

Sustainable CSR in Global Supply Chains

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Abstract

Multinational firms face many challenges in extending sustainability practices to their global supply chains. Establishing standards for environmental practices and working conditions for suppliers through codes of conduct, and then monitoring their performance with audits, is the common method used by MNEs. However, this approach has proven deficient in many cases as the suppliers are often not capable or unwilling to make the changes necessary to assure long-term sustainability of their operations. Audits often are insufficient in uncovering practices that do not meet the codes of conduct, and in any case, do not usually reveal if the firm is on a path to continue to improve their sustainability practices. Drawing upon the experiences of firms that have implemented productivity and quality improvement programs in their global supply chains, some implications for how to implement successful sustainability programs can be found. The challenges that MNEs and their suppliers must overcome to achieve this are discussed and suggestions made on how to achieve real sustainability in global supply chains.

Keywords: Corporate Social Responsibility, sustainability, global supply chains, lean production, quality management, technology transfer

1. Introduction

The pressures on companies to be socially responsible are diverse and increasing. These societal pressures include demands from the company's stakeholders (employees, customers, suppliers, communities, governments, shareholders) but also from some new sources that have arisen in recent years (Waddock, 2008). These include pressures from their peer companies, ratings and rankings such as *Fortune* magazine's annual "Most Admired Companies" issue, Nongovernmental Organizations (NGOs), and social investors who direct their investment to socially responsible firms. Some firms have also come to see Corporate Social Responsibility (CSR) as "enlightened long-term self-interest" (Blake, 2006) whereby they believe that the firm will actually profit from its CSR efforts. There is an increasing body of evidence that sustainability efforts can actually increase shareholder value (Eccles et al., 2012; Freeman et al., 2010; Porter & Kramer, 2011). There are several channels through which CSR could accomplish this (Blake, 2006; Eccles et al., 2012; Clarke, 2007; Mefford, 2010). These include increasing productivity and quality, reducing costs, motivating employees, mitigating risks, and increasing brand image and sales. How these effects play out in different companies will vary in significance depending on various factors specific to the firm and the industry.

In this paper special emphasis is placed on supply chain CSR as this is the focus of many firms' current sustainability efforts. Sustainability is defined in a process-centric way as the design, management, and improvement of a company's business processes to positively impact society, the economic performance of the firm, and the environment (Mishra & Napier, 2015). Sustainability goes beyond Corporate Social Responsibility in being self-perpetuating (sustainable as the name implies) rather than a program adopted because of external demands on the firm and not necessarily a permanent, continuously improving one. Of course, some firms intend for their CSR efforts to be long-term and self-sustaining, and the terms sustainability and CSR are often used interchangeably, as they will be in this paper. As firms extend their global network of suppliers, there is much potential for control and influence beyond the boundaries of the firm (Gerrefi, 1999; Millington, 2008). These companies are becoming increasingly involved in product specifications for suppliers supporting green initiatives as well as codes of conduct for labor issues. They are finding it necessary to confront different regulatory regimes in the countries where they operate leading to problems with varying environmental and labor standards and the degree of enforcement (Millington, 2008). Also, they must confront cultural issues in working with suppliers on

product specifications, codes of conduct, and audits. These challenges are compounded in developing countries by economic volatility, institutional deficiencies, and financial constraints (Silvestre, 2015; Busse, 2016). These are issues that must be addressed as they expand their CSR efforts in global supply chain and will be discussed later in the paper.

Several authors have pointed out the similarity of the evolution of CSR in firms to the quality journey that many firms went through in the 1980's and 1990's (Clarke, 2007; Lupin & Estry, 2010; Waddock, 2008). After experiencing devastating competition from Japanese firms, many U.S. and European companies began implementing quality improvement programs, as well as Just-in-Time and lean manufacturing approaches. At first there was denial by many of these companies that they had quality issues. Then there came gradual acceptance of the need to improve the quality of their products and piecemeal attempts to make improvements. As firms gained more experience with quality methods such as Total Quality Management (TQM) and Six Sigma, they began to realize that there were benefits over and above improving quality such as increased productivity and lower costs, faster and cheaper new product development, greater employee involvement and motivation, and overall improved competitiveness and profitability. However, it was a slow learning process for many firms and some never achieved success in implementing quality programs or lean methods (Mefford, 2010). This may be a cautionary tale for firms attempting to move into later stages of CSR evolution as the extensive organizational and strategic changes required are very difficult to implement, especially outside the boundaries of the firm as in a supply chain.

The paper is organized as follows. The Section 2 discusses the importance to a company and its stakeholders of spreading sustainability to global supply chains, and some lessons from the implementation of quality and lean production programs that may be applicable to this effort. Section 3 highlights some of the challenges that firms will likely face in diffusing sustainability practices through their supply chains, and some ways to deal with them. Section 4 offers some guidelines on how to build long-term sustainability into a global supply chain. The final section draws some conclusions about the successful implementation of sustainability programs in global firms.

2. Implementing Change in Global Supply Chains—Lessons from Lean and Quality Programs

In a large global firm, the potential exists to have a significant impact beyond the firm's direct stakeholders. As the lead company in a global supply chain, a firm can exert influence on many external firms (Bowen et al., 2001; Millington, 2008). The tiers of suppliers that the firm has throughout the world mean that improvements in sustainability can diffuse throughout the supply chain and have an impact beyond the firm's own customers, employees, communities, and shareholders. As sustainability practices are integrated into management of the supply chain, many more customers, employees, communities, and other stakeholders will benefit. Firms may view this as a win-win situation for these companies and society, but spreading this vision presents many challenges. As Millington (2008) observes "there is little evidence to suggest that ESCM [Ethical Supply Chain Management] is widely embedded through the supply chain in Western Countries or more particularly in the developing world". The experiences of firms trying to implement quality and lean production programs in the 1980's and 1990's reveal some of the problems that can arise in the transformative organizational and cultural changes required and can be instructive in how to overcome them.

At first most firms viewed Total Quality Management and Just-in-Time/Lean programs as specialized activities only affecting the production side of the business. Top management was rarely involved and only offered tacit support. Often, they were implemented because other firms were doing so, and it was felt necessary to try to implement these types of programs to remain competitive. The extent of cultural change required in terms of employee involvement, cross-functional teamwork, flat organization structures, and refocusing of corporate goals was often not grasped and not implemented leading to many failures of these programs. Only in firms where top managers were convinced of the competitive imperative of such programs, and became personally involved did they become embedded into corporate strategy and culture and have a major impact (General Electric with Jack Welch championing Six Sigma in the 1990's is an example). Integrating the quality and lean programs throughout the various functions and departments within a firm was a major challenge, and introducing them into supply chains compounded the difficulties. However, a few firms were successful in spreading lean and quality programs to their suppliers (Mefford, 2010).

There is a natural complementarity between quality/lean and environmental/social programs as many have pointed out (Lu et al., 2012; Gopalakrishnan et al., 2012; King & Lennox, 2001; Narasimhan & Schoenherr, 2012; Jackson et al., 2016; Delmas & Pekoic, 2018; Wang et al., 2015). Both, when successful, focus on continuous process improvement. Lean production philosophy emphasizes "doing more with less" and eliminating any source of waste. Excess energy usage, unnecessary transportation, over-packaging, rework and rejects (which links quality to lean) all are forms of waste that are targeted for elimination by streamlining and making more consistent and

reliable production processes. Combining CSR efforts with other initiatives can leverage upon those programs to facilitate CSR implementation (Klassen & Vereecke, 2012; Weingarten & Pagall, 2012). Effective change programs require transference of both “hard” and “soft” technologies. Hard technologies are the product designs and production and communication equipment while soft technology represents the knowledge and management skills necessary to fully utilize the hard technology; i.e., tacit or implicit knowledge. The transference of soft technology is typically more challenging than transferring hard technology, and the failure to do so accounts for many failures of lean and quality programs (Spear & Bowen, 1999). The same lesson should be applied to diffusing CSR methods to suppliers where firms need to go beyond standards and practices to transfer the knowledge and skills needed to introduce social and environmental programs (Fu et al., 2012; Sarkis et al., 2010). Instilling principles of lean and quality thinking, rather than just tools and methods, is essential to effective transference (Spear & Bowen, 1999). Since much of the soft technology is implicit, rather than explicit, collaborative efforts with close contact and working relationships fosters the transfer of CSR consciousness and principles the stage of development of the sustainability efforts and the location in the supply chain are also factors in the choice of approach and methods to employ (Bortolotti et al., 2016).

3. Challenges in Implementing Sustainability Programs in Supply Chains

One of the biggest challenges encountered in obtaining supplier cooperation in quality and lean programs has been in getting them to view such efforts as a win-win situation. Often suppliers see such programs as an attempt by their major customers to impose extra costs and demands upon them with no offsetting benefits. In fact, some firms tried to implement these programs by giving their suppliers cost reduction and quality improvement targets with no guidance or assistance in achieving them. Usually such attempts fail in achieving a self-sustaining program (Ciliberti et al., 2008; Nam, 2013). A more effective approach has been found to be capacity-building so that the employees and managers see a sustainability program as worthwhile to pursue for its intrinsic benefits. The companies that were able to successfully implement lean and quality programs in their supply chains worked with their suppliers to improve their production methods and were patient in expecting results (Womack & Jones, 1996). IKEA, the Swedish retailer of home furnishings, has taken this approach in getting their suppliers involved in their supply chain CSR efforts (Andersen & Skjoett-Larsen, 2009).

A good example of successful quality/lean implementation program is Honda and Toyota’s upgrading of their supplier base in the U.S. As they expanded their U.S. operations, both companies realized that American auto part suppliers were not able to meet the stringent demands that Japanese part suppliers were accustomed to meeting in terms of quality, delivery, and cost. They set up programs that shared many similar features (Liker & Choi, 2004). Both firms sent out their engineers and managers to work with suppliers to improve their production methods. They brought supplier personnel into their in-house training programs. They set up associations of suppliers to share ideas and assist each other and collaborate on new initiatives. Honda and Toyota also worked individually with each supplier to set goals for improvement that were realistic and appropriate for each supplier. As the suppliers were given the knowledge and skills to improve and successfully made the changes, they came to see that it was a win-win situation both for them and their customers. They became more competitive and profitable because of the improvements in their efficiency and quality while Honda and Toyota benefited by having a better, more reliable supply base. Many other firms throughout the world have followed their example and applied the practices of collaboration and support to their supply chains.

This approach may hold the same potential to spread CSR throughout a supply chain. It goes beyond having codes of conduct and audits to providing the knowledge and assistance required by the suppliers to make desired changes. A recent study of 519 manufacturing plants in 17 countries found that supplier assessments did not improve the supplier’s environmental, social, or economic performance while collaboration improved performance on all three measures (Gimenez et al., 2012). Another study found that suppliers resist efforts from their customers to impose best CSR practice upon them (Gallear, et al., 2012). Firms need to more proactively work with their suppliers as they often lack the resources and CSR consciousness to implement effective CSR programs (Lee & Kim, 2009; Lu et al., 2012). Done properly these methods demonstrate to the suppliers that they will benefit from implementation of the CSR programs by gaining competitiveness. As the auto industry experience in the U.S. has demonstrated, this will not come quickly or easily, however. Companies will need to invest the resources to work with their supply base to first convince them that these CSR programs are not just new and costly demands being placed upon them, but rather something that will be beneficial to their success in the long run. This will require extensive training and technical assistance to key suppliers to both convince them of the need to be sustainable, and to provide them the knowledge and tools to implement the programs. IKEA takes this approach with its global supply chain using a “staircase model” where it attempts to move suppliers through four steps—from startup of the program to fulfillment of standards and third-party certification. The company has found that this takes time, effort,

and substantial knowledge transfer (Andersen & Skjoett-Larsen, 2009). If this is done well, over time the first-tier suppliers can spread the programs in the same fashion to their suppliers, thus diffusing the benefits further throughout the supply chain. This process will take years, of course, but will have significant benefits—both for the supply chain partners and the broader society.

There are some special issues that arise in implementing CSR programs in global supply chains that will need to be addressed. One is the power imbalance that exists in many supply chains where a very large customer has tremendous market power and often imposes its will on its suppliers (Millington, 2008; Gugler & Shi, 2009; Andersen & Skjoett-Larsen, 2009). This may even be seen as “moral imperialism” by some suppliers in countries where the standards of business conduct and appropriate practice are quite different (Millington, 2008). This issue has arisen with working conditions for labor in developing countries with limits on the amount of work allowed per day or week. Many multinational codes of conduct limit the total number of hours worked to 60 per week. However, rather than viewing this as protecting employees, some employees (and their employers) resent this as infringing their right to work more hours and earn more. One solution to this dilemma is to upgrade the skills and training of the employees so that their productivity improves, they can work fewer hours, and their wages can be raised without hurting corporate competitiveness and profitability. This is not a solution a lot of managers in developing countries will readily embrace, so partnerships with multinationals can help to disseminate this knowledge and the methods to make it work. The same challenge often arises with environmental issues where many suppliers will see demands from global companies as unreasonable and costly, so assistance will be needed to show them how they can benefit from introducing green programs through cost reduction and increased competitiveness. Working collaboratively with suppliers in a partnership relationship can help to overcome the belief by many suppliers that social and environmental standards are being forced upon them (Gallear et al., 2012; Millington, 2008).

Another issue that arises in global supply chains is that small and medium size firms have neither the knowledge nor the resources to effectively introduce sustainability programs (Humphrey & Schmitz, 2001; Spence & Bourlakis, 2009, Ciliberti et al., 2008). This will hinder firms attempting to expand their supply base to such firms and to minority and women-owned businesses, which typically are small or midsize. The way that the large multinationals can overcome this barrier is to tailor their expectations to the supplier’s capabilities, as Toyota and Honda do with their suppliers, and provide enough technical and financial assistance to allow capable suppliers to reach the CSR goals. A “one size fits all” approach to implementing CSR in a supply chain will not work when the suppliers differ greatly in size, resources, and capabilities. Developing supplier associations to provide mutual assistance beyond what the lead company provides also offers potential to assist the small and midsize suppliers. Realistically, it will take more time to raise these suppliers to the same CSR standards as the larger suppliers, so multinationals must have flexible codes of conduct and auditing practices. If a lead company is not willing to be flexible on its standards, it runs the risk of losing diversity in its supply chain as it drops the smaller, often minority-owned, firms (Spence & Bourlakis, 2009).

These challenges are surmountable, and the potential for realizing the dual benefits of improved profitability and societal impact for all the members of the supply chain are huge when one considers the hundreds of suppliers and thousands of stakeholders involved for a global firm. This would appear to be the next stage in the evolution of CSR for global firms. It involves elements of the “transforming” stage of Mirvis and Googins (2006), the “global citizenship” stage of Frederick (2008), the “innovator” stage of Blake (2006), the “citizenship” stage of Costello and Lozano (2009), but is closest in concept to the “Supply Chain Responsibility” (SCR) stage of Spence and Bourlakis (2009) because of the importance of their supply chain to many MNEs. Spence and Bourlakis see the SCR phase as more an aspirational goal for most companies; these companies are faced with much work to do in their supply chains to reach this goal.

4. Building a Sustainable Global Supply Chain

To develop sustainability in a global supply chain that is truly sustainable for the long term, the lessons learned by companies that have developed lean and quality global supply chains are instructive, and can be applied to do the same with sustainability. What would be the characteristics of a sustainable global supply chain? It would need to satisfy all three elements of sustainability (the three P’s): long-term economic viability (Profit), societally beneficial (People), and environmentally friendly (Planet). Lacking any of these factors will not yield a sustainable supply chain.

4.1 Characteristics of Sustainable Global Supply Chains

Based on the evidence from the experiences of companies that have diffused quality and lean methods through their global supply chains, we can distill some of key features of a sustainable global supply chain:

Shared benefits***Collaborative******Responsive and resilient******Continuously improving***

The complementarity to lean/quality supply chains is immediately apparent as they also share the same features. How each of these features contributes to a sustainable global supply chain is discussed next.

To achieve long-term sustainability, the benefits of sustainability must be shared among the members of the supply chain. Unless each firm sees how they will benefit from contributing to developing such a supply chain, their cooperation and effort will not be forthcoming. Ethical values may encourage some firms to pursue environmental or social goals, but unless there are economic benefits as well, their ardor for sustainability is likely to be inadequate and short-lived. Fortunately, the economic benefits are clear with a process-oriented, capacity building approach to sustainability. Reductions in waste, higher productivity, and lower costs that result from such an approach can engender involvement and commitment.

As has been found in the diffusion of lean and quality programs to supply chains, a collaborative approach is the most effective. Some firms will have greater understanding of the benefits and challenges of lean/quality or sustainability than others or more resources in terms of management skills and financial and other resources, so there is great potential for assistance from the stronger to the weaker. The approach of letting each firm find their own path to success has not been proven very effective in lean or quality diffusion in supply chains (Bortolotti et al., 2016) so it is not likely to be either in sustainability. Through training and financial support from the larger and more advanced firms, the weaker firms can more quickly advance their efforts. Collaboration among firms to share their problems and solutions has been found effective in lean/quality programs and fosters diffusion throughout the supply chain.

A sustainable global supply chain is also responsive and resilient. As new challenges arise such as rapid climate change and new regulations on emissions and labor standards, a responsive supply chain can quickly adapt to meet the new requirements. Collaboration among supply chain partners will allow shared knowledge and methods to be quickly diffused so that individual firms will not have to confront these new challenges alone (Mefford, 2010). Such a supply chain will therefore be resilient, a characteristic of any good supply chain, to confront the myriad challenges of an operating in a global economy with fast-changing economic and political conditions. Most multinational firms have devoted much effort to building resiliency into their global supply chains to deal with natural disasters and changes in costs and regulations. Now they will also need resiliency in the sustainability of their global supply chains.

The last, and perhaps most important, feature of a sustainable global supply chain is that it is continuously improving. This applies not only to increasing innovation, improving its products, and increasing productivity throughout the supply chain, but also to improving sustainability in all three of its aspects (the 3 Ps). The mindset of a truly sustainable sustainability program is to continuously improve: to reduce pollution and waste, to improve working conditions and contribute more to the community, and to increase profitability in a socially responsible way. Without the last feature of being economically viable, a company's long-term sustainability efforts are likely to wane. This has proven to be an essential element of successful diffusion of lean and quality methods in supply chains, and there is no reason to believe the same will not hold true for sustainability.

4.2 Capacity-Building in Global Supply Chains

The approach to achieving a sustainable supply chain that is most likely to be successful in the long run is capacity-building rather than the codes of conduct/audit approach that is most commonly used. What are the characteristics of a capacity-building approach to sustainability in a global supply chain? First and most important, it is process-oriented; that is, it builds self-sustaining processes in individual firms, and in the supply chain, that allow the supply chain members to continuously develop and improve their sustainability programs. Of course, essential to this is the motivation within each firm to want to do this rather than pressure from outside agents to do so. As discussed above, this is achieved by gaining the vision of the benefits of sustainability including the enhanced profitability to each firm. Once this necessary condition is met, then the capacity-building efforts can proceed. The features of this are discussed next. They include:

Supplier and customer selection***Technology transfer******Financial and technical support***

The first step in capacity-building is to select suppliers that have the ability as well as the inclination to develop a sustainability program in their own firm as well as link their efforts with other firms in the supply chain. This is an often-overlooked factor in supplier selection where the focus is typically on product, price, and delivery. However, if the supplier is not interested in improving sustainability in the supply chain, or does not have the management talent or financial resources to do so, it is unlikely that the firm will become a contributing partner in a sustainable supply chain. The same can be said for customer selection. Most firms will not be particular about who they sell their products or services to, but if they wish to be part of a sustainable supply chain, this should become a criterion. Mutual benefits justify customer selection as well as supplier selection.

Technology transfer along the supply chain will be critical to implementing a sustainable global supply chain. As mentioned above, many small and medium-sized firms will lack the technical and financial resources to implement sustainability methods. Assistance from the larger and more advanced firms in the supply chain will be needed to make progress. This will usually take the form of training of the firm's personnel to instill the vision and the methods of sustainability. It might also include financial assistance to fund better information systems, more efficient equipment, or other process improvements. The experience gained in lean and quality diffusion programs in supply chains also suggests that the soft technology aspects are essential. These are the management skills in leading change and motivating employees, as well as process-improvement skills such as those employed in lean and quality programs. Obviously, transference of these tacit capabilities requires close cooperation and coordination and trust among the firms. This type of technology transfer is more difficult than transferring product and equipment designs (i.e., hard technology), but ultimately will determine the success or failure of the effort. The methods that have been found effective in lean and quality programs include training of supplier personnel, both at the supplier's facility and in-house, dispatching managers and engineers to suppliers to assist them, and creating supplier associations for mutual assistance (Likert & Choi, 2004). Suppliers can also be given improvement targets, specifically tailored to each supplier's capability, with rewards such as supplier recognition programs as well as increased business.

In successful technology transfer programs the transference is not only one way, which is typically upstream in the supply chain with the lead firm pushing its technology out to its suppliers. Increasing it is two way with reverse technology transfer from the suppliers to their customers and sideways through supplier associations. Again, the experience of lean and quality-driven supply chains is instructive. Most of these were initiated by the customer firm, but they soon realized that as their suppliers became more capable, they could also learn from them. In global supply chains where firms are located around the world, and experience different environmental and operating conditions, there is much potential to transfer successful adaptations to local conditions to other firms that may experience similar situations. See Figure 1 below for a diagram of the traditional, one-way only technology transfer process versus the two-way, forward and reverse, process sought in a sustainable supply chain. Materials flow downstream through the tiers of the supply chain, while knowledge/information flows upstream in a traditional supply chain, and both up and downstream in a sustainable supply chain. The bidirectional flows in a sustainable supply chain provide the mechanism for collaboration and continuous improvement of sustainability practices.

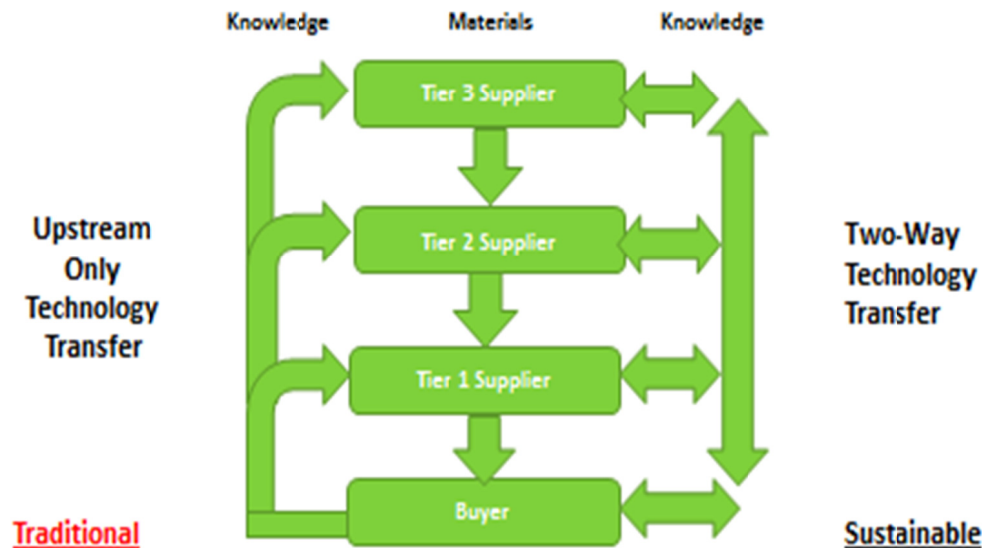


Figure 1. Technology transfer in a supply chain: traditional vs. sustainable

This is particularly applicable in emerging markets where environmental regulations are less demanding and resources are fewer. Adapting to these conditions, which often involves doing more with less resources, can be very instructive for firms facing similar conditions in other countries, and knowledge transfer can be very helpful. For this to happen, the supply chain has to be closely linked and has progressed to the stage where there is technology transfer both up and down the supply chain; i.e. forward and reverse. As multinational firms are increasingly originating in developing countries, these Emerging Market Multinational Companies (EMNCs) will play an increasing part of global supply chains. They may have an advantage in technology transfer as they are less wedded to the one-way approach of most MNCs from developed countries which tend to push their technology upstream in the supply chain. Many of the EMNCs have made foreign acquisitions to acquire advanced technology and are quite willing to do reverse technology transfer throughout their global network (Luo & Tung, 2018). They also have the advantage in having to deal with volatile economic and institutional environments in their home countries and thus may be more responsive and resilient, a characteristic of sustainable supply chains discussed above.

Societal benefits of building sustainable global supply chains extend well beyond the firms involved. There is an overall upgrading of labor and environmental standards throughout the world as the higher standards of developed countries spread through global supply chains to developing countries (Mefford & Johnston, 2016). As local firms in these countries improve their environmental and labor conditions, this puts pressure on other firms to also improve, both through regulation and to attract employees and customers. Furthering this effect is that as the economic benefits to the firms implementing these changes (higher productivity, reduced costs, and increased competitiveness) become apparent to other firms, many will be encouraged to pursue sustainability as well. Of course, the sustainability programs have to be economically sustainable to achieve these benefits, but as explained above, many firms have achieved these results.

5. Conclusions

Perhaps the major challenge a firm faces in implementing a sustainability program is incorporating it into the corporate culture and strategy. As long as sustainability is seen as primarily an externally imposed and secondary goal for a firm, the necessary changes in attitudes, and the resultant commitment to embedding this as part of the core culture of the firm will not occur (Eccles et al., 2014). Consequently, the strategic and operational changes required for successful sustainability will not happen within the firm, let alone in its global supply chain. Therefore, based on the experiences of many global firms, change really does have to begin at home, in the corporate headquarters, before it can be diffused through the supply chain. As was discussed in this paper, the challenges to such diffusion are significant and difficult to overcome. However, similar challenges have been faced before by

MNEs in getting their supply chains to adopt quality programs and lean production methods. The learning that has occurred from these experiences can be instructive for firms in diffusing their sustainability programs through their global supply chain. These lessons suggest that it is necessary to move beyond a “code of conduct and audit model” of supply chain sustainability to one of assisting suppliers in implementing it in their own operations and supply chains, so that it is viewed as a win-win situation for them. A capacity-building approach that emphasizes technology transfer among supply chain partners is the approach most likely to be effective based on the experiences of firms that have implemented lean and quality programs in their supply chains (Mefford, 2010). To accomplish this, firms must realize that they will need to invest in training and technical assistance to foster collaboration within the supply chain, and to develop the capabilities of their suppliers. Transference of hard technology such as product and process designs are insufficient; the firms must also transfer the soft/tacit technology knowledge of attitudes and skills in problem solving and teamwork. This should entail not only the customer firm pushing their technology upstream in the supply chain, but also reverse technology transfer downstream through collaboration. This must be viewed as a long-term project, and also one that has the potential to spread sustainability well beyond the firm itself, and provide significant benefits to the firm’s many suppliers and their other stakeholders.

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