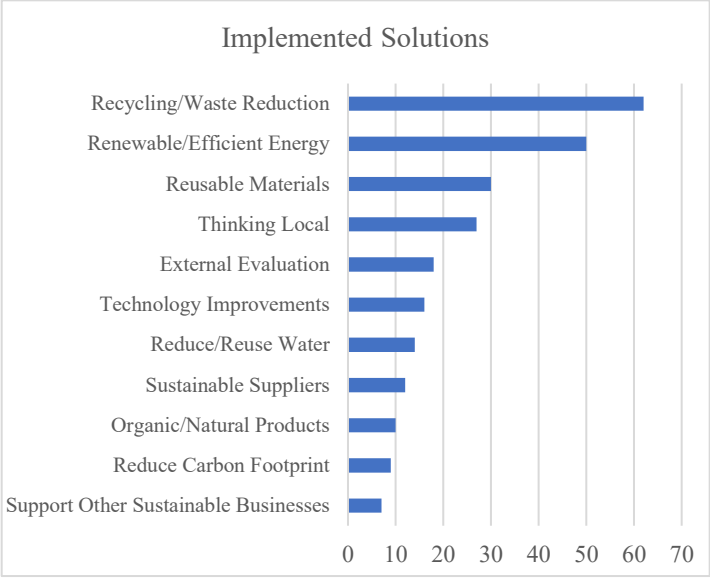

Figure 1. Implemented Solutions by New York State SMEs

The second most prevalent solution was Renewable/ Efficient Energy. In total, 63% of respondents, 50 noted "utilizing efficient energy technologies such as LEDs, reducing energy consumption, or implementing renewable energy technologies." New York State, excluding Ithaca and New York City, were above average in this category with a 74%

(29) engagement rate. Following are select comments from the participating SMEs justifying their focus on this area:

> "Most recently we purchased our own solar farm, that will cover about 11% of power use. The other 89% is accounted for by purchasing solar certificates (purchase solar power). So basically, all our energy is renewable, which is very expensive, but that is the cost of doing business."

> "Lighting is a huge thing for sure, and it's a huge energy draw, and I'm pretty sure we have gone a long way in changing the lights to LED and stuff like that – but that would have been the big thing."

> "Our entire office is also made to be environmentally sustainable and operate in an energy efficient manner. The lights, bathrooms, resources of wood, and manufacturing process for our products use energy conservations methods."

Some other notable sustainable solutions that participants engaged in included Reusable Materials ("using materials or products that can be reused") was mentioned by 38% of respondents, Thinking Local ("Working to improve local community, sourcing from local suppliers, or supporting local economy") by 34%, and Utilizing External Evaluations ("Utilizing third-party sustainability audits or achieving sustainability-related accreditations") by 23%. Other solutions included such activities as Technology Improvements, Reducing / Reusing Water, Incorporating Sustainable Suppliers into the Supply Chain, and Switching to Organic / Natural Products.

The following comments provide a few specific examples of how our responding SMEs went about executing these strategies:

> "… solid waste will come in and evaluate, so they did the evaluation of the recycling and all that. And when you meet their criteria, then you can become a re-business partner, and then they will start sharing; you get on an e-mail list and they share ideas and try to keep track of you to make sure that you stay on track."

> "[We] also get some of their fruit like peaches and berries from local gardens. Another interesting thing that [we] participate in is the use of other local businesses' products. The ice cream served at the restaurant comes from [a local ice cream shop], which also is a known user of local ingredients from … farms."

> "We've replaced all old refrigerators in the past 10 years and are planning to replace all those refrigerators within the next 2 years to obtain our Green Chill certification."

Drivers of Sustainability Strategies

As noted in the literature review, a variety of internal and external factors such as owners/managers' education, businesses' self-motivation and regulations are among the major drivers behind small businesses' decisions to implement sustainability (Johnson & Schaltegger, 2015; Parker et al. 2009; Tilley, 1999; Walker et al., 2008). At the same time, studies have shown several barriers such as the cost of implementing sustainable solutions and resource limitations often preventing SMEs from utilizing such solutions. Below we discuss the key findings of our study with respect to the prominent drivers and barriers identified by New York State SMEs.

Environmental Awareness

Fifty percent of our interviewees noted that education, whether formal or informal (e.g., professional seminars, schooling, journal articles), contributed to their decision to implement sustainable solutions. In addition to education, 31% stated that their communities or networks allowed them to learn about adopting sustainable solutions (Figure 2).

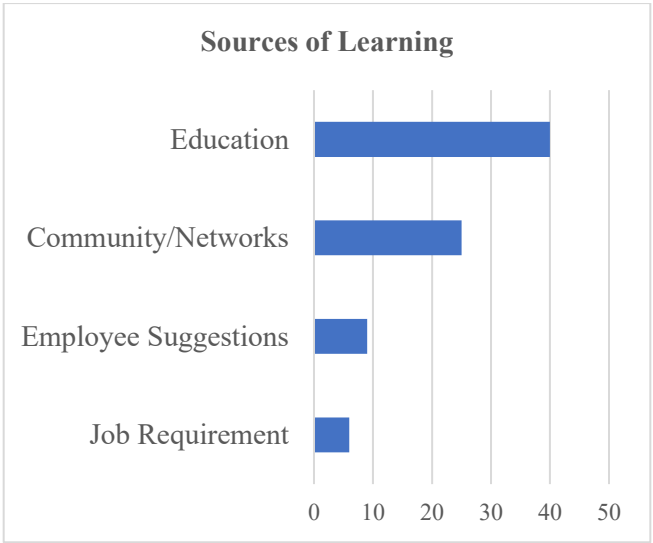

Figure 2. Sources of Learning about Sustainability by SME Managers/Owners

As with typical knowledge-gaining activities, individuals turn towards formal or informal educational outlets such as colleges and journal articles as well as their peers to

obtain knowledge. This was evident across several respondents' comments such as the following:

> "I learned about sustainability in class."

> "Because you're subjected to a community of conversation that supports that modality *[sustainability]*, it makes it a lot easier (…). We are highly suggestive creatures, and you have to conform with your community."

> "In the news, you hear talk about how small businesses are trying to wean themselves off non-sustainable resources and still keep costs down. There's no one source to learn from – it's a societal effort that's been in the spotlight for a while."

Values

The most common motivators identified by our responding SMEs' for implementing sustainability strategies related to their personal values and moral cognitions, general company values, and acting upon what they perceived to be their firms' environmental/social responsibility, in that order. Growing consumer demand for sustainable products and services seems to have also reinforced and further motivated owner/managers' quest for adoption of sustainable solutions (Figure 3).

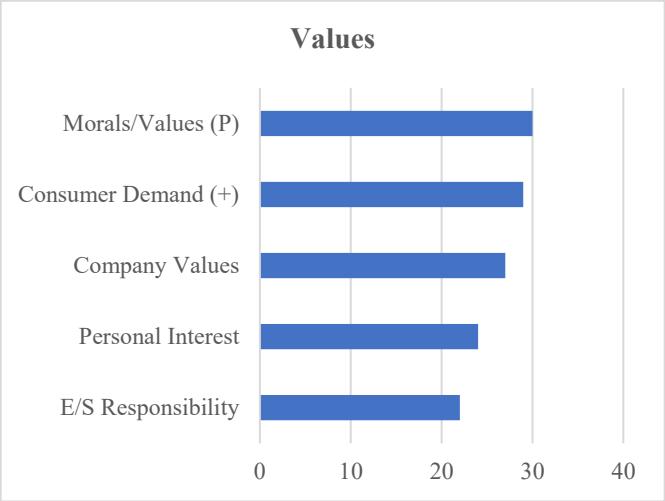

Figure 3. Values Impacting SME Sustainable Solution Implementation

New York State SMEs appear to be driven by the belief that businesses and individuals have an obligation to reduce their negative impact on the environment and society. Additionally, SMEs feel as though engaging in such activities will allow them to improve their bottom line in the long term. This can be surmised from transcript excerpts such as the following:

> "I worked with our board of directors to come up with our mission statement which is our triple bottom line mission to enhance community, economy, and environment, through reuse. We saw our core activity to keep stuff out of the landfill, and that it also had other positive impacts."

> "Our motivations come from the promise of realizing a return on investment quickly. We always watch our bottom line, and we obey the law."

> "I do this because it's the right thing to do. (…) You can't just take the easy way out, and the world is beginning to notice."

Competitive Advantage

Among the 66 owners/managers responding to this question, 59% noted that competition had no impact on their decisions to adopt sustainable solutions while 41% stated that it did. Although it may appear that the actions of competitors in terms of sustainability does not impact SMEs' decisions to implement sustainable solutions, the concept of maintaining competitive advantage may still apply. In relation to this research, it does not appear that adoption of sustainable solutions is impacted heavily by competition, but rather that sustainable solutions are used to inspire the competition. This can be found through comments such as:

> "No [our competitors' adoption of sustainability has not motivated us], I actually look at it like I hope we motivate other people to start doing more."

> "I would say it's a mutually inspiring undertaking, and we sort of inspire each other. There is healthy competition (…) but it's not competition in the sense that we don't want to see them go under or out. We don't want to put them out. We want to see a synergy."

> "Sustainability is not a feature that competitors differentiate themselves in our line of business."

As to the role of consumer demand and social trends as possible external drivers for the adoption of sustainability solutions, approximately 19% and 25% respectively of the owners/managers whom we interviewed mentioned these as key influencers. There was a geographic difference in this regard; more SME owners/managers in smaller cities highlighted the importance of these forces than their counterparts in bigger cities such as New York or Buffalo.

Regulations, Compliance and Incentives

In the opinion of our interviewees, government regulations and incentives did not greatly impact their decision to engage in sustainability. Of the 57 owners/managers who responded to this question, about 39% noted government regulations had an impact on their decision. At the same time, 41% of the 59 interviewees who commented on the role of government incentives, viewed it as an inducement. In terms of regulatory compliance, 81% of the 54 owners/managers stated that it had no impact. Overall, it appears that government programs, held little to no effect on adoption of sustainability solution. Furthermore, the percentage of respondents stating lesser impact of these three areas to their sustainability decisions were much higher in the smaller cities than the bigger urban areas. For example, whereas 70% of the SMEs in Ithaca believed that incentives offered by government, at all levels, played no part in their sustainability engagement decisions; the corresponding percent for SMEs in New York City or Buffalo was between 44 to 50. A cautionary note is in order here in that the when grouped by clusters of geographical locations, or by industry for that matter, the sample size and corresponding number of responding owners/managers become too small for any meaningful statistical analysis and generalization.

Although municipal, state, or federal regulations or support can impact a business's operations, it appears that these factors do not have a major impact on New York State SMEs in terms of implementing sustainable solutions. The following comment by one of the participating managers echoed views of few others who downplayed the impact of government regulations or support programs in initiating sustainability solutions:

> "Not at all, I haven't received any kind of specific notice as to plans I should follow or things I can change about my sustainability from the government."

Barriers to Implementation

As shown in Figure 4, among our responding firms, cost rose to the top among the barriers to sustainability implementation, with 73% who noted it as a major concern. Limited resources were mentioned as the next major barrier to reduce or defer their implementation. Inadequate knowledge and expertise about specific activities to improve their companies' sustainability performance and hence the desire to learn more on how to improve, be it through peer education or local government programs, was also mentioned by some owner/managers; these constraints are consistent with evidence from recent studies (Alvarez Jaramillo et al., 2019)

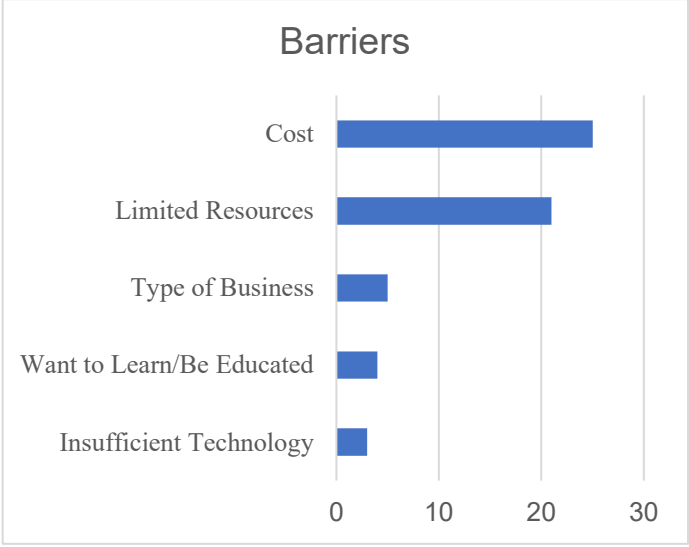

Figure 4. Barriers Impacting SME Sustainable Solution Implementation

The following comments corroborates the role of cost and resource constraints:

> "We are always concerned with the cost of sustainable solutions as they are quite expensive. Especially utility costs of purchasing renewable certificates are 150% more expensive."

> "Yes, entirely, it [adopting sustainable practices] is more time consuming and way more expensive, it's often not practical for a small business."

> "We definitely wanted more energy efficiency in our space, but like I mention we are not in control of our building. It would be really great to have more energy efficient vehicles, but they are not necessarily available or affordable."

Pay Off

When asked if the sustainability solution(s) they adopted had paid off, 68% of our interviewees responded affirmatively. In some cases, they were more specific by adding that their sustainable initiatives had resulted in reduced costs or increased profitability (Figure 5). However, it was not clear if payoff had occurred in other ways such as increased sales, improved customer relations, or enhanced firms' reputation for sustainability. Below are few representative responses on the extent and nature of such payoffs:

"Yes, it has paid off. (…) We feel good about what we do and know that our products are of the best quality. As far as a monetary pay off, well…no one will ever look at our products and point out bad ingredients, or bad business practices, or say that we pollute too much. They can only say something good. In the long run, that is priceless."

"Yes! The composting machine has definitely paid for itself already with only three years of operation and all the money we have saved on taking out the waste. Yeah it's a big expense up front but of course, so is opening up any business. And not only economically but we feel like we're doing our part in helping the planet."

"We've tracked a lot of data through the arch of our growth, and so we have kind of this data driven history. Including tons diverted, dollar sales, we've had a monthly trends document that we've had since 2009. (…) And I feel like we are not even close to reaching our full potential, so we have long ways to go."

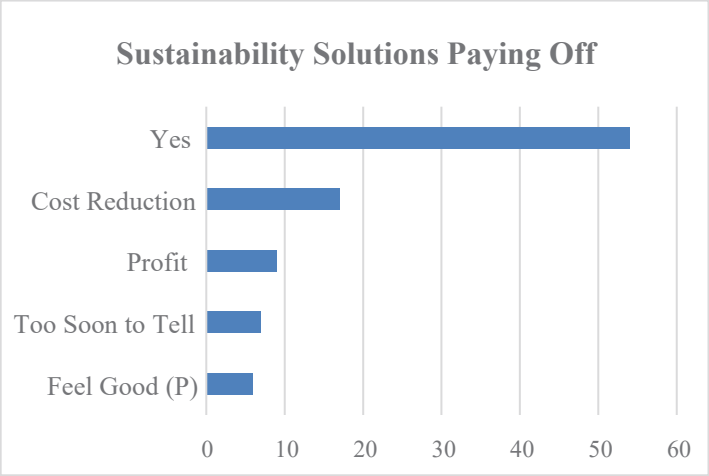

Figure 5. SMES that have Stated their Sustainable Solutions have Paid Off

Discussion

Our findings in the context of earlier studies highlight the commonalities and areas that our research contributes. The key motivators and barriers to sustainability engagement as noted by the earlier research and our study are discussed below.

Environmental Awareness

When first considering implementing sustainable solutions in business operations, it is necessary for small business owners or managers to have some level of knowledge, awareness, or understanding as to how. This aligns with the rise of sustainability-related courses and educational opportunities offered at colleges and universities around the U.S, which expose business owners and managers to the subject (Christensen et al., 2007). Our finding is in concert with several previous studies which showed SME owners/managers or employees' knowledge about how to engage in environment improvement was one of the key motivators for adoption of sustainability solutions (Gadenne et al., 2008; Giri et al., 2015; Meqdadi et al., 2012; Parker et al., 2009; Walker et al., 2008).

As these social sources have been linked to opportunity recognition to remain competitive with larger firms, it is plausible to conclude that learned opportunities such as reducing costs or improving customer relations seem to have impacted SMEs' business owners/managers' decisions to implement sustainable solutions (Ozgen & Baron, 2007).

Values

Although businesses may differ in their motivations depending on industry or market segment, their underlying motivations to engage in sustainability appear to be similar. Lozano (2015) notes that SMEs can be motivated by a variety of factors such as organizational culture and values, customer expectations, and regulations.

As it relates to management values, earlier studies have noted both the dismissive predisposition by some who do not see environmental issues or the need to act responsibly as significant for their business, believing that their impact is small or insignificant. On the other hand, some other studies found managers who believe they have a responsibility to engage in environmental improvement, proactively undertake such actions and view their business having an environmental impact (Parker et al., 2009; Schaefer et al., 2020; Walker et al., 2008). Our findings underscore the role and importance of SME owners/managers' values and demonstrate that their commitments to sustainability engagement have made a significant difference in the adoption of sustainability by a firm.

Competitive Advantage

With 30.2 million SMEs in the U.S., individual businesses operate in a vastly competitive environment (SBA Office of Advocacy, 2018). As a result, staying competitive or diversifying one's product line or services is a top priority for business owners and managers. As it has been noted, engaging in effective sustainable efforts that help reduce costs,

increase innovation/creativity, improve risk management and optimize business operations have led to strong competitive advantages (Aghelie, 2017; Fink & Whelan, 2016; Laszlo & Zhexembayeva, 2017; Meqdadi et al., 2012).

While some of the earlier studies on external drivers of sustainability adoption have identified the necessity to keep up with the key competitors' business practices (Cantele & Zardini, 2018), based on our findings, we believe this to have been traditionally the case more so with the larger companies. As the competitive landscape broadens and consumers obtain greater power in influencing business decisions, it has become essential for firms wishing to remain competitive to engage in corporate social responsibility activities such as giving back to the community, sourcing from sustainable suppliers, or providing adequate living wages (Juščius & Snieška, 2008). Coupled with a continuous growth in the environmental movement since the mid 1900s, business owners and managers have become more aware of the necessity of intertwining their operations with sustainability to limit negative impact while maximizing their operations (Dunlap & Mertig, 2014). As sustainability engagement becomes more mainstream among SMEs, competitive positioning and innovations in differentiation with other competitors, small or large, is bound to gain momentum among SMEs.

Regulations, Compliance and Incentives

Over the past few decades, there has been an increase in government assistance provided to businesses not only for general economic growth purposes, but also for sustainability activities such as climate investments (Stiglitz, 2016). However, New York State SMEs did not appear to consider the regulations having a key role in their adoption of sustainability. Findings of the earlier studies on the role of government regulations, compliance, and incentives in companies' sustainability decisions have been mixed. For example, Parker et al. (2009) found extensive regulations to force SMEs sustainability improvement, financial support to offset the costs, or penalties to discourage negative environmental impact were all impactful on companies' sustainability decisions. Johnson and Schaltegger (2015) and Aghelie's (2017), on the other hand, found that the absence of government support or limited financial incentives offered to support green sustainable projects were among the major barriers to the firms' adoption of sustainability.

Government intervention and involvement in business practices have been prevalent in the U.S. for quite some time. Graafland and Smid (2017) argues that direct government regulations and involvement, although helping to improve environmental performance, should be used in conjunction with other factors such as social license pressures in order to be effective.

Barriers to Implementation

Aside from the various motivations that encourage SMEs to implement sustainable solutions, there also exists barriers that inhibit sustainability implementation. Luthra et al. (2015) identified 28 barriers to sustainability for SMEs across seven core dimensions including economical and financial, market, awareness and information, technical, ecological and geographical, cultural and behavioral, and political and government issues. The high cost of environmental programs and lack of financial resources have been among the most frequently cited barriers to the adoption of sustainability programs, particularly among the SMEs making such investment unaffordable and/or highly risky (Aghelie, 2017; Chan, 2011; Chasse & Boiral, 2017; Johnson & Schaltegger, 2015; Meath et al., 2016; Meqdadi et al., 2012; Walker et al.,2008).

For the New York State SMEs who participated in this study, these barriers, though unique to each organization based on size and industry, primarily included costs due to the capital intensity of sustainable solutions, such as solar panels, and a general lack of resources, such as time and space or employees. These top barriers are also listed as major impediments in the most recent findings by Alvarez Jaramillo et al. (2019), Bakos et al. (2020) and Shields and Shelleman (2017). Shields and Shelleman's (2017) study indicated that unclear or delayed payback and resource constraints (financial, time, staff, technology expertise, organizational) are major barriers. However, some barriers discussed in the literature did not emerge as such in our study. For example, lack of education and awareness is listed as a top barrier in both Alvarez Jaramillo et al. (2019) and Bakos et al. (2020) studies, specifically shown in the developing countries. The New York State SMEs, even those who had not implemented sustainability, did not find the lack of education and awareness as barriers.

Conclusion

The U.S. SMEs have not been adequately studied in the literature. This study took a comprehensive approach by investigating the drivers and barriers of SMEs' sustainability in the U.S. Through in-depth interviews with 75 SMEs across different sectors, our goal was to understand U.S. SMEs' strategies and the environment in which they make their sustainability decisions.

Our research identified important internal and external drivers of the sustainability adoption in U.S. SMEs. Inter-

nal drivers, such as a sense of moral obligation to reduce negative environmental impacts, lower costs and potential future liabilities (cleanup costs), or the possibility of lower long-term operating costs, like the cost of gas or electricity, were all positively influencing adoption decisions of SMEs. Among external drivers, majority of SMEs did not consider competitive advantage, regulatory compliances, or financial incentives as important influencers of sustainability adoption strategies. Further analysis of this finding can help public policy makers to either extend the government regulations or make them more effective in advancing SMEs' sustainability engagement. Meanwhile, social trends, such as customers valuing socially responsible products, were considered important factors. In addition, any formal or facilitated education as external drivers, such as workshops, seminars, conferences, or environmental audits, played a positive role. This calls for planning and developing more formal education at colleges and universities or informal programs at places, such as chamber of commerce, that can strengthen SMEs' ability to adopt sustainable solutions. Our study also identified the barriers such as cost and limited resources that prevent SMEs' adoption of sustainability.

With its focus on one state's SMEs only and given the methodology and the sample size used in this study, the generalizability of our results is clearly limited. We conducted a qualitative research study to explore and understand important factors influencing New York State SMEs' sustainability behavior. Our results are based on analytical and not statistical inferences.

One possible direction for future research would be to develop an online survey and collect data from hundreds of SMEs across New York State and/or other states and further analyze the data by firms' size, age, industry and location (e.g., urban vs. rural), among others. The online survey would gather more objective structured data to conduct statistical analysis of the importance of various factors and their relationships that should lead to gaining deeper insights on SMEs' sustainability behavior.

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Appendix

#	Term	Definition
1	Ahead	Consider themselves ahead or usually ahead of regulations or competition
2	Community/ Networks	Learn from other businesses, past employers, or organized groups of businesses they are a part of; Supported by/learn from the community
3	Company Values	Mention of impact from mission statement or company goals; Founded for sustainability
4	Competitors	They are motivated by their competitors (want a competitive advantage, learn from them, partner with them, and/or use them as a comparison for evaluating their sustainability
5	Complex Solutions	Solutions are too complex/difficult to understand to implement
6	Consumer Demand (Negative)	Consumers are not currently interested or concerned with their solution or service; Customers are not willing to commit to such endeavors at this time; Customers want certain products that cannot be made sustainably
7	Consumer Demand (Positive)	Customers want/expect certain sustainable or environmentally friendly products/services; Customers suggest/inform business about sustainable options
8	Consumer Price Sensitivity	Consumers are concerned with cost of adoption and/or the product because it may impact sales and make profit difficult to obtain
9	Convenience	Adopting certain sustainable practices was made convenient for their business or was more convenient than other alternatives
10	Cost	Solutions are too expensive; Cost is too high
11	Cost Reduction	Want to reduce costs; Sustainable practices have paid off by actually lowering expenses
12	Cost Will Decline	Believe the price of implementing solutions will go down over time
13	Customer Incentives	They give consumers incentives to be more sustainable
14	Customer Retention	Has increased customer base and retention from sustainability
15	Customer Satisfaction	Value customer satisfaction; feel that their sustainability efforts have improved customer satisfaction
16	Data Driven	Motivated by measurement/data to reach goals or maximize potential
17	Different Priorities/ Goals	They are focused on other goals or have other priorities that are keeping them from improving sustainability
18	Environmental/ Social Responsibility	The company takes on responsibility for the impact they have on the environment and society because they feel that it is important as a business to contribute
19	Educating Sustainability	The business or their customers feel that it is important to include labels on products to show/educate consumers about product's sustainability; Provide educational opportunities for individuals, companies, or communities to learn more about sustainability; view education about sustainability as important
20	Education	Attended (and maybe influenced by) conferences and/or presentations that educated them on sustainability; Have a degree or have taken courses that relate to sustainability or the environment; Conducted external research that is either informal (books, internet, magazines, etc.) or formal (literature reviews, published journals; Learned about sustainable practices from advertisements, motivated by relevant ads they have seen, and/or have learned about sustainable practices on tv, etc.

21	Employee Satisfaction	Employees are happy with sustainability efforts
22	Employee Suggestions	Other employees/interns suggest/inform business about sustainable options
23	External Evaluation	They have received accreditations or similar forms of formal recognition; They have assessed their sustainable practices through formal evaluations (such as energy consumption, usage, and recycling system evaluations); They perform/receive periodic environmental audits (by choice or because it is mandated)
24	Family Influence	Learned from family members; Influenced/motivated by family
25	Farming Property Tax Returns	They benefit from getting tax returns from farming property
26	Federal Influenced	Influenced by federal laws, regulations, incentives, etc.
27	Feel Good	Feel satisfied/happy with what they have done for the environment; Feel like they have made a positive impact
28	Government Info	Learn about sustainability from info shared by any level of government (regulations, recommendations, etc.)
29	Green Financial Services	Provide solutions for businesses to value environmental costs/impact and apply it to financial statements
30	Growth Opportunity	Paid off financially so they were able to expand (new locations, more employees, etc.); Gain (real or perceived) opportunities from adopting sustainable practices
31	Health Code Regulations	Influenced by health code regulations (particularly relevant to food/farming industry)
32	Health/Safety Concerns	Use environmentally friendly products primarily because they are safer for consumers (not necessarily because they are more sustainable)
33	Image Enhancement	Want to improve company image by supporting/engaging in sustainable practices; Enhanced their image through sustainable practices
34	Impact	They believe they have an impact on the environment, but may not do anything further to reduce their impact
35	Improve/Invent Sustainable Practices	They want to be innovative and create new/improve sustainable solutions for their own business or for other businesses to adopt
36	Incentives	Policies relating to incentives are a motivating factor (tax incentives, accreditations, networking opportunities)
37	Incentives Don't Apply	Feel that most incentives don't apply to their business (incentives aren't motivating)
38	Increase Impact (Positive)	Do more good, not less bad
39	Industry Trends	Motivated by trends in their specific industry
40	Insufficient Technology	Do not have the necessary technology for solutions they want to implement
41	Job Requirement	There is an expectation to be sustainable; Sustainability is part of job description or part of what they do in work
42	Lack of Control (Leasing)	Business feels like they cannot be in control of all sustainable practices because they are renting or leasing their property
43	Lack of New Solutions	Not aware of new solutions that are available or that they are capable of implementing

44	Limited Resources	Have a limited capacity in regard to available resources (space, materials, time, money, etc.)
45	Little/No Impact	Feel as though their business has little to no impact on the environment or that implementing sustainable practices will have little to no impact
46	Loans/Grants	Motivated by grant support they receive or intend to receive; Limited by the loans/grants they cannot receive
47	Local Policies	Influenced mostly by local policies (over state or federal)
48	Morals/Values	Motivated by own personal beliefs, morals, or values
49	More Involvement	Want more businesses and municipalities to commit to sustainability
50	Negative/Limiting View	View regulations as limiting to their practices; Have a negative view/opinion of regulations
51	New Recommendations	Get recommendations from outside sources (term used if outside source was not specified)
52	No Machines	They do not use machines for production
53	Not Aware of Regulations/ Incentives	They aren't aware of or haven't heard of any regulations or incentives to influence their decisions
54	Organic/Natural Products	Ingredients/products have no chemicals or are naturally/organically made
55	Other Businesses	They learn from or are influenced by other businesses that aren't competitors; they don't explicitly say that these businesses are part of their community or network
56	Performance	Want business to be successful based on performance in terms of sales, productivity, etc.
57	Personal Interest	Interested in sustainability for reasons other than morals/values; May have an educational interest or fascination with sustainability
58	Previous Work Experience	Learned about sustainable practices through previous jobs/work experiences
59	Product Redesign	Redesigned their product(s) to be more sustainable
60	Profit	Motivated by the profit they make; has paid off in profits
61	Quality	Create products that are higher quality, so they last longer; Sustainability paid off because they believe that their products are of the highest quality (since they are sustainable/natural)
62	Recycling/Waste Reduction	They compost, recycle electronics/basic materials (paper, plastic, cardboard, etc.); "Upcycle" (resell used/refurbished goods); Used term if they talked about "reducing waste" in general
63	Reduce Carbon Footprint	They have reduced emissions or pollution; Used term if they specifically said they reduce carbon footprint without elaborating
64	Reduce Impact	Have a primary goal to reduce the impact that they have on the environment (can be a personal or business goal)
65	Reduce/Reuse Water	Reduce how much water they use; They reuse water (i.e. save rainwater)
66	Regulations	Influenced by regulations to not be sustainable
67	Regulations Don't Apply	Feel that some regulations don't apply to their business or don't really affect them (regulations aren't motivating)
68	Renewable/ Efficient Energy	Use renewable forms of energy (i.e. wind, solar power); They have made their energy more efficient or reduced energy consumption (i.e. improved lighting, better heating)
69	Reusable Materials	They reuse their materials or choose to use reusable materials

70	Scale Reduction	Reduced size of operations to reduce impact/waste
71	Small/Delayed Pay Off	They believe that implementing sustainable solutions is not necessarily worth it because the benefits/pay off would not be immediate or would be too small
72	Social Trends	Feel obligated to adopt sustainable practices because of local culture, social media, other trends; Pressure to conform
73	State Influenced	Influenced by specifically state laws, regulations, incentives, or other form of motivator
74	Support Other Sustainable Businesses	They support other sustainable businesses by exchanging ideas or resources for sustainable solutions
75	Sustainability Leadership	Educate/inspire community; Model for other businesses/people; View their business as a leader in sustainability; View business as successful in inspiring other businesses/consumers to be more sustainable; Inspire consumers to be more sustainable or to support sustainable practices
76	Sustainable Suppliers	Source goods from suppliers that have sustainable practices
77	Sustainable Wages	They believe in paying their employees enough to live in current market/economy (certain living standard based on need)
78	Technology Improvements	Bought better/more efficient machines; Improved technology in a way that is more efficient/sustainable
79	Thinking Local	Have a positive impact on the local community; Products/materials are made locally or within the country; They think it is important to support their local economy (buy locally and offer/share sustainable solutions with other local businesses)
80	Too Soon to Tell	Company is not able to gauge the success of sustainable initiatives yet
81	Transportation Improvements	Improved distribution methods
82	Type of Business	They feel that the type of business they are in prevents them from being able to adopt more or any sustainable solutions
83	Unnecessary	They feel as though implementing sustainable solutions is unnecessary for the success of their business
84	Want to Learn/Be Educated	They want to learn more about sustainable practices because they value sustainability, but don't know how to improve
85	Way of Life	Have always been interested in sustainability, doing sustainable practices