

How Small and Medium Enterprises in North Carolina Respond to Supply Chain Pressure for
Sustainable Practices

by

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Thesis submitted in partial fulfillment of
the requirements for the degree of
Master of Science in Environment in the Graduate School
of Duke University

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ABSTRACT

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Abstract

More companies are beginning to manage the environmental impacts of their supply chain in addition to their own operations. Supply chain pressure has been shown to be generally effective at increasing practices with lower environmental practices (sustainable practices) in suppliers. However, questions have been raised about exactly how small and medium-sized enterprises (SMEs) in supply chains respond to pressure from business customers for sustainable practices and what factors influence their response. This study develops a framework for understanding what factors influence how SMEs respond to a variety of drivers of sustainability, which is then adapted to guide an empirical study of how SMEs respond to supply chain pressure for sustainable practices. A survey of 100 companies across North Carolina found suppliers generally comply with or exceed requirements from business customers. The role of supply chain pressure in suppliers' decisions to exceed requirements needs further research. The study also found evidence that supply chain pressure can act as a ceiling on what practices companies adopt by causing suppliers to abandon practices that exceeded customer requirements and were not recognized or rewarded. Care needs to be taken in designing supply chain management strategies to avoid supply chain pressure being counterproductive at increasing proactive SME sustainability.

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1. Introduction

Pressure from consumers is increasingly driving companies to improve the environmental sustainability of their operations and products (Auld, Bernstein, & Cashore, 2008). In addition to changing their own practices companies are increasingly adopting strategies to increase the environmental sustainability of their supply chains, using supply chain pressure to push their suppliers to adopt more sustainable practices (Seuring, Sarkis, Müller, & Rao, 2008). More supply chain management for sustainability by large companies provide increasing opportunities to use supply chain pressure to increase the adoption of environmentally sustainable practices in small and medium sized enterprises (SMEs) (Côté, Lopez, Marche, Perron, & Wright, 2008). Supply chain pressure has been shown to increase the adoption of environmentally sustainable practices in SMEs within supply chains in most cases (Baden, Harwood, & Woodward, 2009; Ciliberti, Pontrandolfo, & Scozzi, 2010; Lee, 2008; Yu & Bell, 2007). However, some SMEs engage more than others, and recent research suggests in some situations supply chain pressure may even be counterproductive to getting SMEs to adopt sustainable practices (Baden et al., 2009; Brammer, Hojmosse, & Marchant, 2011; Ciliberti et al., 2010).

Baden et al. (2009) found that sustainability efforts were hampered by supply chain pressure when SMEs already had different sustainable practices than those required and rewarded by customers. The authors highlight the need for additional research to understand how SME owner-manager values influence their company's reaction to supply chain pressures. Brammer et al. (2011) found significant differences in sustainable practice adoption between small companies with less than 100 employees and medium sized companies with 101-250 employees and suggest future research on SME sustainable take firm size into account. In a literature review Ciliberti et al. (2010) describe supply chain pressure as effective at increasing the adoption of sustainable practices in supplier SMEs generally but highlight the need for research to understand which

particular practices SMEs adopt in response to supply chain pressure. The authors also highlight a lack of theoretical frameworks about SMEs adopting sustainable practices in response to supply chain pressure.

While models exist for understanding what influences large companies to adopt sustainable practices (e.g. Bansal & Roth, 2000) and previous research has identified important external drivers and internal factors that influence the adoption of sustainable practices in SMEs no models or frameworks have been developed to illustrate how SMEs adopt sustainable practices (Ciliberti et al., 2010). Studies have shown that SMEs adopt environmentally sustainable practices in response to a variety of drivers, including external pressures such as regulations, customer demand, and institutional pressures and internal drivers such as the personal values of owners and managers (eg. Darnall, Henriques, & Sadowsky, 2010; Gabzdylova, Raffensperger, & Castka, 2009; Hoffman, 2001; Tilley, 1999). SMEs respond to these drivers differently based on internal characteristics, such as resources available to invest in sustainable practices and the owners and managers' knowledge of and interest in environmental issues (e.g. Grogan, 2012; Mir, 2008; Tilley, 1999) This study develops a theoretical framework for understanding how SMEs respond to a number of drivers of sustainability and uses that model to guide an empirical study that examines how SMEs in the United States respond to supply chain pressure to adopt sustainable practices, or sustainable supply chain pressure.

The study contributes to the literature on supply chain sustainability by examining how SMEs in the United States respond to sustainable supply chain pressure. The United States is an underrepresented country in the SME sustainability literature (Parker, Redmond, & Simpson, 2009), and while several recent studies have examined the drivers of sustainable practices in U.S. SMEs (Cordano, Marshall, & Silverman, 2010; Grogan, 2012; Mir, 2008) none have examined the influence of supply chain pressures. The study contributes to the broader literature on SME

sustainability both through its focus on U.S. SMEs and through the development of a theoretical framework linking external drivers and internal factors influencing how SMEs respond to those drivers.

Sustainability is often operationalized by adding environmental and social performance criteria to financial criteria when measuring business performance, creating a triple bottom line that companies use to try to achieve satisfactory performance in all three areas (Elkington, 1998). Sustainable supply chain management has been defined as "the management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainability, i.e. economic, environmental, and social, into account which are derived from customer and stakeholder requirements" (Seuring & Müller, 2008, p. 1700). This study focuses on and refers to the environmental and economic aspect of sustainability within companies and supply chains and does not include social issues unless explicitly stated. Sustainable practices help companies move towards achieving the goal of being able to "meet the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations World Commission on Environment and Development, 1987). Literature on sustainability and environmental management in SMEs generally focuses on the environmental aspect of sustainability, examining practices that provide environmental improvements, or "changes in technology and practices which reduce the current level of negative impact on the environment" (Parker et al., 2009, p. 2). This study expands that definition to include ensuring companies remain economically viable while moving towards environmental sustainability. Sustainable practices in this study are defined as practices that produce the same product or service while producing less negative environmental impacts compared to current or conventional practices while allowing the company to remain economically competitive.

2. Why Study SMEs?

Engaging small and medium sized enterprises in sustainability is critical to addressing today's environmental challenges because of the collective impact of SMEs on the environment. SMEs account for 99.7 percent of all companies and employ 49.2 percent of workers in the United States and 99.8 percent of companies and 66.9 percent of workers in the European Union (United States Census Bureau, European, 2011; 2009). The environmental impact of individual SMEs is small relative to large companies but the collective impact of SMEs is significant. For example, SMEs are estimated to produce 64 percent of industrial pollution in the EU (European Commission, 2010). In this study the U.S. definition of SMEs is used, which includes businesses with less than 500 employees (U.S. Small Business Administration, 2012). There is no official distinction between a small and medium sized company in the U.S. so a common definition in the literature of small businesses as those with less than 100 employees (Brammer et al., 2011) is used to differentiate small and medium sized companies in this study.

Most research and pressure on the environmental practices of businesses has been directed towards large companies while the environmental practices of small and medium sized enterprises have received relatively little attention (Baden et al., 2009; Brammer et al., 2011; Ciliberti et al., 2010; Jenkins, 2006; Parker et al., 2009; Tilley, 1999). The environmental practices of SMEs need to be examined separately from those of large businesses because the implementation of sustainable practices is different in SMEs (e.g. Ciliberti, Pontrandolfo, & Scozzi, 2008; Lepoutre & Heene, 2006). SMEs tend to lack internal resources to learn about or invest in sustainable practices (e.g. Gadenne, Kennedy, & McKeiver, 2009; Revell, 2007; Tilley, 1999), which tends to make them more reactive than proactive in adopting sustainable practices compared to large companies (Darnall et al., 2010). Another important difference is the direct management of many SMEs by their owners, whose personal values and awareness of

environmental issues significantly influence the adoption of sustainable practices by the company (Darnall et al., 2010; Grogan, 2012; Lepoutre & Heene, 2006; Sharma & Sharma, 2011; Tilley, 1999). These and other differences mean practices and theories based on large companies may not be appropriate for SMEs and further research is needed on how SMEs respond to demand for sustainable practices (Jenkins, 2006; Lepoutre & Heene, 2006).

3. Factors Influencing Sustainable Practices in SMEs

Models for understanding the adoption of sustainable practices in large companies provide a starting point for developing a framework of sustainable practice adoption in SMEs. The model developed by Bansal and Roth (2000) is a good example of how different drivers and internal factors influence a company's strategy regarding adopting sustainable practices. Bansal and Roth's model includes the main drivers that companies respond to and how the motivation behind the company's decision to adopt sustainable practices in the first place influences which drivers it responds to and what practices it is likely to adopt. The authors' recognition of the importance of a company's motivation for adopting sustainable practices makes the model a particularly appropriate inspiration for understanding how SMEs adopt sustainable practices because SMEs have a variety of business motivations that influence their overall business decision making, including regarding sustainable practices.

A theoretical framework for understanding the adoption of sustainable practices can take the same general form as the model developed by Bansal and Roth (2000): drivers, internal factors affecting how SMEs interpret those drivers, and response strategies. Major external drivers include customer demand, government regulation, and institutional pressures. Key internal factors include size, the values and beliefs of owners and managers, and the company's primary business motivation. These internal factors influence whether SMEs respond to drivers of sustainability reactively or proactively. Each of these framework components is discussed in detail in this section.

3.1 Link between Profits and Sustainability

The first driver of sustainable practices to consider as an explanation for why some companies have adopted sustainable practices is direct financial benefit. The traditional theory of business motivations is that all firms prioritize maximizing profits when making decisions and

that maximizing profits is the only social obligation of a firm (Case & Fair, 2007; Friedman, 1970; Jensen, 2002). Investments in protecting the environment have historically been viewed as imposing financial burdens by companies, which has made many reluctant to adopt sustainable practices (Porter & van der Linde, 1995). Despite this reluctance some companies did invest in sustainable practices, which prompted scholars to look for a link between sustainable practices and profitability. Research has only recently demonstrated a positive, very small relationship between increased sustainability and increased profitability (Margolis, Elfenbein, & Walsh, 2009; van Beurden & Gossling, 2008). The widespread belief among scholars and businesses that the link between investments in sustainability and profits is unclear is based on older research while research from after 1990 demonstrates a positive relationship (van Beurden & Gossling, 2008). However, the relationship appears to be so small that firms are unlikely to invest in sustainability if they are seeking to maximize their profits because the potential return on investment is likely less than other investment opportunities (Margolis et al., 2009). Ultimately after a thorough meta review of the literature Margolis et al. (2009) suggest that future research be directed at why and how firms pursue corporate social responsibility, including environmentally sustainable practices, in the first place rather than at the link between sustainability and profitability.

3.2 External Drivers of SME Sustainability

Uncertainty over the link between sustainable practices and profitability led scholars to examine what other drivers lead SMEs to adopt sustainable practices. The major external drivers identified by previous studies and discussed below include customer demand, regulation, and institutional pressures.

3.2.1 Customer Demand

Customer demand is one of the most important drivers of SME sustainability, with SMEs feeling pressure from both consumers and business customers to adopt more sustainable practices

(Darnall et al., 2010; Gabzdylova et al., 2009; Gadenne et al., 2009; Lee, 2008; Revell, 2007; Tilley, 1999; van Hemel & Cramer, 2002; Williamson, Lynch-Wood, & Ramsay, 2006).

Consumers are increasingly taking environmental performance into account when making purchasing decisions. This directly affects consumer facing SMEs as well as SMEs who supply to consumer facing companies. Consumer facing companies are increasingly turning to non-state market-driven (NSMD) governance systems, such as environmental certification programs, to comply with consumer demands as well as appease regulatory authorities who may consider regulating their business activities (Auld et al., 2008; Cashore, 2002). NSMD systems rely heavily on supply chain pressure to allow companies to provide more sustainable products or services by increasing the sustainability of their suppliers' practices (Cashore, 2002). As larger firms and some governments have begun managing their supply chains for sustainability SMEs who are part of those supply chains have been increasingly required to adopt sustainable practices to continue selling to those customers (Burke & Gaughran, 2007; H. Walker & Preuss, 2008). A lack of customer demand can also be a hindrance to companies who might otherwise consider adopting sustainable practices (Revell, 2007), further highlighting the importance of customer demand as a factor affecting sustainable practice adoption by SMEs.

3.2.2 Regulation

Regulation has been an effective motivator and is argued by some to be a critical tool for increasing sustainable practice adoption by SMEs because it reaches companies who would otherwise be reluctant to invest in sustainable practices (Darnall et al., 2010; Gabzdylova et al., 2009; Gadenne et al., 2009; Revell, 2007; Tilley, 1999; Williamson et al., 2006). However, regulation is not necessarily effective at influencing SMEs to adopt sustainable practices beyond those needed for legal compliance (Williamson et al., 2006). The absence or lax enforcement of regulations can influence SMEs to avoid adopting green practices to gain economic advantages

(Shi, Peng, Liu, & Zhong, 2008). In addition, many regulations exclude small businesses to avoid imposing too many financially costly regulatory compliance burdens on them. When properly enforced though regulation can be an effective driver of specific sustainable practices in SMEs (Mir, 2008; Williamson et al., 2006).

3.2.3 Institutional Pressure

Institutional pressure from industry initiatives or updated codes and standards can also push SMEs to adopt more sustainable practices (Ciliberti, de Haan, de Groot, & Pontrandolfo, 2009; Cordano et al., 2010; Hoffman, 2001). Today industry consortia are increasingly establishing initiatives and standards to increase the sustainability of companies in their industry, in part for financial gain by reducing economic inefficiencies and risks associated with poor environmental practices (Golden, Subramanian, & Zimmerman, 2011). Industry trends can influence SMEs to adopt sustainable practices that are becoming standard in their industry, especially if doing so may help preempt regulation (Gabzdylova, et al., 2009; van Hemel & Cramer, 2002; Tilley, 1999). As sustainable practices become more common in an industry they can eventually become part of the regular way of doing business throughout the industry, which can lead to widespread adoption because of institutional pressures that drive companies within the same industry to adopt similar practices as their peers (Hoffman, 2001).

3.3 Internal Factors Influencing SME Sustainability

Previous studies have found that internal factors influence how companies interpret and respond to external drivers of sustainability. Key factors identified by previous research include size, owner-manager personal values and beliefs about environmental issues and sustainable practices, and the company's primary business motivation.

3.3.1 Size

Previous research has show firm size to be a significant factor influencing a company's adoption of sustainable practices because several important factors are associated with size. Smaller companies are generally less aware of environmental issues and lack the time and financial resources to learn about and invest in them (Darnall et al., 2010; Lepoutre & Heene, 2006; Revell, 2007; Shi et al., 2008; Tilley, 1999). Brammer et al. (2011) also found that small businesses perceive fewer benefits and less strategic incentive to invest in sustainable practices than medium sized businesses. These factors can contribute to small companies being less likely to engage with environmental sustainability initiatives than medium sized companies (Brammer et al., 2011). However, when SMEs do engage with sustainability they can do so very quickly because individual owners and managers often have significant influence over strategy as well as operational decision making (Darnall et al., 2010; Sharma & Sharma, 2011). Size is included in the framework to represent the variety of ways it influences how SMEs consider sustainable practices.

3.3.2 Owner-Manager Values and Beliefs

Previous research has found that the personal values and beliefs of the owners and managers can be a significant driver of or barrier to sustainable practices in SMEs (Battisti & Perry, 2011; Cordano et al., 2010; Naffziger, Ahmed, & Montagno, 2003; Sharma & Sharma, 2011; Tilley, 1999; von Weltzien Hoivik & Melé, 2009). The personal beliefs of SME decision makers can serve to amplify external drivers of sustainability based on how decision makers interpret encounters with customers, market trends and opportunities, and community interest in sustainability (Grogan, 2012). Even if SME owners and managers are not concerned about the environment, a small number of interactions with stakeholders interested in environmental issues can convince them that the company should adopt green practices to satisfy those stakeholders

(Darnall et al., 2010). The limited resources small companies can spend gathering and processing information leaves them to rely on less formal methods of analysis and interactions with personal advisors and a small numbers of customers when making business decisions, making the personal beliefs of owners and managers very influential in decision making (Grogan, 2012).

Despite uncertainty over the relationship between sustainability and profitability some SME owners and managers see sustainable practices as a way to gain competitive advantage. Some SME owners and managers have cited the opportunity to access new markets or differentiate their product from others in the market as reasons for adopting green practices (Gabzdylova et al., 2009; van Hemel & Cramer, 2002). Some owners and managers also cited beliefs that the more sustainable practices will help improve the quality of their product and improve the efficiency of their production process (Gabzdylova et al., 2009; van Hemel & Cramer, 2002). Battisti and Perry (2011) found that SME owners can perceive sustainable practices as an expense that costs more than it will make or save, an opportunity to gain competitive advantage, a moral obligation to balance with profit maximizing practices, or the whole purpose for operating the company. Owners with different views tend to adopt different practices for different reasons and at different rates (Battisti & Perry, 2011).

The personal values and beliefs of SME owners and managers can also be a major barrier to adopting more sustainable practices (Battisti & Perry, 2011; Revell, 2007; Shi et al., 2008; Tilley, 1999; van Hemel & Cramer, 2002; Williamson et al., 2006). Low levels of awareness and understanding of environmental issues tend to lead owners and managers to believe that their business has little environmental impact or that they are not responsible for the environmental issues their company contributes to (Shi et al., 2008; Tilley, 1999; van Hemel & Cramer, 2002). Owners and managers can also be reluctant to adopt sustainable practices if they perceive customer demand for such practices as low (Revell, 2007; van Hemel & Cramer, 2002) or if they

are simply unwilling to consider or adjust to changes in business operations (Shi et al., 2008).

Whether a help or hindrance the personal values and beliefs of SME owners and managers are a critical factor influencing their company's adoption of sustainable practices.

3.3.3 Primary Business Motivation

Previous research has shown that SMEs are founded and run to achieve a variety of goals and do not always consider maximizing profits the primary goal of the company (E. Walker & Brown, 2004). Companies that are not responsible to external stockholders have additional flexibility in setting business priorities. For example, Sharma and Sharma (2011) found that family controlled companies were more likely to proactively adopt sustainable practices because they were more able to focus on other goals besides maximizing stockholder value.

The primary business motivation of each company is an important factor in determining how the company responds to drivers of sustainable practices (Bansal & Roth, 2000; Parker et al., 2009; Spence & Rutherford, 2001). A company's primary business motivation refers to the relative prioritization of various goals within business decision making, such as maximizing profits, complying with regulatory requirements, and protecting the environment. In a study on the drivers of sustainable practices in large companies Bansal and Roth (2000) identified three motivations for companies to adopt sustainable practices: competitiveness, legitimation, and environmental responsibility. Firms motivated by competitiveness were interested in sustainable practices to capitalize on opportunities to increase their competitive advantage and their profits. Firms motivated by legitimation were concerned with complying with legal requirements and social norms to maintain their license to operate and avoid external scrutiny. Firms motivated by ecological responsibility felt that reducing their company's impact on the natural environment was a moral imperative.

Other studies have identified these motivations in SMEs as well, and in some cases these and other motivations are the top decision making priority for companies rather than just their motivation when adopting sustainable practices (Parker et al., 2009; Spence & Rutherford, 2001). In a study about what influenced decision making about socially preferable practices in SMEs Spence and Rutherford (2001) identified four primary motivations, three of which match those found by Bansal and Roth (2000): enlightened self-interest (Bansal and Roth's competitiveness); subsistence (legitimation); and social priority (environmental responsibility). Spence and Rutherford (2001) also identified a fourth motivation, profit maximization, where making money is the company's top priority and all other considerations are secondary. In a review study specifically on practices to help increase environmental sustainability in SMEs Parker et al. (2009) identified these same four motivations, referring to them as advantage, compliance, environment, and profit-driven, respectively. Building on these categorizations four primary motivations are developed for this study: Profit, Compliance, Lifestyle, and Environment.

3.3.3.1 Profit Motivation

Companies with a profit motivation are companies that fit the traditional theory of companies whose primary goal is to maximize profits (Case & Fair, 2007; Friedman, 1970; Jensen, 2002). Profit motivated companies can adopt sustainable practices proactively or reactively depending on how they view the economic return on investment. Because the link between investing in sustainability and increased financial performance is very small (Margolis et al., 2009) profit motivated companies that believe sustainable practices have uncertain or low return on investment will likely invest in them reactively. Some profit motivated companies may invest in sustainability to build competitive advantage by lowering costs, allowing access to new markets, or increasing product differentiation (Bansal & Roth, 2000; Parker et al., 2009), but

most profit motivated companies will avoid sustainable practices due to their uncertain return on investment. Either way the top priority of profit motivated companies is to maximize their profits, with all other business goals secondary to that.

3.3.3.2 Compliance Motivation

Compliance motivated companies are focused on survival and longevity. Often in highly competitive industries, compliance motivated companies prioritize meeting external requirements to maintain their license to operate while otherwise minimizing costs but not necessarily maximizing profits (Bansal & Roth, 2000; Parker et al., 2009; Spence & Rutherford, 2001). Compliance motivated companies will tend to not proactively adopt sustainable practices, preferring to react to customer demands (Burke & Gaughran, 2007; H. Walker & Preuss, 2008), regulatory requirements (Mir, 2008; Williamson et al., 2006), or institutional pressures within their industry (Ciliberti et al., 2009; Gabzdylova et al., 2009; Tilley, 1999; van Hemel & Cramer, 2002). This reactive approach is further reinforced in markets with low demand for sustainable practices and high competition that requires companies to minimize operating costs to stay competitive (Revell, 2007).

3.3.3.3 Lifestyle Motivation

Lifestyle motivated companies are founded and operated to allow the owner to meet personal goals, usually of having a flexible lifestyle (Lashley & Rowson, 2010; E. Walker & Brown, 2004) or high degree of control over product quality (Jennings & Beaver, 1997; E. Walker & Brown, 2004). Owners of lifestyle companies focus on achieving business success as they define it personally, not necessarily using financial criteria (Jennings & Beaver, 1997). Lifestyle companies may even purposefully take steps that have negative economic implications for the company, such as avoiding hiring additional staff, if doing so would compromise the owner's lifestyle goals (E. Walker & Brown, 2004). Lifestyle companies are likely to proactively

adopt sustainable practices only if doing so advances the owners' personal goals for running the company.

3.3.3.4 Environment Motivation

Environment motivated companies prioritize protecting the environment over maximizing profits when making business decisions, often out of a sense of moral obligation or duty (Bansal & Roth, 2000; Battisti & Perry, 2011; Parker et al., 2009). Similar to lifestyle companies, environment motivated companies are willing to make business decisions that advance the company's non-financial goals of protecting the environment or operating in a sustainable way at the expense of the company's potential to maximize profits (Kirkwood & Walton, 2010; Parker et al., 2009; Schaper, 2005). Environment motivated companies are the most likely to adopt sustainable practices proactively because their owners and managers make environmental protection the company's top decision making priority with profit maximization second to it.

3.5 Sustainability Strategies

SMEs can respond to drivers of sustainability reactively, by waiting for requirements to be imposed on them, or proactively, without or in addition to requirements from customers or regulations. Based on the literature review above SMEs are more likely to begin proactively adopting sustainable practices in response to customer pressure and institutional pressures than regulatory pressures. Customer pressure and institutional changes are more likely to induce companies to adopt sustainable practices proactively to keep up with their competitors or gain competitive advantage by getting ahead of competitors on an increasingly important purchasing criteria.

In general, larger companies are more likely to proactively adopt sustainable practices than smaller companies. However, the adoption of sustainable practices in small companies can

vary greatly with the owner's level of interest in environmental issues and the company's relative prioritization of business goals. For example, environment motivated companies are more likely to proactively adopt sustainable practices than companies with other motivations, as are companies whose owners and managers are more aware of environmental issues and believe their company makes significant contributes to those issues.

3.6 SME Sustainability Drivers Framework

Based on the literature reviewed above a theoretical framework for representing how SMEs respond to drivers of sustainability is presented in figure 1, below. The boxes on the left represent the major categories of external drivers of sustainability as identified by previous studies and include regulations, customer demand, and institutional pressures. The central box represents internal factors affecting how SMEs respond to external drivers and include size, owner-manager values and beliefs, and primary business motivation. The boxes on the right represent the broad strategies SMEs can follow in responding to sustainability drivers, reactive and proactive adoption of sustainable practices.

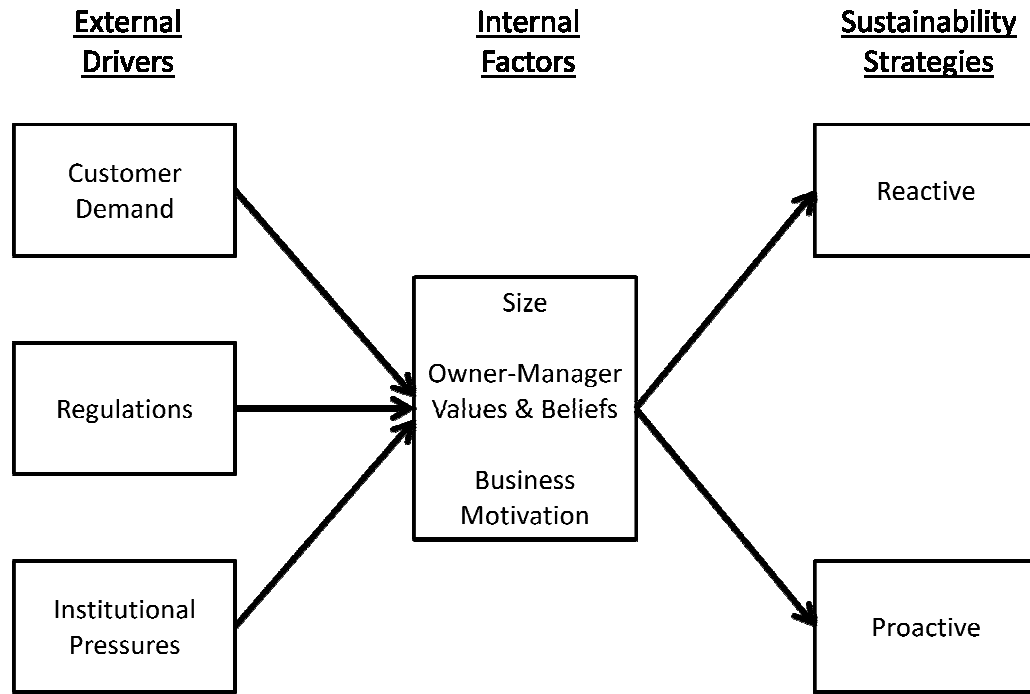


Figure 1: Framework of SME sustainable practice adoption

The framework presented in figure 1 includes very broad categories of drivers, internal factors, and strategies for adopting sustainable practices. The framework can be adapted to examine SME response to any particular driver by adding appropriate detail to each part of the framework. The next section describes an empirical study conducted using the framework as a guide to explore how SMEs in the United States respond to sustainable supply chain pressure.

4. SME Response to Sustainable Supply Chain Pressure

The framework presented above was used to guide an empirical study of how SMEs respond to sustainable supply chain pressure. Components of the framework were adapted and specified to include the factors identified in the literature on sustainable supply chain pressures, described below.

4.1 Supply Chain Pressure

Pressure from large buyer companies has been shown to be effective at increasing the sustainable practices adopted by companies within the supply chain in general (Baden et al., 2009; Ciliberti et al., 2010; Lee, 2008; Yu & Bell, 2007). Broadly, buyer companies can ask their customers to voluntarily adopt sustainable practices or require them to adopt certain practices or meet certain standards. Companies can adopt a variety of strategies to exert pressure down their supply chain and the way that pressure is applied may influence how their suppliers respond. Supply chain management strategies can vary in how much the buyer company includes environmental performance criteria in their purchasing decisions, requires suppliers to adopt specific practices or broader environmental management systems, and audits supplier compliance with such requirements (Jorgensen & Knudsen, 2006). In general, the more involved the buyer company is with its suppliers in terms of auditing and collaborating to address environmental concerns the more suppliers are likely to engage with sustainability (Hamner, 2005).

4.2 Size

Previous studies suggest that a number of factors correlated with company size may influence how SMEs respond to supply chain pressure. Smaller businesses tend to be less aware of environmental issues and have fewer resources available to invest in learning about and implementing sustainable practices, leading them into a more reactive strategy for adopting them

(Brammer et al., 2011; Darnall et al., 2010; Lepoutre & Heene, 2006). Difference in the perceived benefits of sustainable practices between medium and small sized companies can also contribute to different uptake of sustainable practices between different sized companies, with small companies less likely to proactively adopt sustainable practices than medium sized companies (Brammer et al., 2011). On the other hand supply chain pressure may help some SMEs begin proactively adopting sustainable practices by focusing attention on environmental issues and overcoming information deficiencies caused by resource limitations . The role of size and differences between responses of small and medium-sized companies to supply chain pressure will be explored in the study.

4.3 Owner-Manager Environmental Interest

Previous research indicates that the personal values of SME owners and managers may also have a significant influence on how companies respond to supply chain pressure (Baden et al., 2009; Ciliberti et al., 2009; Darnall et al., 2010; Lee, 2008). The personal values and awareness of environmental issues of a company's owner and managers have been shown to be important determinants of how proactively a company adopts sustainable practices in general, with more environmentally concerned owners and managers likely to adopt more sustainable practices (e.g. Naffziger et al., 2003). However, some concern has been raised that supply chain pressure can be counterproductive when applied to companies already engaged in sustainability efforts (Baden et al., 2009; Ciliberti et al., 2010). Baden et al. (2009) found environmental performance requirements imposed by customers prevented some SMEs from adopting more progressive practices because they were not rewarded for doing so. This has raised questions about the possible existence of a "ceiling effect" from supply chain pressure, where such pressure could be a disincentive for SMEs to invest in sustainable practices beyond what will be acknowledged and rewarded by buyer companies. Ultimately the influence of the personal values

of owners and managers on how SMEs react to supply chain pressure is uncertain and Baden et al. (2009) explicitly call for research focused on this relationship.

4.4 Primary Business Motivation

Companies with different primary business motivations will likely respond differently to any given driver of sustainability based on how well the benefits of adopting sustainable practices advance their most important business goals. Profit motivated companies that view sustainable practices as having negative or low return on investment are likely to only adopt the practices required while otherwise continuing with existing practices and attempting to maintain competitive advantage by minimizing their compliance costs. On the other hand some profit motivated companies may see opportunities for increased competitive advantage from adopting sustainable practices in response to supply chain pressure, especially if several customers or their primary customer are requesting more sustainable practices. The uptake of sustainable practices by lifestyle companies will likely depend on the owner's personal interest in environmental issues and how much he thinks sustainable practices can advance or hinder the company's ability to meet his personal goals. Environment motivated companies may not even need to change their practices to comply with customer requirements because they are likely to already be proactively adopting sustainable practices. Environment motivated companies are likely at the highest risk for having supply chain pressure act as a ceiling on practices that exceed customer requirements. So far no study has examined how business motivation influences a company's response to supply chain pressure.

4.5 Sustainability Strategies

The framework's sustainability strategies represent the strategies SMEs can adopt in response to supply chain pressure. While the goal of pressuring suppliers to adopt more

sustainable practices is often to get suppliers to adopt particular practices to shield the buying company from risk associated with poor practices (Seuring & Müller, 2008) supply chain pressure may help SMEs begin proactively managing environmental issues by overcoming information deficiencies or increased expected return on investment (Lepoutre & Heene, 2006). SMEs may also come to believe that sustainable practices can provide them with competitive advantage through lower operating costs and product differentiation (Apospori, Zografos, & Magrizos, 2012; Hammann, Habisch, & Pechlaner, 2009), providing enough incentive for them to begin proactively adopting sustainable practices.

SMEs may also respond to supply chain pressure in a reactive manor, focusing on complying with specific demands from buyers on an ad-hoc basis. SMEs often behave this way due to resource constraints (e.g. Darnall et al., 2010) and may even be pushed into a reactive, compliance focused strategy by buyers who do not recognize or reward sustainable practices beyond the specific practices or metrics the buyer demands (Brammer et al., 2011). SMEs can also withdraw from supply chains where they are under pressure to adopt sustainable practices which they cannot or prefer not to invest in (Brammer et al., 2011).

4.6 Supply Chain Pressure Framework

Figure 2 shows how all of the components described in this section fit into the broader theoretical framework developed earlier. The driver being examined, supply chain pressure, is shown in the left most box. Important internal factors are shown in the central box, and potential responses to supply chain pressure are in the right most boxes.

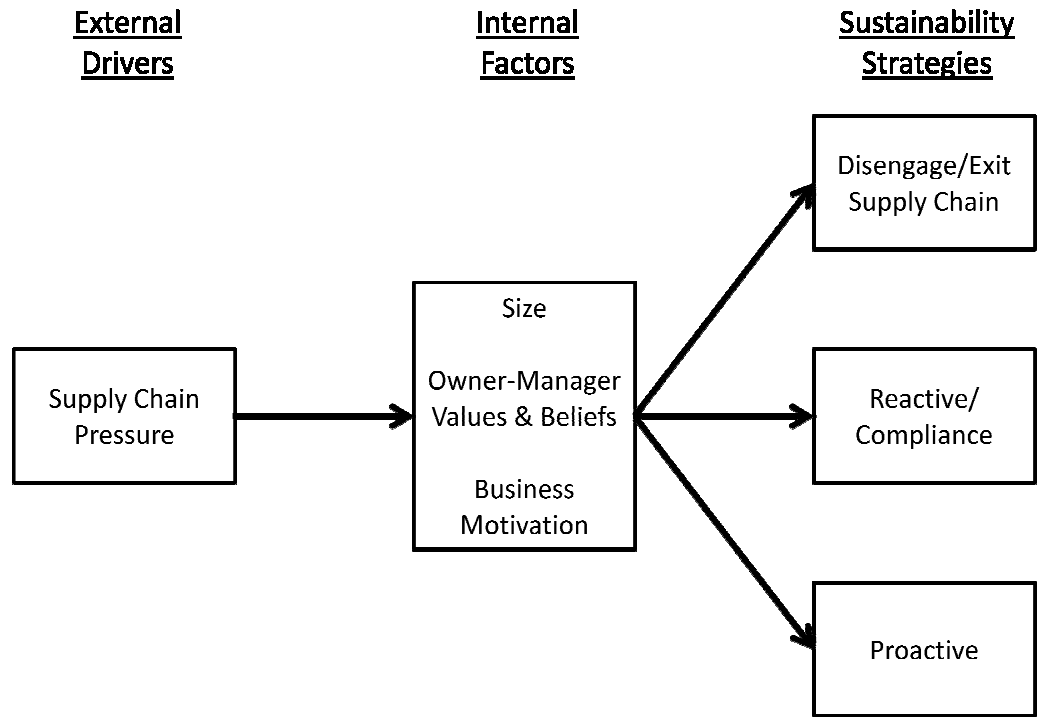


Figure 2: Framework of SME responses to sustainable supply chain pressure

5. Study Methods

A mixed methods approach was used to gather data for this study. A survey was used to gather quantitative data on what sustainable practices U.S. SMEs have adopted, how much supply chain pressure they have felt, and their internal characteristics. Follow-up interviews were used to collect more in-depth, qualitative data on how different factors influence decisions about sustainable practices, including factors not identified in previous research or included in the theoretical framework presented above.

Surveys have been used with success in previous studies on the environmental practices of SMEs, including in the United States (e.g. Cordano et al., 2010; Gadenne et al., 2009; Jorgensen & Knudsen, 2006). Most studies examining sustainability in SMEs within supply chains have used multiple case studies to collect data, which Ciliberti et al. (2010) suggest could be integrated into the results of broader empirical studies using surveys. This study incorporates findings from previous research into a theoretical framework and evaluates the components of that framework with survey data.

5.1 Survey Pretesting

Pretesting included expert review, a focus group, and pretesting with businesses similar to but outside of the target population. Survey and business research experts at Duke University were consulted throughout the survey design and pretesting process. A focus group was conducted with several local business owners to test survey questions and get feedback on the survey's clarity and comprehensiveness. Feedback from these sources resulted in adding some questions and clarifying certain important terms used within the survey. Questions were also reordered to ensure the most important questions were most likely to be answered by partial responses. Test surveys conducted with owners of businesses outside the sample population led to significant revisions of the survey question structure and language. Both the structure and

wording of questions were simplified significantly to make the questions quicker and easier to understand and answer. Some less critical questions were also moved to the follow-up interview script in an effort to keep the survey as focused and short as possible.

5.2 Sample Selection

The study collected data from SMEs in North Carolina. This regional constraint helps minimize confounding factors that vary by state to add power to the study findings (Bansal, 2005). Follow-up interviews were also facilitated by the regional constraint, which allowed the researcher to travel to companies to conduct in-person interviews. However, the geographic constraint does limit how much the findings can be generalized beyond the state without careful consideration of the differences between North Carolina and other states or countries.

To attempt to obtain a representative sample of companies across the state counties were stratified based on their economic and development characteristics. Data from the N.C. Rural Economic Development Center (2012), a non-profit economic development organization, were used to develop the strata and determine how many businesses in each strata needed to be surveyed to obtain a representative sample.

Local chambers of commerce were recruited to distribute the survey to their membership networks to maximize the chance of reaching company owners or managers, the target population for the survey. Counties in each strata were randomly sorted and chambers within each county were called until the number of companies being sent the survey in each strata matched the overall percentage of companies within each strata. Chambers representing multiple counties were only included after chambers in each county they represent were contacted to ensure all chambers had an equal chance of being selected. This sampling method ultimately relies on self-selection into the survey both by chambers of commerce and individual companies so the survey results are not from a random sample and cannot be generalized as widely as initially desired.

Despite this limitation the sampling frame should help avoid overly biasing the sample with companies in the same type of economically and physically developed counties.

5.3 Data Collection

5.3.1 Survey

The survey was conducted online using Qualtrics, a web-based survey software for implementing and analyzing surveys. A web link to the survey was emailed to participating chambers of commerce who distributed the link to their members in their regular email newsletters, in a separate email, or occasionally via social media (including Facebook and Twitter). The survey included 22 close-ended questions and was designed to take 10 minutes to complete (see Appendix A for the survey questions). Topics covered included: how important environmental issues are to the business owner or manager; whether and how various stakeholders have engaged with or pressured the company over environmental issues; how the company has responded to stakeholder pressure; what sustainable practices the company had adopted; and what challenges companies face in adopting more sustainable practices.

5.3.2 Interviews

At the end of the survey respondents were given the opportunity to volunteer for a follow-up interview with the researcher. Open-ended questions were used to allow the respondent to discuss any factors that influenced decision making on sustainable practices, including factors not represented in the study's framework. Questions covered some of the same topics as the survey in more depth, including: how pressure has been applied to the company, how it responded, and why; how the company's primary business motivation influenced its adoption of sustainable practices; and challenges the company has faced and still faces to adopting more sustainable practices.

5.4 Response Rate

The overall survey response rate was very low due to a variety of factors, including the sampling method and characteristics of the sample population. Of the 87 chambers of commerce contacted 14 agreed to share the survey with their members. Based on estimates provided by some chambers and public membership rolls of others the survey was sent to approximately 7,950 companies and 100 responses were received for an overall response rate of 1.3%. At least 8 of the participating chambers included the survey link in their regular member newsletters, which some chambers indicated have very low open rates and survey response rates. Two chambers indicated the newsletters containing the survey link had a 21% and 23% open rate, so less than a quarter of their members actually saw the survey link. Adjusting the estimate of companies that received the survey with the lower numbers from those two chambers provides a potential sample size of approximately 6,170 companies and a response rate of 1.6%. If a 25% open rate is assumed for all other chambers' newsletters the response rate would be to 3% from a potential sample of approximately 3,280 companies.

The survey response rates are much lower than desired but are on par with what several chambers of commerce indicated is typical. After agreeing to share the survey one chamber's vice president said "our survey rate is usually about 1%" (M. Yount, personal communication, November 13, 2012). Another chamber's president said "our response rate for surveys has not been very good, especially since the economic downturn (no extra people in anyone's business...the boss is also "working the front" so to speak)" (B. Joyce, personal communication, January 11, 2013). Based on the dates of survey responses and when different chambers indicated they sent the survey to their members direct emails with the survey link seem to have been much more effective at eliciting responses than survey links included in newsletters.

Table 1: The percent of all companies in the state and in the sample from each strata.

Sample Stratification		
	State %	Sample %
Tier 1 rural	14	15
Tier 2 rural	18	11
Tier 2 urban	11	5
Tier 3 rural	14	21
Tier 3 urban	43	47

The left-hand column in table 2 shows the percent of companies in the state within each strata, which formed the sampling frame target. The right-hand column shows how many of the potential respondents are in each stratum. The proportion of respondents in each stratum is roughly equal to the proportion of all companies in the state within each stratum, though ultimately the survey sampled a bit more from the most economically developed counties of the state. This makes the sample skewed a bit towards more economically developed areas of the state.

Follow-up interviews were conducted with 5 survey respondents. All of the interviewees were from small companies with less than 50 employees, including two with no employees besides the owner or partners. Three women and two men were interviewed, all of whom are owners or owning partners of their company. Industries represented include media, professional consulting services, healthcare, textile printing, and real estate. Three interviews were conducted in person and two were conducted remotely. Four interviewees were from urban and one from rural counties. All five interviewees were from counties in the top economic development tier (tier 3).

6. Results

6.1 Demographics

The demographics of respondents were quite varied, reflecting the diverse membership in local chambers of commerce. Using the broadest 2012 North American Industry Classification System (NAICS) categories 16 industry groups plus non-profits are represented in the survey, the breakdown of which is shown in figure 2.

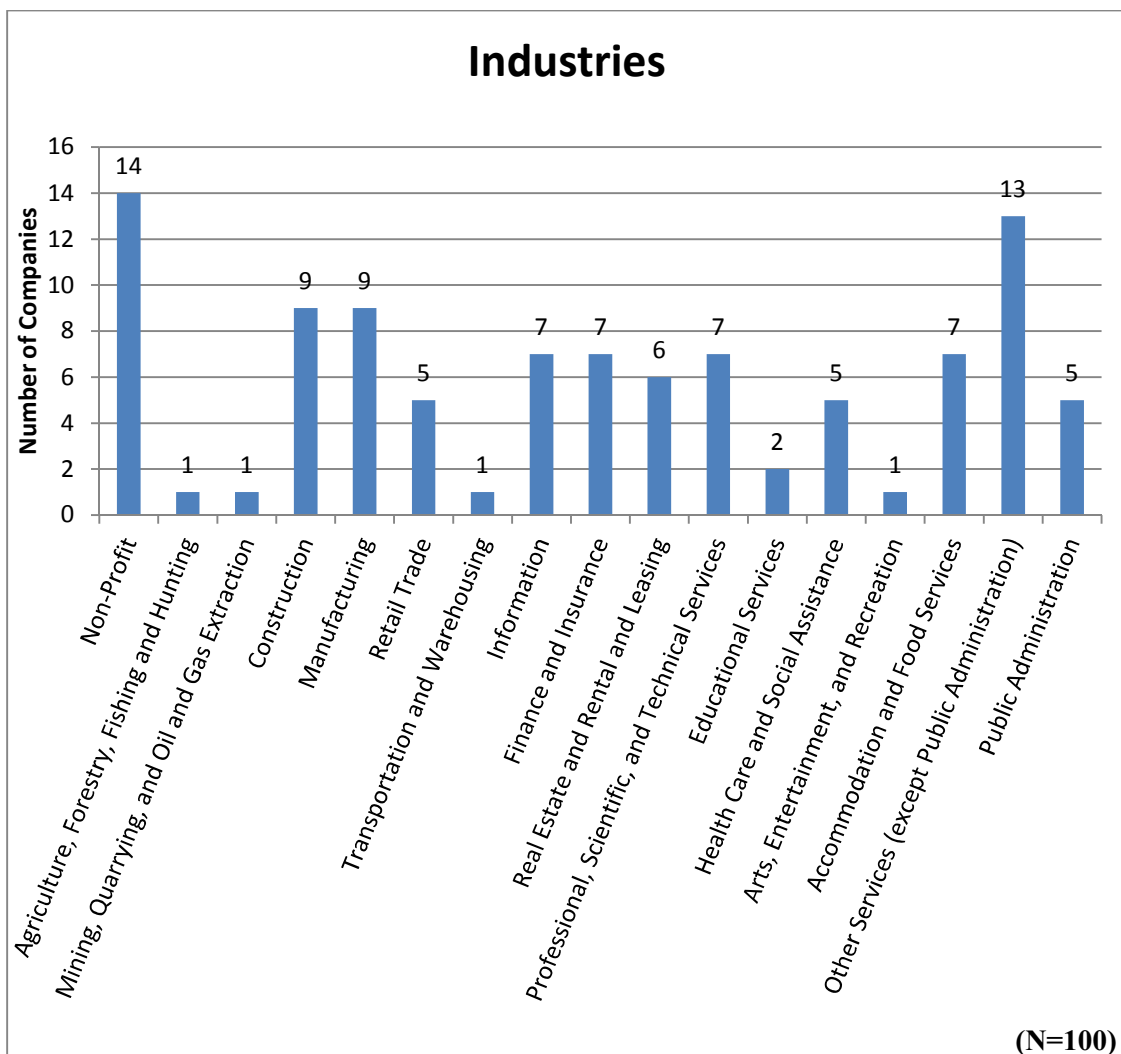


Figure 3: The number of survey respondents in each industry

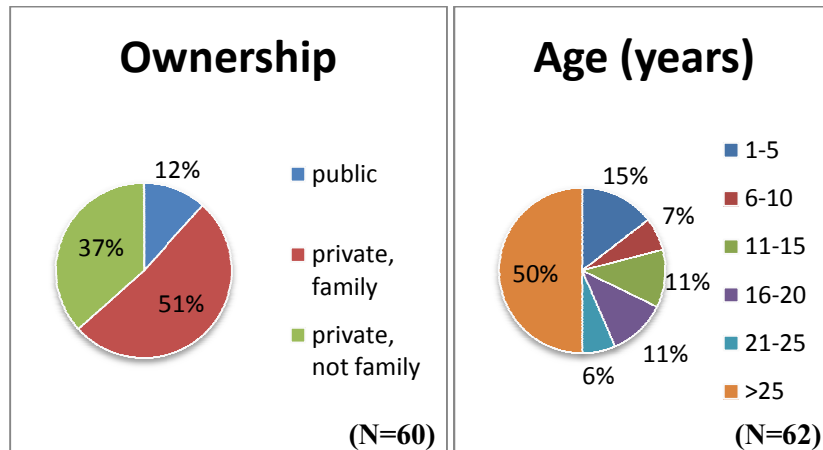


Figure 4: Descriptive Statistics: Company ownership and age

88% of companies represented are privately owned, with 51% family owned. Half of the companies are over 25 years old. Only 3% of respondents claimed to be startups while 53% indicated their company is growing and 44% that their company is mature.

6.2 Response to Supply Chain Pressure

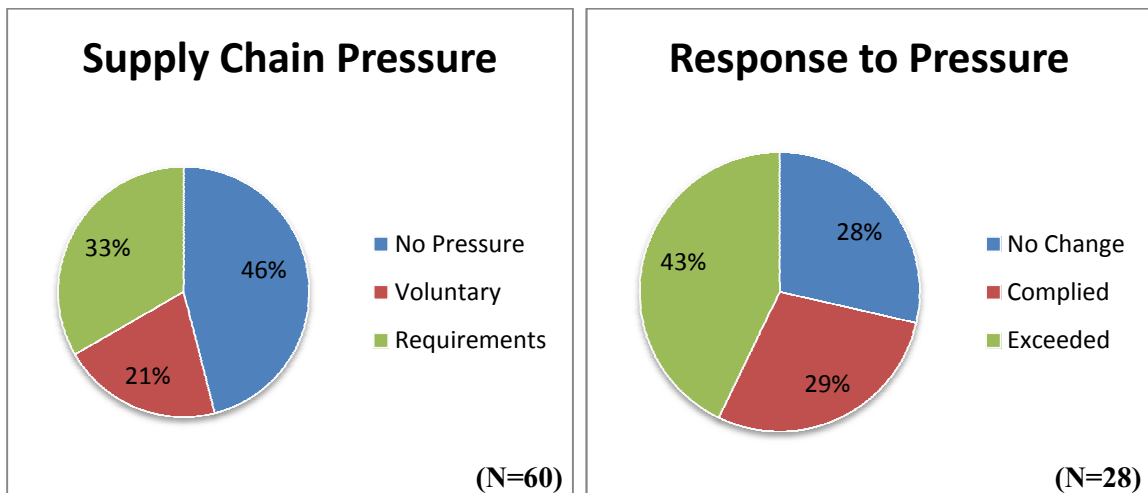


Figure 5: How companies felt and responded to supply chain pressure

Respondents were asked directly whether they have felt pressure from their business customers to adopt more environmentally sustainable practices and if so how they responded to that pressure. The results are shown in figure 5, above. Of respondents who sell to other businesses 46% said they have felt no pressure from their business customers to adopt more

sustainable practices. 21% of respondents were encouraged but not required to voluntarily adopt more sustainable practices, and 33% were required to adopt specific practices or meet other specific sustainability criteria.

Of the 28 companies that described how they responded to supply chain pressure 28% made no changes because they already met expectations or customers only asked them to voluntarily adopt sustainable practices. 29% of companies responded by adopting practices that complied with customer requirements, and 43% adopted practices that exceeded their customers' requirements or expectations. These findings indicate that supply chain pressure may indeed prompt some SMEs to begin to adopt sustainable practices proactively rather than simply adopting the specific practices required by customers.

Unfortunately too few respondents answered all of the survey question to allow the data to be analyzed statistically. The final dataset has high item non-response for several key factors as the result of attrition throughout the survey and selection of respondents out of some questions by indicating that they do not feel pressure to adopt sustainable practices from business customers. The missing data are not likely missing completely at random and are a potential source of additional bias in the data. Imputing data for the missing values would thus result in an even more biased dataset and was not done. List-wise deletion of responses with missing answers was used to generate a set of complete responses for statistical analysis but this technique resulted in too few observations to make any statistical inference regarding correlations between response to supply chain pressure and internal factors.

6.2.1 Owner-Manager Environmental Interest

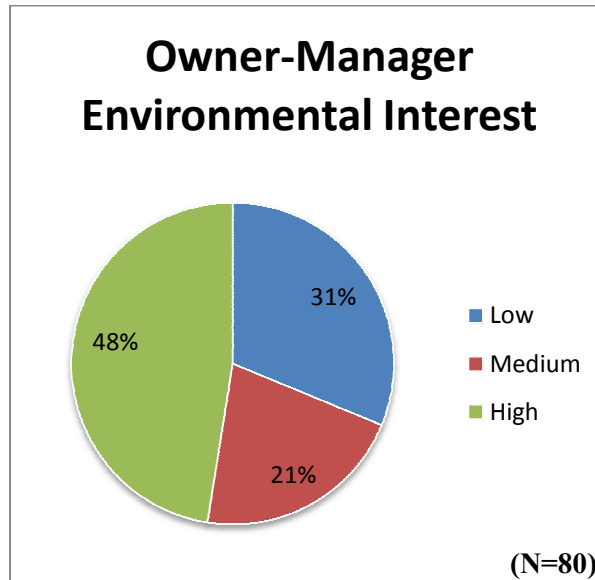


Figure 6: Stated importance of protecting the environment when making business decisions

When making business decisions 48% of respondents ranked protecting the environment as high in importance (4 or 5 out of 5) and 31% ranked it as low (1 or 2 out of 5). For comparison, 86% ranked profit maximization as high and 6% as low. While too few responses were received to analyze the relationship between owner-manager environmental interest and response to supply chain pressure statistically interview data support the theory that owner-manager environmental interest has an important affect on a company’s adoption of sustainable practices. The owner of a small healthcare company did not have any sustainable practices in her company just to protect the environment because she focuses on cost and impact on patient care when making business decisions. “What drives me most is patient care and satisfaction because...that is how we are going to generate more referrals in the future and therefore a sustainable practice” (Interviewee 2, personal communication, December 10, 2012). She generally does not consider sustainable practices because “my perception is that products that are more friendly for the environment...are more expensive and...the volume of what I would put

into the environment would be so miniscule so as not to influence my decision” (Interviewee 2, personal communication, December 10, 2012).

In contrast the owner of a small newspaper company had proactively adopted a number of practices designed to make her company more sustainable because she felt it important to do so personally, even though her customers have not expressed much interest in her company’s sustainable practices. “My husband and I feel very strongly that we are supposed to be good stewards anyway of our resources and the earth...I feel like that’s our responsibility whether or not customers ever know the steps that we take” (Interviewee 1, personal communication, December 10, 2012). These data suggest that some SMEs are more interested in adopting sustainable practices because their owners and managers are interested in protecting the environment, which may make similar SMEs more likely to respond proactively to supply chain pressure.

6.2.2.1 Ceiling Effect

Another indication of the importance of owner-manager environmental interest is the potential of supply chain pressure to act as a ceiling on practices adopted by companies rather than an incentive to proactively adopt sustainable practices (Baden et al., 2009). This study found evidence that this “ceiling effect” exists. Three respondents indicated that in response to supply chain pressure they abandoned practices that exceeded customers’ expectations. Two of those respondents then adopted practices that complied with customers’ requirements and the third respondent adopted other practices that again exceeded requirements.

6.2.3 Size

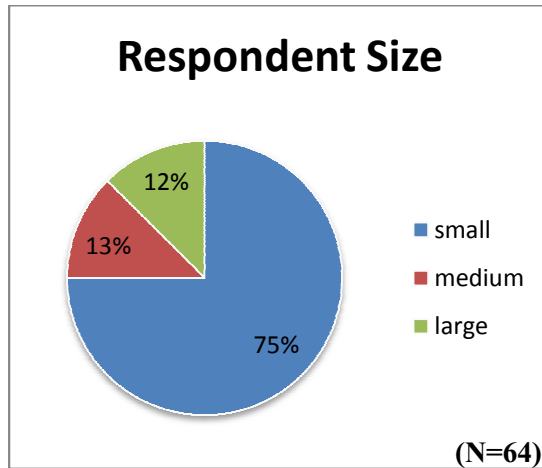


Figure 7: Size of respondent companies

75% of the companies that responded to the survey were small, with less than 100 employees. Of all respondents 48% had less than 10 employees, 19% less than 50 employees, and 8% less than 100 employees. Medium sized companies with less than 250 employees made up 8% of respondents and 5% of respondents were from companies with less than 500 employees. The remaining 12% were from large companies with more than 500 employees.

Interview data support the theory that size is an important factor affecting sustainable practice adoption. The owner of a small healthcare company doesn't feel the increased cost of more sustainable practices is worth paying for her company because "the volume of what I would put into the environment would be so miniscule so as not to influence my decision" (Interviewee 2, personal communication, December 10, 2012). This sentiment was shared by a number of respondents, as illustrated in figure 8 below, with 22% of small companies and 25% of medium-sized companies indicating they believe their environmental impacts are too small to justify investing in mitigating.

6.2.3.1 Size and Barriers to Sustainable Practices

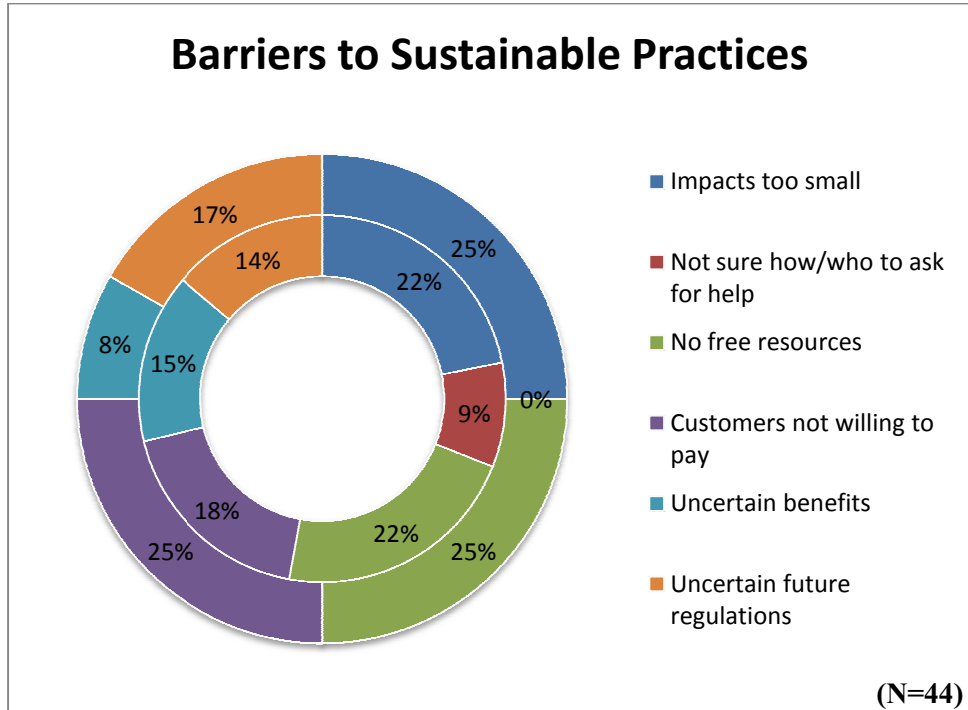


Figure 8: Barriers to reducing their companies' environmental impacts cited by small companies (inner ring) and medium sized companies (outer ring)

The barriers cited by respondents and shown in figure 8 suggest that small and medium-sized companies face many of the same challenges but at different rates. A slightly larger proportion of medium sized companies directly cited lack of time and capital as barriers than small companies. However, some small companies indicated they were not sure how to reduce their environmental impacts or who to ask for help doing so, which are challenges that could be derived from lack of time to research options or capital to hire external help. Adding these barriers to resource constraints more small companies indicated, directly or indirectly, that resource constraints are a significant barrier to adopting more sustainable practices. More small companies also indicated they are uncertain how much their company will benefit from adopting sustainable practices. This is consistent with past research findings that small businesses perceive fewer benefits from adopting sustainable practices than medium sized companies (Brammer et al.,

2011). Another interesting difference is that medium sized companies cited concern that their customers are not willing to pay more for sustainable practices at a higher rate than small companies, suggesting the customers of the small companies answering the survey are less price sensitive than customers of medium-sized respondents.

6.2.4 Primary Business Motivation

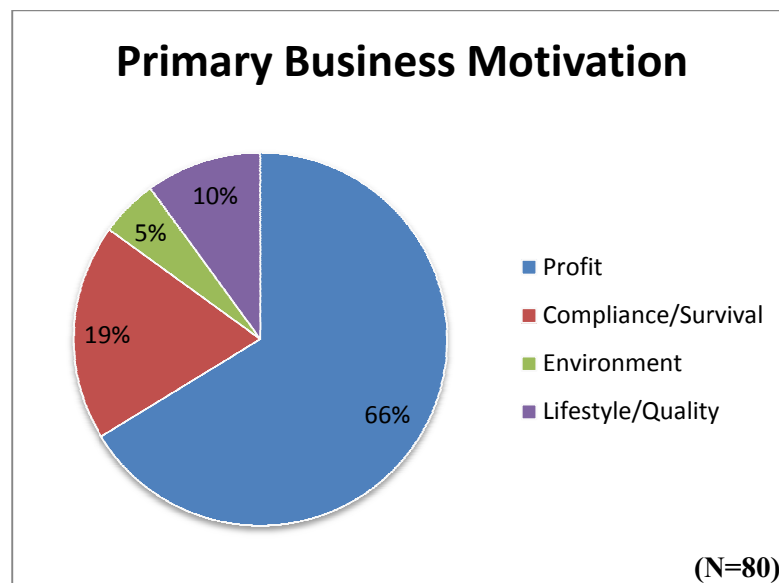


Figure 9: Respondents' primary business motivation. Determined from respondents' ranking of business priorities

The primary business motivation of each respondent was determined based on how highly they rated the importance of different priorities when making business decisions, including: maximizing profit, meeting legal and regulatory requirements, product quality, impact on personal lifestyle, and protecting the environment. Most companies, 66%, were categorized as profit motivated. Compliance motivated companies that focus on meeting regulatory requirements more than maximizing profit accounted for 19% of respondents. 9% of companies were run to provide the owner with a particular lifestyle or to produce a product to a high quality standard rather than to maximize profits. Environment motivated companies that ranked protecting the environment higher than maximizing profits and most other factors made up 5% of

respondents. Unfortunately too few complete responses were received to examine how companies with different business motivations responded to supply chain pressure.

6.2.5 Other Factors

While data was collected for other potential factors influencing SME response to supply chain pressure, including age, industry, development stage, and ownership, the low number of complete responses prevented statistical examination of any correlations.

Consistent with past research interview data suggest that industry specific variables may have a significant influence on sustainable practices within SMEs. For example, the owner of a small healthcare company indicated that environmental performance is not a criteria she sees companies in her industry compete on. “There’s nothing... in my association that talks about environmental issues.” (Interviewee 2, personal communication, December 10, 2012). A realtor in another part of the state indicated that environmental features are not currently high on peoples’ priority lists when looking for a house in her area. “We don’t have a lot of people asking for green. The people that are looking up here are wanting the most for their money...they’re not taking green into consideration, they’re taking money into consideration” (Interviewee 4, personal communication, February 14, 2013). The SMEs in these industries are competing on price and quality and sustainability is not a major decision-making criterion for them.

In contrast, the newspaper printing industry has been moving towards more sustainable printing for some time, such that “switching over to soy based ink...it’s become such a common practice that it’s very accommodating” (Interviewee 1, personal communication, December 10, 2012). More sustainable options are also increasing in the textile printing industry, where products made from recycled content are becoming more widely available. However, higher costs for more sustainable products and quality concerns are hindering uptake by some SMEs. The owner of a textile printing company offers a “small line of recycled bags” but “they do not sell

well” and “the most available items...do show signs of wear quickly in comparison to the new fabrics” (Interviewee 5, personal communication, February 20, 2013). He cited cost as a major barrier to selling more sustainable products, saying such products “need to meet a price point and these products have not reached that price point yet” (Interviewee 5, personal communication, February 20, 2013). So while more sustainable practices are increasingly viable for some SMEs as such practices become more common in their industries SMEs still face challenges based on their specific circumstances, such as how willing their customers are to pay for more sustainable practices.

7. Discussion and Implications

This study developed a theoretical framework of the adoption of sustainable practices by SMEs, including the main external drivers and internal factors that influence SMEs to adopt sustainable practices more reactively or proactively. The major external drivers include customer demand, regulation, and institutional drivers. The major internal characteristics include size, the personal values and beliefs of owners and managers, and the company's primary business motivation. The framework was used to guide an empirical study of how SMEs in North Carolina respond to supply chain pressure for sustainable practices.

Of the respondents who felt supply chain pressure 43% indicated that they responded by adopting practices that exceeded requirements imposed by supply chain customers. In addition, no respondents indicated that they refused to comply with supply chain customer requirements if some were imposed and 46% of respondents indicated that they do not feel any pressure from business customers to adopt more sustainable practices. These findings are consistent with the findings of previous studies that supply chain pressure is generally effective at increasing sustainable practices in SMEs (Baden et al., 2009; Ciliberti et al., 2010; Lee, 2008; Yu & Bell, 2007). The percentage of companies that exceeded requirements is very high and may be due to the small sample size of the survey and self-selection into the survey by companies highly interested in sustainability. Still, the finding suggests that supply chain pressure may indeed be an effective tool for increasing proactive adoption of sustainable practices in SMEs. With so many respondents indicating they feel no pressure from business customers to adopt sustainable practices many more companies could potentially become engaged with sustainable practices through increased management of supply chains for sustainability.

Exactly why supply chain pressure leads some companies to adopt practices beyond requirements is unclear. The pressure may provide the justification needed for owners and

managers who would like to adopt more sustainable practices but couldn't justify doing so without more customer interest. Exceeding expectations may also be a hedge against future increases in requirements, which may seem likely based on growing consumer interest in sustainability, or adoption of more practices by competitors that could threaten the company's market share or competitive advantage.

Consistent with past research the results of this study indicate that size even within the SME category is a significant factor that influences SME sustainability for a variety of reasons. A lack of resources available to invest in sustainable practices has long been recognized as a hindrance to SME sustainability (Brammer et al., 2011; Darnall et al., 2010; Lepoutre & Heene, 2006). Roughly the same proportion of small and medium sized companies cited lack of resources as a barrier to adopting more sustainable practices, but small companies' lack of resources contributed to them being more uncertain about how to reduce their companies' environmental impacts than medium-sized companies. A greater percentage of small companies also indicated they were unsure how much their company would benefit from more sustainable practices. This supports research that suggests small companies perceive fewer potential benefits from sustainable practices than medium sized companies (Brammer et al., 2011).

Size appears to be an important factor influencing the adoption of sustainable practices by SMEs and should be taken into account in future research and efforts to increase sustainability in SMEs. Companies managing their supply chains for sustainability should take size into account when developing their strategy as different sized companies may respond to the same incentive or requirement differently. Resource and knowledge discrepancies between small and medium sized companies may lead suppliers to adopt different practices based on how much they can justify investing in sustainable practices and what practices they know of to invest in to meet customer demands. Similarly, support programs and voluntary initiatives designed to help SMEs adopt

more sustainable practices should be designed to recognize the different challenges, resources, and opportunities available to different sized companies. Future research should also take size into account to develop the findings and recommendations relevant to all sizes of companies.

Consistent with past research this study found evidence of multiple business motivations among respondents (Bansal & Roth, 2000; Parker et al., 2009; Spence & Rutherford, 2001). Companies in this study were categorized into profit, compliance, environment, and lifestyle focused groups. While the majority of respondents are profit motivated one-third prioritize other goals more than maximizing profits when making business decisions, such as meeting regulatory requirements, making a high quality product, or protecting the environment. Efforts to increase sustainability in SMEs should take into account the fact that all SMEs do not use the same criteria when making business decisions, which may affect their response to supply chain pressure and other efforts to increase their adoption of sustainable practices.

Interview data from the study support the findings of previous research that owner-manager interest in sustainability can be a major influence on a company's practices. The owner of a small media company adopted a number of more sustainable printing practices despite a lack of expressed interest by customers because she felt such steps important to take personally. " I feel like that's our responsibility whether or not customers ever know the steps that we take" (Interviewee 1, personal communication, December 10, 2012). In contrast, the owner of a small healthcare company indicated she was generally not interested in sustainable practices and would only be if they could be adopted without compromising other business priorities, such as quality of patient care and minimizing operating expenses. "What drives me most is patient care and satisfaction ... the volume of what I would put into the environment would be so miniscule so as not to influence my decision" (Interviewee 2, personal communication, December 10, 2012). The interest of the owners and managers in sustainability should be taken into account when designing

supply chain management strategies to ensure both highly interested and highly skeptical suppliers are properly motivated to adopt sustainable practices.

Owner-manager interest in sustainability may be a key factor in how SMEs deal with supply chain pressure's potential ceiling effect. Several companies reported abandoning practices that exceeded customer expectations in response to supply chain pressure. Two of those companies adopted practices that complied with customer requirements and the other adopted practices that exceeded customer requirements. This suggests that owners and managers with a high interest in sustainability may not always be prevented from adopting practices that exceed customer requirements. Supply chain pressure may serve to redirect or steer investment into practices the company's customers deem important rather than what SME owners and managers deem important. However, proactive sustainability can clearly be stifled by the imposition of demands from customers that do not take into account and reward existing efforts. This potential side-effect of supply chain pressure is important to keep in mind when designing strategies for sustainable supply chain management, especially because of potentially differing environmental management priorities between suppliers and their customers.

In addition, policy makers may be able to use supply chain pressure as a tool to drive practices in SMEs within supply chains of larger companies when mandating more sustainable practices through regulation is infeasible. With large companies increasingly engaging with sustainability governments could reach many smaller companies by enlisting their large customers into partnerships or voluntary programs that help the large companies encourage their suppliers to adopt certain practices or address certain issues that have been identified as public priorities. Governments can use voluntary training and certification programs to enlist large companies in sustainable supply chain management programs and offer help to SME suppliers in any other company's supply chain. The additional support, training, and financial incentives of

voluntary initiatives, including initiatives sponsored by governments and organizations outside a company's industry, have can help SMEs adopt more sustainable practices than they otherwise would (Lee, 2008; Tilley, 1999).

While institutional pressures to adopt sustainable practices are increasing within many industries interview data suggests that SMEs aren't all feeling such pressure and that some are able to take advantage of opportunities presented by institutional shifts more than others. For instance, an SME in the healthcare industry does not see environmental performance widely discussed in industry press or product catalogues. "I haven't seen much...in my industry that would try to entice me to buy other products, it's more of a price competition" (Interviewee 2, personal communication, December 10, 2012). In contrast, some SMEs in the newspaper and textile printing industries are more active in moving towards more sustainable materials as doing so has become more common. "As business overall has gotten more used to trying to look for environmentally friendly or conscious ways to operate there's been a lot of change. Switching over to soy based ink, probably if we had asked for that 5 years ago our printer might have looked at us like we were aliens, but today it's become such a common practice that it's very accommodating." (Interviewee 1, personal communication, December 10, 2012). Barriers still hinder uptake of some practices though, such as in this SME in the textile printing industry where "Customers have requested finished goods including clothing from recycled fabrics, bags etc and very few are available at the price point wanted" and "the most available items...do show signs of wear quickly" (Interviewee 5, personal communication, February 20, 2013).

While shifts within industries are helping some SMEs adopt more sustainable practices SMEs in other industries may be feeling less of these institutional shifts. Policy makers should consider ways to accelerate institutional shifts in industries where environmental performance is not a high priority. Companies pursuing sustainable supply chain management in industries that

have not included environmental performance as a competitive factor in the past may need to spend more effort convincing suppliers as well as customers of the merits of more sustainable practices. Making very clear that environmental performance criteria will be included in purchasing decisions going forward will also be important to overcome suppliers resistance to change and difficulty justifying spending resources on complying. Additional support for suppliers may be needed to overcome both initial skepticism and uncertainty about how to respond to requirements of more sustainable practices, especially if traditional sources of information have not or do not discuss environmental issues widely.

7.1 Study Limitations

Despite having many SME owners and managers on email contact lists chambers of commerce do not generally get a good survey response rate. Chambers also forwarded the survey link to their members themselves rather than providing the researcher direct access to member contact information, which limited the number of follow-up messages that could be sent to potential respondents. No compensation was offered to potential respondents either, which could have increased the response rate. These factors led to the study having a very low response rate, which prevented robust statistical analysis.

In addition the survey findings cannot be generalized beyond the survey respondents because respondents were not randomly selected. Respondents self-selected into the survey, and even before that they decided to join their local chamber of commerce, which many companies do not do. Self selection into the survey also likely drew in respondents who are passionate about environmental issues. The high percentage of companies in the survey who responded to supply chain pressure by adopting practices that exceed customers' expectations may indicate such a bias in the sample.

Distributing the survey through local chambers of commerce also contributed to the high number of industries represented in the sample. Having more responses concentrated in a small number of industries would have enabled additional analysis of the institutional dynamics within industries and how those influence SME response to supply chain pressure.

7.2 Future Research

Future research can use the theoretical framework presented here to examine additional drivers of and internal factors influencing sustainability in SMEs. Future studies can also add detail to the framework, which is presented here as a very broad, high-level description of the major factors influencing SME sustainability. Additional research is needed to determine how all of the framework components interact to influence SME sustainability and what can be done to enhance the drivers and help SMEs overcome barriers to adopting sustainable practices.

Despite the empirical study's limitations several findings corroborate past research and suggest potential areas for future research. To start, a randomly selected, larger sample would enable a more robust statistical analysis and generalizable examination of both the broader framework and questions about how SMEs respond to supply chain pressure. The geographic limits of the survey could also be relaxed and a sample gathered from more diverse areas of the country. A randomly selected sample of companies from several areas of the country would provide a better view into the effect of supply chain pressure on SMEs across the country. Focusing on a limited number of industries would help limit the number of confounding variables introduced by broadening the geographic frame.

Why supply chain pressure leads some companies to adopt practices beyond customer requirements is an interesting area for future research. Does the pressure from customers cause supplier owners and managers to shift their beliefs about the potential benefits of sustainable practices to the company? Does the increased customer pressure lead to an increased sense of

institutional shifts within the industry, or society at large, that suppliers see as something they should respond to or try to get ahead of for competitive reasons?

Many respondents indicated they felt no pressure from their business customers to adopt more sustainable practices. Is this due to differences between industries and the uptake of sustainability in companies at the end of supply chains or to local factors specific to each SME? More focused studies on SMEs in one or a small number of industries can shed light on whether the companies answering the survey were just too many supplier tiers removed from companies at the end of their supply chain to feel pressure or if the institutional drivers differ significantly between industries.

Supply chain pressure's potential ceiling effect needs to be better understood if supply chain pressure is going to be used increasingly to push SMEs to adopt more sustainable practices. What exactly determines whether a company will just comply with requirements or will exceed expectations? Is this decision driven by owner-manager values or other considerations such as cost or competitiveness concerns? Are there best practices that companies should adopt when managing their supply chain to avoid creating a ceiling for their suppliers?

Finally, examining how companies perceive barriers to adopting more sustainable practices and how those perceptions differ based on company characteristics, such as size, can provide important information for policy makers, business support organizations, and companies seeking to help their suppliers or partners improve their sustainability.

Appendix: Survey Questions

1. What is your position in the company?
2. What industry is your company in?
3. Roughly how much of your business is conducted with each group?
4. How important are the following goals when making business decisions, in general?
5. How important are the following characteristics of your products or services to your customers?
6. How much has each group required your company to provide products that meet certain environmental criteria?
7. In what ways have customers required your company to meet environmental criteria?
8. Please indicate how many of your business customers enforce their environmental requirements using the following practices.
9. How did your company respond to customers' requests to meet environmental criteria?
10. Does your company have any of the following practices?
11. Which of the following are barriers to reducing your company's environmental impact?
12. Have you sought external help responding to requirements to meet environmental criteria?
13. From whom did you seek help in responding to requirements to meet environmental criteria?
14. Is your company privately or publicly owned?
15. Is the company family owned?
16. How many employees does your company have?
17. How many years has your company been in business?
18. What development stage is your company in?

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