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Increasing Sustainability in Global Supply Chains

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Abstract

Increasing stakeholder concerns about sustainability have recently led businesses to consider environmental, economic, and social issues in supply chain management. This three-component approach to sustainability is known as the “triple bottom line.” The triple bottom line was developed in the 1990s with the intention of providing a framework for evaluating organizational economics along with social and environmental impacts. Climate change and resource depletion necessitate improvements to the sustainability of the current global supply chain to avoid the planet becoming unable to meet the needs of future generations.

This paper uses the triple bottom line to examine the current sustainability of the global supply chain, which is defined here as an amalgamation of all existing supply chains. A brief history of supply chain sustainability, consideration of globalization’s impact, and discussion of current approaches towards sustainability support analysis of the current impacts of the supply chain. Methods for increasing supply chain sustainability are developed through analysis of existing research and a case study of British Aerospace Systems. The impacts of fully integrating sustainability into business processes and viewing sustainability as an opportunity for innovation are emphasized in the recommendations. Finally, the future of supply chain sustainability then is addressed.

Sustainability in the Global Supply Chain

Global supply chains are complex systems, encompassing all the interconnected stages that are required to create and transport goods and services from suppliers to consumers. Supply chains link different businesses together through logistics with the intent of efficiently using resources across the entire chain, necessitating a great deal of collaboration between companies (Reeds, 2000). Managing and optimizing these material flows with their associated business relationships is the focus of supply chain professionals around the globe. Successful supply chain management matches production to consumer demand, maintains low inventory levels and creates value (Chopra & Meindl, 2013).

Supply chains can be assessed using metrics, which focus on drivers of their performance. According to Chopra and Meindl (2013), these drivers are divided into logistical and cross-functional drivers. The logistical drivers are facilities, inventory, and transportation; the cross-functional drivers are information, sourcing, and pricing. Facilities are the physical places where goods are manufactured and kept. Inventory describes all of the raw materials, work in process, and finished products. Transportation involves moving products from one location to another. Information is all of the raw data and analysis of that data. Sourcing is the selection of companies that will carry out supply chain processes like production or transportation. Pricing is the choice of how much companies will charge for their products in the supply chain. A compromise must be struck between responsiveness and efficiency; aligning supply chain strategy with competitive strategy ensures high value creation. Through the analysis of driver metrics, companies can determine how each driver impacts the supply chain's financial performance. However, financial performance is no longer the only standard on which that supply chains are evaluated.

Increasingly, supply chain performance is measured based upon a combination of social, environmental, and financial criteria. This approach is known as the “triple bottom line” (Elkington, 1997), which refers to the assessment of a business’ impact on people and the planet, in addition to the more standard economic impact analysis. The three elements of the triple bottom line are social equity, environmental capital, and economic bottom line. Sustainable development is achieved when each of these elements is taken into consideration. Exclusively pursuing increased shareholder value threatens the planet’s ability to sustain future generations. Moving towards evaluating supply chains on the triple bottom line is necessary in a world facing climate change and resource depletion. These three bottom lines are also the pillars of sustainability (Gopalakrishnan, Yusuf, Musa, Abubakar, & Ambursa, 2012). In order to achieve sustainability, these three pillars must be balanced against one another, taking economic, social, and environmental factors into account. Sustainability is based on the premise that “everything that humans require for their survival and well-being depends, directly or indirectly, on the natural environment” (Marsh, 1864). The global supply chain will face increasing pressure to incorporate sustainable practices, due to rising consumer awareness of environmental and social sustainability issues and more governments enacting legislation with the goal of mitigating the environmental impacts of business activities.

Some business executives view the recent push towards increased supply chain sustainability with concern, believing that their profit margins will be eroded in the pursuit of environmental friendliness. The idea that companies must invest in expensive sustainability measures just to satisfy stakeholders concerned about environmental and social impacts was unexpectedly common among supply chain executives interviewed by Cooper and Griffis (2015). Instead of focusing on the costs associated with sustainable operations, consider the

massive business opportunity to innovate that an increased focus on sustainability presents. Organizations should view the trend towards developing sustainable supply chains as a chance to develop new sustainable products that will stimulate demand, and as an opportunity for reducing costs through efficient use of resources. The current state of global supply chain sustainability leaves much to be desired, with many companies failing to acknowledge that sustainability was a critical issue for their business and even fewer viewing sustainability as a business opportunity (PricewaterhouseCoopers, 2012). However, some organizations are working towards taking the next step in the process of becoming a sustainable business. It is critical that the global supply chain community embraces this push for sustainability wholeheartedly, protecting future generations through continuous improvement and innovation.

This paper aims to identify innovative opportunities for increasing global supply chain sustainability. To begin, the background and current state of supply chain sustainability is examined. A case study of British Aerospace Systems (BAe) then establishes a set of best practices for the implementation of sustainable methods in a supply chain. Recommendations on how other companies should approach sustainability with an outlook to the future conclude the report.

Current State of Global Supply Chain Sustainability

Today, the global supply chain plays a major role in the overall business community. However, this focus on inter-business processes is a recent development in the world of logistics and operations. Supply chain management has only existed since the 1980s and was not given widespread attention until the mid-1990s (Kolenko, 2014). Even more contemporary is the increasing attention now devoted to the sustainable management of supply chains.

Origins of Supply Chain Sustainability

The strength of the current emphasis on business sustainability is impressive, especially considering how recent the origins of the trend are. Milton Friedman's 1970 position that "there is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits" was followed by many businesses through the 1980s. Jack Welch, CEO of General Electric from 1981 to 2001, focused exclusively on increasing shareholder value, receiving strong results. Even as corporations pursued increasingly short-term profit goals, awareness of sustainability was building in popular and academic culture (Linton, Klassen, & Jayaraman, 2007). This awareness was due to popular books and films involving sustainability and environmentalism such as *Silent Spring* (Carson, 1962), *the Lorax* (Geisel, 1971), and *Soylent Green* (Fleischer, 1973). Papers such as Harding's 1968 work on the tragedy of the commons increased the academic interest.

Sustainability was defined in 1987 as "using resources to meet the needs of the present without compromising the ability of future generations to meet their own needs" by the United Nations World Commission on Environment and Development (p. 41). The introduction in the 1990s of the triple bottom line framework for evaluation of organizational performance was a major step towards adaption of sustainable business practices (Elkington, 1997). Using the triple bottom line to measure performance requires consideration of the interdependent factors of economy, society, and the environment. Assessment of an organization's true bottom line can be difficult to conduct, as it requires the social and ecological bottom lines to be quantified. Performing a cost-benefit analysis resolves this issue, enabling impacts on people and the planet to be viewed monetarily.

One early investigation into sustainability specifically for supply chain purposes is Ellram's 1995 paper on models for analysis of the total cost of ownership in purchasing. Ellram put forth both value-based and cost-based models of ownership, seeking to create a framework for evaluating and selecting suppliers while considering factors beyond a simple purchase price. Evaluating the sustainability performance of suppliers is crucial for all companies seeking to reduce the environmental impact of not just their own company, but also of their entire supply chain. These initial efforts towards defining sustainability, developing a method to evaluate business sustainability, and creating a framework to analyze suppliers have developed into current supply chain sustainability practices.

Environmental Impacts of Current Supply Chains

The forces of globalization and competition are constantly present in the modern business environment. Along with the global desires for continued economic growth and improved living standards, these forces have accelerated climate change and increased consumption of strictly limited natural resources (Gopalakrishnan, et al., 2012). For companies to remain competitive, forming global supply chains is essential, and these complex relationships between businesses allow for outsourcing of goods and services on an unprecedented level. As a result of the prevalence of outsourcing, supply chains have significantly impacted the environment. (Gopalakrishnan, et al., 2012).

Key categories for measuring environmental impacts from supply chains include energy and water consumption, greenhouse gas emissions, and waste generation (Chopra & Meindl, 2013). Environmental impacts from these categories are found throughout the supply chain. Facilities consume energy and water in the course of their operations, outputting greenhouse gases and waste (Chopra & Meindl, 2013). Products that end up in landfills after travelling

through the supply chain and living out their usefulness to consumers are a clear example of waste generation. Worldwide transportation of goods is a significant source of carbon emissions and energy use throughout the entire supply chain (Chopra & Meindl, 2013). Sourcing products from suppliers who lack a commitment to sustainable business practices leads to an increased environmental impact from all categories (Chopra & Meindl, 2013).

Greenhouse gas emissions from the global supply chain have been addressed in several studies. A 2009 study conducted by Huang, Weber, and Matthews aimed at categorizing scope 3 emissions, defined as “indirect emissions upstream and downstream in the company’s value chain” (p. 8509). They found that, on average, over 75% of an industry sector’s carbon footprint is attributed to scope 3 emissions. Those scope 3 emissions are more difficult to quantify than direct company emissions or emissions resulting from energy purchases by a company. Downstream emissions in a supply chain are especially difficult to quantify, as no criteria has been established to determine where an industry or company’s responsibility for emissions ends. Including scope 3 emissions is not required by existing protocols for disclosure of greenhouse gas emissions, which may lead even companies with a serious approach towards reducing their carbon footprint to discount this tremendous opportunity for sustainability improvements (Huang et al., 2009). As the majority of emissions are produced by other companies in the supply chain, this means emissions are effectively being outsourced to other areas of the world. The role globalization plays in increasing the environmental impacts of supply chains requires further examination.

History of Globalization

Globalization’s extent has consistently trended upwards over the course of history, as developments in transportation and communication have significantly increased the ability of

one person, organization, or government to interact beneficially with others located around the world (Wolf, 2014). Momentary slowdowns caused by wars and trade barriers have been overcome by increasingly interdependent nations. In the late 19th and early 20th centuries, globalization rapidly increased due to imperialism in Africa and Asia and the widespread adoption of technological advances such as steamships, telegraphs, and railways. Globalization came to a virtual halt with the successive onsets of World War I, the Great Depression, and World War II. This was due to trade restrictions and the sentiment held by many newly independent countries that international commerce was exploitative (Wolf, 2014). After World War II, globalization began to increase again gradually. This process was accelerated by China's late 1970s economic reforms allowing greater privatization and foreign investment, the 1991 dissolution of the U.S.S.R., the 1991 opening of India to trade and investment, the 1993 formation of the European Union, and the creation in 1995 of the World Trade Organization (WTO) (Wolf, 2014). The Great Recession of the late 2000s caused a brief decline in globalization's increase, but that has been reversed due to the global economy's recovery (Wolf, 2014).

Globalization's Impact on the Global Supply Chain

Through advances in transportation and communication technologies, tremendous opportunities have been made available to businesses. Increased levels of globalization have enabled the development of complex supply chains, involving suppliers from all over the world. These networks of companies allow for the opportunity to reduce costs by sourcing goods and services from regions of the world where labor and production costs are low. Additionally, globalization expands access to markets worldwide, allowing for companies to sell their products in developing markets with high demand and often less competition than they face elsewhere.

Two industries that take full advantage of globalization's cost reduction effects are consumer electronics and apparel (Chopra & Meindl, 2013). Consumer electronics, such as smartphones and tablets, are high in value and cost-efficient to ship worldwide due to their small size and low weight. Apparel manufacturing is labor-intensive, and finished products are also light and compact for efficient shipping.

Although outsourcing production to countries with low costs for labor and manufacturing can increase profitability, the approach is not without its drawbacks. Criticism of the sustainability of low-cost sourcing approaches focuses on the social impact of underpaid workers in unsafe working conditions. Additionally, the environmental impact from shipping goods around the globe instead of producing them closer to the markets where they will be sold is significant. Labor conditions at Foxconn, one of the largest contract manufacturers of electronics for clients including Apple, have been repeatedly criticized. Employees of Foxconn have been driven to suicide by the poor working conditions. These include illegal amounts of overtime, an overcrowded work environment, unpaid labor by interns, and industrial accidents resulting in deaths and injuries (Barboza & Duhigg, 2012). Globalization presents opportunities for cost savings to companies, but the social and environmental impacts of outsourcing to low-cost countries must also be considered.

Current Approaches to Supply Chain Sustainability

Supply chain sustainability is still quite a new concept, meaning that the majority of businesses have done very little to increase the sustainability of the supply chain in which they are involved. In a 2013 survey of 503 supply chain executives, PricewaterhouseCoopers found that just 42% of respondents indicated that making the supply chain more sustainable was a critical or significant issue to them by ranking it as highly important. In comparison, 79% of

those surveyed responded that managing profitability of the total supply chain was a critical or significant issue. Additionally, 69% of respondents stated that meeting increasing customer requirements was a critical or significant issue. The only issue ranking lower than increasing supply chain sustainability was responding to changing regulatory requirements, with 36% of respondents indicating that this was a critical or significant issue. This effective dismissal of the importance of increasing the sustainability of supply chains shows that significant efforts must take place to educate supply chain professionals about the benefits available when the triple bottom line is used to evaluate and optimize supply chains. Cooper and Griffis' 2015 interviews of 53 firms about their current supply chain sustainability practices also returned less than promising results, finding that "none of the participants stated any expected direct financial benefit from their sustainability initiatives" (p. 6).

The motivations for implementing sustainable supply chain practices of firms in this study center on the pressure experienced from customers and other stakeholders to increase sustainable practices. Particularly threatening to these companies was the possibility of social media outbursts if their supply chain was found to not align with consumer expectations for sustainability practices. Though some firms did state that they went beyond compliance with relevant government regulations, this was driven by risk avoidance rather than any expectation for increased profitability (Cooper & Griffis, 2015). Social media appears to be a powerful tool for consumers to confront businesses that fail to incorporate sustainability into their supply chain strategy. For three-quarters of companies interviewed by Ernst & Young (EY) for a report on the state of sustainability in supply chains, avoidance of risk to their company's reputation is the primary force behind the implementation of sustainability measures in their supply chain (EY,

2016). This general emphasis on reputational risk avoidance indicates that companies need to consider other potential benefits of sustainably managing their supply chain.

Risk avoidance is the current leader among the potential motives for developing a sustainable supply chain (EY, 2016). This focus on risk avoidance and reputation management indicates that many companies still view sustainability as a cost center, included in corporate social responsibility reports to keep consumers satisfied with the business' ethics. However, some companies have taken greater steps towards developing sustainable supply chains, likely due to their understanding of the potential for differentiation through the incorporation of sustainable attributes in products (EY, 2016). Differentiation based on sustainability is possible because consumer demand for sustainably sourced products manufactured in a socially and environmentally responsible way has increased (EY, 2016). One encouraging point is that all companies interviewed by EY are creating business processes to create sustainability expectations for their suppliers, with monitored performance and disclosure of the results. Technology and collaboration are now being used by some companies to enable greater influence deeper into their levels of suppliers.

Arguably, the most important finding of EY's 2016 report is that collaboration is widely viewed as crucial for companies to increase their impact in business and society. Collaborating with suppliers on sustainability initiatives and influencing them to adopt socially and environmentally responsible practices is critical for reducing the environmental impact of the global supply chain (EY, 2016). Though the current state of sustainability in the global supply chain leaves much to be desired, the outlook for the future is positive. Awareness of sustainability in businesses has notably increased within the last decade (EY, 2016). Firms must establish supply chain sustainability expectations, developing a set of best practices, analyzing

their current supply chain's impact, working with suppliers, and creating key performance indicators to be worked towards and reported publicly. Increasing a supply chain's sustainability requires tenacity and vision, but success will yield benefits for all stakeholders, from the company to the world beyond.

Case Study: British Aerospace Systems

British Aerospace (BAe) Systems is a global company providing defense, aerospace, and security products. BAe Systems currently employs 83,100 people in 40 countries, and is headquartered in Central London and Farnborough, United Kingdom (British Aerospace Systems, 2017). Key markets for BAe Systems include the United Kingdom, the United States, India, the Kingdom of Saudi Arabia, and Australia. Customers for their products are primarily the governments of these countries. According to BAe Systems' 2016 corporate responsibility summary, the company has a fundamental commitment to corporate responsibility, "driven from the top, delivered across the business and measured for effectiveness" (pg. 15). BAe Systems' approach to corporate responsibility includes emphases on diversity and inclusion in the workplace, ethical business practices, employee safety and health, resource efficiency, product stewardship, supplier relationships, supply chain sustainability, and investing in the community.

In 2009, BAe Systems developed a strategic framework to focus on increasing their corporate responsibility by focusing on environmental and social initiatives (Gopalakrishnan, et al., 2012). Environmental initiatives included implementation of ISO 14001, a standard developed for environmental management (Gopalakrishnan, et al., 2012). ISO 14001 "sets out the requirements for an environmental management system" and "helps organizations improve their environmental performance through more efficient use of resources and reduction of waste, gaining a competitive advantage and the trust of stakeholders" (International Organization for

Standardization (ISO), 2015). Additionally, a focus on efficient resource use including reuse and recycling was sought, and climate change was addressed through analysis of BAe Systems' carbon footprint. From a social sustainability standpoint, the safety of BAe employees is the paramount issue. Additionally, employee engagement was targeted for improvement along with the development of a more diverse and inclusive workplace environment (Gopalakrishnan, et al., 2012).

These sustainability initiatives pursued by BAe Systems were not achieved without overcoming challenges. Easily the most critical issue faced by BAe Systems in 2009 was the need for procurement and manufacturing costs to remain competitive while achieving increased environmental friendliness in these critical processes (Gopalakrishnan, et al., 2012).

Implementation of their sustainability initiatives was made more difficult due to a lack of a strong governmental or industry mandate for sustainability. BAe also focused heavily on sustainability initiatives that would result in reduced costs for the company, indicating that these initiatives are merely an afterthought compared to the all-important bottom line.

One other challenge faced in 2009 is that initiatives were exclusively focused on the internal company instead of involving the company's upstream and downstream supply chain partners. Providing devoted attention to the supply chain sustainability performance of suppliers and distributors requires use of advanced business technologies for monitoring and reporting of upstream and downstream metrics. Though the issues posed by these challenges are significant, many of these problems have been overcome by BAe Systems in the present day. Even in 2009, BAe Systems held the view that sustainability is a long-term commitment requiring continuous improvement of business processes with an eye towards financial, environmental, and social factors.

Implementation of Sustainable Supply Chain Best Practices

With these initiatives to pursue and challenges to overcome in mind, a set of best practices for improving supply chain sustainability were developed. Changes should be driven from the top of the organization downwards, with executives fully invested. To begin this massive undertaking, assess the current business environment and identify the underlying drivers for moving towards increased sustainability. These will likely fall into the broad categories of managing risks to the company, increasing productivity, and creating opportunities for growth (United Nations [UN] Global Compact, 2015).

Building the case for implementation of sustainability with a thorough evaluation of the associated costs and benefits will make the task of building support within the company much more straightforward. Developing a vision of the company's ideal sustainable supply chain is also a useful objective, as this can inform the strategic direction and allow for creation of benchmarks. Once the business environment has been evaluated and a vision has been created, expectations for the supply chain's sustainability performance can be developed. A code of conduct for internal supply chain employees and external suppliers and distributors should be developed. The most crucial step is ensuring complete buy-in from the company's most senior supply chain executive, as that executive can direct policy implementation of measures to ensure that employees are following a set of procurement ethics.

The creation of a set of expectations for supplier sustainability is also essential, addressing crucial areas such as human rights and labor issues, environmental performance, and anti-corruption measures (UN Global Compact, 2015). Due to the complexity of today's global supply chains, identifying areas where making sustainability improvements creates the most impact will allow companies to streamline their implementation process. A complete map of the

company's supply chain should be referenced or developed if not already available, including second and third-tier suppliers all the way back to raw material extraction. Sustainability risks can then be evaluated on this map, with priority given to risks with the highest likelihood of occurrence and severity of potential impact (UN Global Compact, 2015).

After this identification of sustainability program scope and prioritization of risks, building a dialogue with suppliers about sustainability is the next step. Clear expectations for suppliers, such as the code of conduct previously developed, should be communicated using contracts. The risk assessment developed from the supply chain map will be used to choose sustainability focus areas. The current state of suppliers' sustainability must be evaluated, using tools such as self-assessments, audits, and worker surveys (UN Global Compact, 2015). When performance issues arise, remediation with suppliers shall take place, using incentives to encourage continuous improvement. Suppliers should be supported, investing in their capabilities for sustainability by solving any underlying causes of low performance. Monitoring the supplier's performance is key, using performance metrics to track improvements over time and to identify problem areas. Working with indirect suppliers is often a challenge, as these indirect suppliers may present significant risks to a company's supply chain, and yet due to the degrees of separation, companies may not be able to exert pressure upon these suppliers or even realize that problems exist due to a lack of visibility (UN Global Compact, 2015).

Sustainability needs to be integrated fully into all business functions that impact the supply chain in order to realize the best results. One of the most persistent dilemmas with implementing sustainability practices is reconciliation of the business's financial goals with its sustainability goals. Having investment from the executives and board of directors is essential for success in implementing sustainable supply chain practices. With these powerful individuals

supporting sustainability goals, manager and employees throughout the company will be more likely to also support these goals (UN Global Compact, 2015). Managers from different parts of the company should collaborate and communicate to ensure that contradictory goals from these separate internal groups do not negatively impact sustainability measures.

The most direct group impacting the supply chain's sustainability would be the employees working in the supply chain division, so achieving their full commitment to the sustainability objectives is imperative (UN Global Compact, 2015). These direct impacts include selection of new suppliers with strong sustainability practices themselves, communication with existing suppliers to ensure continuous sustainability improvement, considering sustainability in procurement, and developing processes to get suppliers to create their own internal sustainability programs. Working with other companies in an industry and building partnerships with stakeholders are essential for attacking sustainability issues too intricate and sizable to be addressed alone.

The primary ways that companies can collaborate are through sharing best practices for sustainability, and developing joint sustainability standards to avoid repetition and contradictory directions (UN Global Compact, 2015). Working together with suppliers and other industry members to create a shared code of conduct can be a valuable exercise reducing confusion and enabling simpler implementation of sustainable supply chain practices. Partnerships with other stakeholders besides suppliers and industry members should also be explored. Governments, workers' organizations, non-governmental organizations, activists, experts, and communities can all provide valuable input on sustainability issues (UN Global Compact, 2015).

Once these sustainability practices have been developed and implemented by working not only within the company but also externally with suppliers, industry partners, and other

stakeholders, the final step in a sustainability implementation is to create goals and performance indicators to measure progress and identify problem areas. The process of goal development must be an integrative one, involving executives from all impacted business areas (UN Global Compact, 2015). Orienting business objectives to coincide with sustainability measures is key to ensuring the success of this goal creation process. Performance against these goals must be measured continuously to enable companies to have a real-time view of their sustainability initiatives' success and challenges. Defining goals and breaking those larger goals down into smaller objectives is a taxing process, but this is essential to ensure that all levels of the company know what they can be doing to contribute to increased supply chain sustainability (UN Global Compact, 2015).

The most general categories of sustainability goals will be goals focusing on internal performance, and goals targeting supplier performance. Internal performance goals can detail how the conflict between business performance objectives and sustainability objectives can be resolved. Additionally, internal goals can facilitate the integration of sustainability into decision making processes on overall supply chain matters. Supplier performance goals should focus not only on individual suppliers but also a compound assessment of every supplier with whom the company works. Suppliers should be also monitored on how they address risk over time, examining how suppliers react to being audited and evaluating their human rights, environmental, ethics, and supplier management performance (UN Global Compact, 2015).

After internal and supplier goals are developed, companies must create assessment processes to hold themselves and their external partners accountable. Data on internal and external stakeholders will be collected to allow for tracking of key sustainability performance indicators (UN Global Compact, 2015). Data integrity will be a challenge, especially with

supplier metrics. Some less reputable suppliers may attempt to deceive the companies they work with as to the true state of their sustainability practices. New data collection and sharing technologies have recently emerged, these can play a valuable role in supplier metric assessments (UN Global Compact, 2015).

Once all of this useful and accurate data has been collected, some of it must be shared publicly to assure interested stakeholders of the company's commitment to transparency and sustainable practices. However, confidential information that could create risks to stakeholders or personnel should not be publicly shared. Internally, executives will receive regular updates on sustainability performance metrics, and supply chain professionals at the company will use supplier metrics to make decisions about awarding contracts and choosing new suppliers (UN Global Compact, 2015). Through taking these steps towards implementation of these supply chain sustainability best practices, companies can increase their collaboration with suppliers all the way back to the raw materials, create internal support for sustainability initiatives, assure external stakeholders that sustainable practices are being followed, and positively impact people, the planet, and the company's profits.

The Future of Supply Chain Sustainability

Though the state of supply chain sustainability today is vastly improved from the situation five or ten years ago, more needs to be done in the future to ensure that our environment can thrive during the 21st century. Though predictions of what the future holds for supply chain sustainability are difficult to make with complete confidence, several trends will likely dominate the next decade of sustainability advances. These include the full integration of sustainability into procurement and supply chain processes, increased transparency for suppliers and information disclosure to the public, and the increasing importance of considering reverse

supply chain sustainability (EY, 2016). Due to increasing customer awareness of sustainability in the younger generations that are beginning to enter their prime years of purchasing influence, companies are expected to differentiate their products as more sustainable than their competitors.

Sustainability in the future will be used as a frame to monitor risks, drive innovation in business strategy and product creation, and increase customer involvement (EY, 2016). Sustainability evaluation tools such as total cost of ownership, life cycle analysis, balanced scorecards, and the triple bottom line will be commonly used to assist in making purchasing decisions. Supply chain professionals will be expected to have an understanding of global factors, sustainability concerns, and technology in addition to financial measures and analytics (EY, 2016).

Transparency in the global supply chain is expanding, and will continue to do so into the 21st century (EY, 2016). With technologies for sharing information on the rise, companies will have less ability to keep their trade secrets private. Questions will be asked by interested stakeholders about companies' suppliers, human rights practices, environmental impacts, and raw materials sourcing from areas of conflict (EY, 2016). Recent technologies have been developed that will be essential for communicating with the public and suppliers about sustainability measures being taken, and also for monitoring suppliers or collecting data for key performance indicators. The levels of company transparency that will be reached in the coming decades are completely unprecedented, with new methods for connecting with stakeholders to inform them proactively about the sustainability aspects of procurement (EY, 2016).

The reverse supply chain will be considered in the sustainable supply chains of tomorrow, as the global economy will begin to transition into a circular one from its current state of relentless consumerism and throwaway culture. This circular economy will focus heavily on

use and re-use of products, balancing value creation between economic, social, and environmental considerations (EY, 2016). In a circular economy, consumers pay for access to products rather than ownership, and businesses will focus heavily towards ongoing integrative relationships with partners rather than individual distributive transactions. Significant innovation is expected in product, raw material, and component reuse, with design of goods and services shifting to bring more focus on a product's ability to be serviced or disassembled into components or raw materials for reassembly or recycling into other products (EY, 2016). Additionally, this evolution towards a circular economy will necessitate the re-consideration of sustainability risk evaluation. Through the current generational shift towards heightened awareness of environmental sustainability, corporations will be driven to improve their environmental and social performance while achieving increased economic success due to value creation derived from consideration of sustainability.

Conclusion

Over the course of recorded history, advancements in communication and transportation technologies have led to an increasingly complex state of the global supply chain networks. Globalization's impact on the creation of the current supply chains cannot be overstated. Today, companies source materials from all over the world using the latest technologies and highly optimized processes to remain competitive with their industry peers. Although the current state of global business no longer exclusively focuses on financial considerations, more attention must be paid to social and environmental concerns for companies to become truly sustainable. Companies must move past the common pitfall of treating sustainable practices as cost centers only valuable for avoiding criticism from stakeholders. Instead, they must now view

sustainability as a valuable business opportunity in light of the current generational shift towards environmental and social awareness.

The triple bottom line approach is undoubtedly a great tool for more holistic evaluation of business success. Once a company can successfully reconcile their financial goals with their sustainability initiatives, a successful implementation of sustainable supply chain practices becomes increasingly likely.

One example of success in sustainable practice implementation was found at BAe Systems, with notable improvements found between a 2009 analysis of their sustainability and their recent 2016 corporate responsibility report. This implementation would not have been possible without a series of best practices. These can be broadly outlined as beginning with committing a business to more sustainable methods, analyzing the current business situation, and creating goals and expectations for the company and suppliers. Companies then should move into assessment of areas to focus on for maximum impact, before communicating their expectations to employees and suppliers, collaborating with other industry members, and integrating with suppliers. Progress must be tracked to enable detailed knowledge of the current state of sustainability, and sustainability reports should be made available to the public.

Looking towards the future, sustainability will continue to increase in strategic importance as awareness of sustainability becomes more commonplace. Sustainability must be integrated across all business divisions and processes as information on the current state of sustainability with stakeholders will become increasingly transparent and the shift towards a circular economy will cause heightened emphasis on the reverse supply chain. Though sustainability's current state leaves something to be desired, the future is promising. Corporations worldwide are increasingly aware of sustainability's importance, and some leading

firms have already integrated many of the recommendations made in this report into their everyday business processes.

Businesses have already come a long way from the view that “there is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits” (Friedman, 1970). In contrast to those profit-focused views, Former Secretary General of the UN, Ban Ki-Moon, stated in 2013 that “sustainable development is the pathway to the future we want for all. It offers a framework to generate economic growth, achieve social justice, exercise environmental stewardship, and strengthen governance” (p. 1). Truly, the need for sustainable development could not be greater than it is today. Corporations, governments, and people the world over must rise to the challenge of ensuring that our world remains a habitable environment for the generations of the future by optimizing the sustainability of the global supply chain.

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