Chapter 11
Greening the Supply Chain: A Framework for Best Practices

Aymen Sajjad

Introduction

The notion of green supply chain management has become a topical issue for academic discourse and industry practice. Min and Kim (2012, p. 39) argue that "a growing number of firms have explored 'greening' (environmental-friendly) initiatives as their competitive strategic weapon". Today, it is widely acknowledged that environmental responsibility of a firm is not limited to intra-organizational management of environmental issues (Vanalle, Ganga, Godinho Filho, & Lucato, 2017). However, currently firms are seeking ways to develop both their intra- and inter-environmental performance (Kovacs, 2008; Linton, Klassen, & Jayaraman, 2007; Sarkis, 2014) because a large portion of adverse environmental impacts arise from supply chain activities (Brickman & Ungerman, 2008; Chaabane, Ramudhin, & Paquet, 2012). The concept of green supply chain management takes a holistic view of environmental management (Mangla, Kumar, & Barua, 2015). It focuses on the management of environmental issues within a firm's operations and at the external level where it addresses issues such as industrial ecology, product life cycle management, green procurement, green logistics, extended producer responsibility, and product stewardship (Kleindorfer, Singhal, & Wassenhove, 2005; Srivastava, 2007).

Scholars have defined green supply chain management in different ways; however, most conceptualizations acknowledge that it is a broad concept that relates to the management of a set of activities and processes by which a product is sourced, designed, manufactured, transported, used, and disposed of at the end of its useful life. The purpose of this extended focus is to recognize the interconnected nature of systems by which a product is produced and to formulate suitable strategies to alleviate potential harmful environmental impacts associated with varied organizational systems, activities and processes using a systematic and coordinated approach.

A. Sajjad (✉)
School of Management, Massey Business School, Massey University, Auckland, New Zealand
e-mail: A.Sajjad@massey.ac.nz

© Springer Nature Switzerland AG 2019

G. Eweje, R. J. Bathurst (eds.), *Clean, Green and Responsible?*, CSR, Sustainability, Ethics & Governance, https://doi.org/10.1007/978-3-030-21436-4_11

Srivastava (2007, pp. 54–55) defined green supply chain management as "integrating environmental thinking into supply-chain management, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life".

According to Esty and Winston (2009, p. 35), "the environmental concerns that are most urgent in any particular company will vary a great deal . . . [and] environmental issues evolve over time". A prudent manager needs to understand the dynamic nature of the environmental management issues and develop corporate strategies accordingly. For managerial guidance, Esty and Winston (2009) identified a generic list of top 10 environmental issues. Some of these issues include: climate change, energy and water consumption, biodiversity and land use, air pollution, ozone layer depletion, and deforestation. However, the most important issues for any particular firm depends on a range of contextual factors such as industry, size, location, and business model (Lai, Wong, & Lam, 2015; Sancha, Wong, & Thomsen, 2016; Wu, Wu, Chen, & Goh, 2014). It is pertinent to note that almost all of the above listed issues relate directly or indirectly to the greening the supply chain. Proactive firms are not only addressing environmental issues in their internal operations, but also seeking ways by which negative environmental impacts can be managed and reduced throughout their supply chain operations (Zhu, Qu, Geng, & Fujita, 2017).

Prior literature suggests that a variety of factors influence firms to adopt green supply chain management practices. At the organizational level, top management commitment, operational efficiency and competitiveness are frequently reported factors propelling firms to implement green supply chain management practices (Lee, Sung Rha, Choi, & Noh, 2013). For instance, several studies confirmed that adoption of green supply chain management practices lead to improved occupational health and safety at work; reduction in production, packaging, and logistics costs which help a firm to protect against environmental risk exposure and develop its competitive advantage (Cantor, 2008; García-Arca & Prado-Prado, 2006; Green, Zelbst, Meacham, & Bhadauria, 2012; Spekman & Davis, 2004; Zhu & Sarkis, 2004). Additionally, at the external level, green supply chain management practices also enable firms to develop strong market position and societal legitimacy. For instance, green supply chain management could assist a firm to enhance its reputation and brand value, customers' acceptance of its products and services, and shield against current and potential environmental regulations as well as pressures from non-governmental organizations (Giunipero, Hooker, & Denslow, 2012; Shekari & Rajabzadeh Ghatari, 2013; Walker, Di Sisto, & McBain, 2008).

While many firms recognize the significance of incorporating green practices (Baines, Brown, Benedettini, & Ball, 2012), in practice they often confront diverse barriers that inhibit adoption practices in their supply chain operations. Barriers to green supply chain management relate to both internal organizational issues and external constraints that limit a firm's capability to embrace these practices. Internal issues may emerge from lack of top management support, lack of knowledge and skills; inadequate management systems; lack of supportive systems and structures; financial restraints; organizational size and resources; and behavioral and

psychological barriers (Chkanikova & Mont, 2015; Hervani, Helms, & Sarkis, 2005; Walker & Brammer, 2009). External barriers could be linked to poorly designed regulations; lack of uniform performance management systems; poor supplier capability; lack of competitor pressure; and inadequate customer demand (Hervani et al., 2005; Jones, Comfort, & Hillier, 2008; Porter & van der Linde, 1995). Encouragingly, it is relatively easier to overcome some of the internal barriers such as lack of knowledge and skills of the employees through concerted educational efforts, and training and development programs. Nevertheless, external barriers are quite difficult to address, as a firm often holds a limited control over external factors such as activities of customers, suppliers and regulators. Some firms, however, are collaborating with their suppliers, and improving their capability and capacity to develop environmental performance (Tachizawa, Gimenez, & Sierra, 2015). For example, the USA-based multinational company Walmart has established environmental standards for suppliers and is also collaborating with its thousands of suppliers to improve their environmental profiles.

The remainder of the chapter is structured as follows: First, an overview of the current state of environmental issues and undertakings in New Zealand is presented. Then, drawing on the dominant theoretical perspectives on sustainability, the value of green supply chain management adoption is explored. In this regard, a case of New Zealand based firm—Sanford is considered to demonstrate the relevance of selected theoretical perspectives in the adoption of green supply chain management practices. Next, green supply chain management approaches are presented, followed by a discussion. The chapter concludes with directions for future research, and limitations section.

The State of Environmental Affairs in New Zealand

"The world is shifting to greener forms of growth—and so is New Zealand" (Ministry of Economic Development, 2011, p. 63). Accordingly, environmental conservation has become a significant issue for New Zealand. A recent report by the Green Growth Advisory Group notes that "New Zealand is recognized in global forums as an environmentally responsible nation (on the issues like marine life conservation, introduction of an ETS and renewable energy development). We are already perceived in world markets for goods, services and capital as a relatively green country" (Ministry of Economic Development, 2011, p. 15).

Although New Zealand is relatively a small country, it exports large quantities of horticulture and agriculture products. In addition, it is a popular tourist destination for international travelers. The country has branded itself as "100% pure" (Collins, Roper, & Lawrence, 2010). Internationally, there is a perception that New Zealand is a 'clean and green' country and a large proportion its population has a profound passion for and connection with the natural environment. New Zealand's Ministry for Environment (MfE) estimated that New Zealand's clean and green image is worth billions of dollars (MfE, 2001). For instance, at present, each year more than

three million tourist visit New Zealand, and the Ministry of Business and Innovation & Employment (MBIE) forecasted that by 2023 the international tourist arrival will reach 4.9 million with a total annual international visitor expenditure to $15.3 billion (MBIE, 2017). Furthermore, "New Zealand's 'clean green' image has been picked up by other industries and is now fundamental to many export products" (Foote, Joy, & Death, 2015, p. 716). However, the negative environmental impacts associated with the Dairy industry has prompted a critical debate around the viability of New Zealand's sustainable future, the '100% pure' campaign, as well as the global perception of its clean and green image. The practices of the dairy industry are far from achieving sustainable standards, and as a result, many of New Zealand's fresh water streams, wetlands, lakes, and rivers are slowly deteriorating (Bain & Dandachi, 2015; Foote et al., 2015).

On the other hand, the research also reported that environmental awareness and responsibility is steadily growing in the New Zealand business sector (Collins, Lawrence, Pavlovich, & Ryan, 2007; Collins et al., 2010; Eweje, 2011). Many firms are taking opportunities to enhance their environmental performance by integrating environmental management principles in their business operations. Furthermore, the interest and responsiveness of the New Zealand business sector can also be observed by their membership in various sustainability advocacy organizations—the Sustainable Business Council and Sustainable Business Network (Sajjad, Eweje, & Tappin, 2015). These organizations advise their members regarding enhancing knowledge and capability concerning the adoption of sustainable business practices, and sharing and promoting best sustainability practices.

Moreover, some proactive firms have already started incorporating the United Nations (UN) Sustainable Development Goals (SDGs) in the business models. For instance, Sanford, a leading seafood firm, has adopted the UN SDGs framework for directing and implementing its sustainability vision. The firm has also taken some proactive measures related to green supply chain management including replacing polystyrene bins and plastic packaging, fuel and energy saving initiatives, and supply chain collaboration for environmental improvements (Sanford, 2017). Some other notable New Zealand based firms that have shown interest in the UN SDGs and are in the process of integrating these goals into their business models include Fonterra, Auckland Council, Vodafone, Contact Energy, New Zealand Post, Toyota New Zealand, and Westpac (Sustainable Business Council, 2017).

Theoretical Underpinnings of the Green Supply Chain Management Concept

There are several theoretical and practical reasons why firms should adopt green supply chain management approaches. The following discussion explores critically the theoretical rationale of and practical justification for embracing green supply chain management at a firm's intra- and inter-organizational supply chain operations.

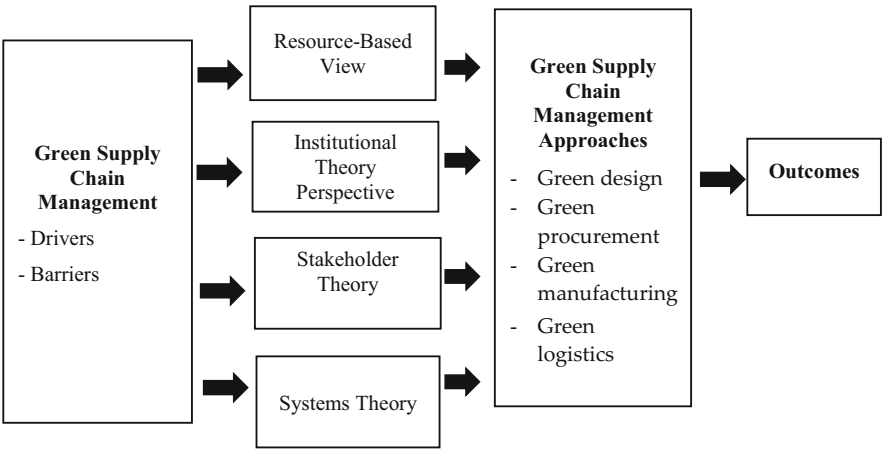

Fig. 11.1 A framework for best green supply chain management practices implementation

Thus, this chapter draws on four theoretical lenses—resource-based view, institutional theory, stakeholder theory, and systems theory—to explain the rational for GCSM implementation by firms. The framework for best GSCM practices implementation is shown in Fig. 11.1.

Resource-Based View

The resource-based view is primarily concerned with the relationship between a firm's resources and its competitive advantage (Barney, 1991; Hart, 1995). It suggests that a firm holds a bundle of resources that are valuable, scarce, imperfectibly imitable and imperfectly substitutable. A firm can achieve sustained competitive advantage by harnessing these resources (Barney, 1991). The goal of green supply chain management is to reduce a firm's pollution, waste, and other negative environmental impacts caused by its supply chain activities (Tseng, 2011); therefore, green supply chain management allows firms to simultaneously safeguard natural resources and save financial resources, making them more competitive and environmentally friendly (Hart, 1995; Shi, Koh, Baldwin, & Cucchiella, 2012).

Thus, the resource-based view of the firm supports the integration of green supply chain management in the firm's business operations and supply chain activities (Bowen, Cousins, Lamming, & Farukt, 2001; Gavronski, Klassen, Vachon, & do Nascimento, 2011; Lee et al., 2013). It further proposes that those firms, which integrate green thinking into their supply chain operations and develop environmental management knowledge and resources both at the inter- and intra-organizational supply chain levels (Gavronski et al., 2011) will be in a superior position to achieve sustained competitive advantage. Thus, an effective management of green supply chain management issues enables a firm to better manage its physical, informational, human and financial resources both at the intra- and inter-organizational levels that

in turns help the firm to differentiate itself from its competitors and improve its operational performance (Gold, Seuring, & Beske, 2010).

In addition, green supply chain management competency also enables a firm to reduce potential environmental harm, risk exposure, redundancies and waste across the supply chain, which otherwise could add substantial financial, legal, or environmental burdens on the firm. Furthermore, improved green supply chain management also permits a firm to better position itself in the marketplace by distinguishing its products and services from that of competitors, as customers become more aware of environmental issues and demand green or sustainable products (Zhu, Sarkis, & Lai, 2007). A similar logic can be applied in terms of acquiring financial capital, penetrating an existing market or expanding business to new markets. For instance, a firm can promote its products and services to new customers or acquire funds from investors by showcasing its green management capability, environmental responsibility, and eco-friendly profile (Zhu et al., 2007). Thus, green supply chain management can be a source of sustained competitive advantage providing that a firm develop its competencies, constantly improve its business operations, and actively collaborate with supply chain partners for developing environmental performance (Vachon & Klassen, 2007).

Institutional Theory Perspective

Institutional theory investigates how external pressures shape organizational actions (Hirsch, 1975). It provides a justification for implementing a green supply chain management approach. Institutional theory argues for promoting organizational practices that are socially expected, publicly endorsed, confirm to social perceptions and norms, and are considered legitimate. Thus, firms that adopt pro-environmental practices and responsible business behavior tend to develop and maintain societal legitimacy. Institutionalists argue that:

1. All organizations exist within a context of institutional rules—there is no such thing as 'the market': all markets are socially constructed;
2. All organizations are set within a context of social expectations, which constrain 'acceptable' actions; and
3. All managers are socialized into seeing the world in certain ways, thus constraining their understanding of opportunities (Johnson & Greenwood, 2007, p. 16).

Hence, it is an imperative for firms to operate within societal norms and legal boundaries. DiMaggio and Powell (1983) suggest three forms institutional isomorphism namely, coercive, normative and mimetic that influence firms in their approach to environmental practices. First, governments often exert coercive pressures in the form of regulations to develop green supply chain management policies and practices (Zhu, Sarkis, & Lai, 2013). Second, normative pressures are driven by the environmental or social expectations of customers to adopt green supply chain

management practices (Ball & Craig, 2010; Zhu, Geng, Fujita, & Hashimoto, 2010). Third, imitation has an important role developed nations where firms are increasingly required to implement comparable green supply chain management practices to align their actions to that of successful competitors (Zhu et al., 2013).

The element of coercive isomorphism indicates that environmental regulations and legislations are becoming more rigorously enforced, resulting in punitive actions when firms ignore environmental standards or are unable to meet such requirements. Accordingly, firms are bound to comply with these rules and codes of practice imposed by regulatory bodies. It is pertinent to argue that disregarding environmental standards poses great risk to firms in the form of substantial fines, legal penalties, trade barriers, lost productivity due to additional inspections, and potential closure of operations (Epstein, 2008; Rivera, 2004; Zhu et al., 2013).

Normative pressures from international buyers can be considered as key factors that drive firms to adopt green supply chain management practices (Sarkis, Zhu, & Lai, 2011). In fact, currently customer awareness is continually rising regarding environmental issues because of social media and advances in information and communication technologies. Thus, ignoring such expectations could be damaging for the long-term survival of the firm. Finally, green supply chain management approaches have now become a norm in most developed countries (Sarkis et al., 2011) and many firms are trying to align their environmental practices to that of exemplary competitors in their industry. Firms that do not follow green supply chain management practices could be at risk of losing their market share and profitability.

Stakeholder Theory

A stakeholder is "any group or individual who can affect or is affected by the achievement of an organization's objectives" (Freeman, 1984, p. 46). Stakeholder theory can be used as a valuable lens to assess a green supply chain management approach. The concepts of sustainability, responsibility, ethics and environmental management are primarily associated with the management of stakeholder concerns and their varied expectations (Garvare & Johansson, 2010). Particularly, stakeholder groups including media, public, non-governmental organizations, creditors, and customers have now became more aware and concerned with global environmental issues. These stakeholders are increasingly expecting firms to demonstrate leadership in addressing these issues and be accountable, transparent, ethical, and responsible for their business activities (Hassini, Surti, & Searcy, 2012; Plambeck, Lee, & Yatsko, 2012).

In addition, the current focus of stakeholders is increasingly shifting towards responsible management for supply chain activities, which is where the majority of the most pressing environmental issues lie (Schnittfeld & Busch, 2016; Wolf, 2014). For example, Walmart is actively working with its 70,000 suppliers to reduce waste, packaging, energy use and fuel consumption (Esty & Winston, 2009). Accordingly, these demands and expectations cannot be overlooked, as failure to account for

stakeholders' concerns could be detrimental to a firm's reputation and its long term survival. Hoejmose, Roehrich, and Grosvold (2014, p. 77) noted that "responsible supply chain management practices can help protect a firm's corporate reputation by shielding from negative media attention and consumer boycott". They further argued that responsible and sustainable supply chain practices can also improve a firm's reputation and image, enabling firms to obtain business contracts and access to new market segments.

Systems Theory

The concept of green supply chain management is reinforced by system theory perspective. As many global environmental problems are closely intertwined including air pollution, biodiversity loss, climate change, energy and food security and water shortage (Liu et al., 2015), it is necessary to address such interconnected problems holistically. A single firm could not resolve these complicated issues alone. Therefore, a systemic, integrative, inclusive and collaborative effort between supply chain members is an imperative to pragmatically resolve these issues. Accordingly, a systems perspective is a useful approach to understanding the complicated and dynamic relationships that emerge from managing green supply chain management activities along extended supply chains. According to O'Riordan (1981), systems theory provides conceptual roots and theoretical underpinnings to environmental management and related concepts. However, Holt and Ghobadian (2009, p. 935) argued that "much of the embryonic green supply chain management research has tended to focus on upstream activities, conversion processes, or the downstream activities rather than adopting a holistic approach propagated by SCM [supply chain management]". The theory postulates that impacts in one part of a system with have consequences elsewhere (Holt & Ghobadian, 2009) and understanding these connections and linkages between varied systems is important to devise a comprehensive and appropriate response to distinct but connected environmental problems (Clayton & Radcliffe, 2015). Thus, a green supply chain management approach holds enormous potential to addressing global environmental issues as it encourages systems-wide environmental improvements and inclusive focus in the globalized production networks. For example, by bringing key actors across the supply chain to a common platform and creating conditions where these actors share resources, knowledge and technology could enable interconnected firms to successfully achieve their of environmental goals.

Integrating Theoretical Perspectives with the Practical World: The Sanford Case

As demonstrated, there are several practical reasons why firms should embrace green supply chain management practices. Next, it is pertinent to focus how selected theoretical perspectives relate to the practical world. In this regard, the following discussion specifically investigates the case of Sanford, a New Zealand based seafood firm, to examine how the concept of green supply chain management is practiced in the firm and its relationship with the theoretical perspectives.

To improve value creation for its stakeholders, Sanford focuses on six types of capital namely, natural capital, intellectual capital, social and relationship capital, human capital, manufactured capital and financial capital. Linking this to a resource-based view, green supply chain management practices are particularly useful in terms of developing a firm's natural capital resources, manufacturing capacity, and financial capital base. For instance, Sanford's 2017 annual report states that the firm saved more than $2 million through delivering key procurement projects (Sanford, 2017). This was achieved through several supply chain initiatives targeted at greening the supply chain including fuel and electricity reduction, climate friendly refrigeration, sustainable packaging (replacing polystyrene bins and plastic packaging) initiative, waste minimization, and collaboration with supply chain partners (Sanford, 2017). Thus, it can be argued that green supply chain management practices enable a firm to improve its performance in terms of enhancing natural, financial, manufacturing and relationship capital base.

From an institutional theory viewpoint, regulatory and customer pressures are instrumental for firms to promote green supply chain practices. Sanford not only focuses on fundamental regulatory requirements but has several beyond compliance initiatives by which it addresses the needs of its varied stakeholders. For example, Sanford demonstrates its environmental commitment by achieving environmental and food safety accreditation for its processes and products through international certification bodies such as ISO 14001, Marine Stewardship Council Certification, FSSC 22000—Food Safety Management System, and Marine Farm Association Certification (Sanford, 2017). These initiatives enable Sanford to align its operations with the best industry practices, which in turn is helping the firm to achieve social legitimacy and promote responsible seafood manufacturer image amongst its competitors and customers.

Stakeholder management is considered as an integral part of Sanford's strategy. The firm uses a five step process to engage with its stakeholders in relation to social and environmental issues (Sanford, 2017). The specific steps of the process include: identify stakeholders, interview stakeholders, ask stakeholders to score each issue, produce a materiality matrix and radar, and sense-check. The Sanford 2017 annual report states that "we work in partnership with our stakeholders to ensure that we responsibly consume and produce seafood" (Sanford, 2017, p. 56). It is further noted in the report that "climate change is affecting every country and the disruption is likely to have a significant impact on all our customers. We are conscious of the

impact that climate change could have on the oceans and the inherent risk to our business model" (Sanford, 2017, p. 96). Accordingly, the firm adopts various internal environmental initiatives and supply chain related improvements in response to fulfil stakeholders expectations. And in this context, stakeholder theory provides an ample justification for embracing green supply chain initiatives.

Sanford utilizes a business excellence framework, which allows the firm to understand and address its core issues in a holistic way (Sanford, 2017). It also provides a structured and considered approach which supports an integrated value creation across the business. System thinking reflected in the business excellence framework could be considered as a valuable approach to understand the linkages between a firm's materiality issues as well as the relationship between diverse set of actors involved in the value creation process for Sanford. The firm has established an inclusive system by which it manages it impacts both at the intra- and inter organizational levels. In particular, Sanford's adoption of various environmental practices and collaborative initiatives with external stakeholders demonstrate that the firm is aware of its wider environmental influence on a range of stakeholder groups and thus applying a system thinking approach to manage and improve its supply chain impacts.

Green Supply Chain Management Approaches

Green supply chain management involves a wide range of environmental related initiatives and practices that help a firm to reduce its environmental impacts and improve environmental performance. The following discussion presents some of the main green supply chain management approaches examined in the literature. This includes: eco-design, green procurement, green manufacturing, and green logistics management.

Eco-Design

Eco-design refers to incorporating life cycle thinking and environmental consciousness in the product design phase so that negative environmental impacts of the product can be minimized throughout its extended life cycle. Eco-design focuses on the development of green products, which are described as "products with an alternate design such that less physical resources are required during its life cycle" (Janssen & Jager, 2002, p. 288). Thus, eco-design enables a firm to carefully plan and analyze a product's environmental impacts at the product development stage (Eltayeb, Zailani, & Ramayah, 2011; Srivastava, 2007). Eltayeb et al. (2011, p. 497) define eco-design as "actions taken during product development aimed at minimizing a product's environmental impacts during its whole life cycle—from acquiring materials, to manufacturing, use, and ultimately to its final disposal". Gunasekaran

and Spalanzani (2012) estimated that about 30–80% of the environmental impacts of a product are directly or indirectly linked to the product design stage. Accordingly, systematic planning and detailed assessments of a product at the design stage could have substantial promising implications for subsequent stages of product life cycle including production, packaging, transportation, storage, use, and the end of life management of a product.

Furthermore, early identification and assessment of potential harmful impacts of products provide an opportunity for a manufacturer to avoid, mitigate or totally eliminate undesirable environmental issues that may subsequently endanger a firm's reputation and image or could potentially make it liable to legal implications (Dangelico & Pujari, 2010; Gottberg, Morris, Pollard, Mark-Herbert, & Cook, 2006). Further, the assessment of conceivable environmental impacts puts a firm into a promising position to improve business competitiveness by improving the manufacturing processes and systems, eliminate redundancies, substitute hazardous materials and substances, devise waste reduction, remanufacturing, and re-utilization plan, and enhance resource efficiency (Dangelico & Pujari, 2010).

Green Procurement

Green procurement focuses on the management of environmental issues related to buyer-supplier relationship with reference to the purchase of environmentally friendly products and services. Green procurement includes supplier selection based on their environmental competence and performance, technical and eco-design capability, environmental collaboration, and supplier evaluation for environmental standards (Paulraj, 2011). These practices generally fall into two categories—(1) procurement of certified products or services, and (2) environmental monitoring and collaboration with suppliers (Tachizawa et al., 2015). The first approach suggests that firms demand their suppliers to attain product or process-specific standards in order to ensure supplier meets certain standards (Gimenez & Sierra, 2013; Raynolds, 2004). For example, many firms demand their suppliers to hold an up-to-date ISO 14001 certification, which provides a buyer some level of assurance and confidence that a supplier has appropriate systems and procedures in place to manage its environmental impacts. While this approach has its advantages, it is relatively less effective it terms of facilitating a long-term buyer-supplier partnership where they can mutually develop environmentally friendly innovative products and processes.

Conversely, several leading firms are presently engaging with their suppliers for environmental improvements and green product development initiatives. For example, General Electric and IBM have used supply chain collaboration as an important vehicle to establish environmental guidelines and innovative approaches to overcome pertinent environmental issues. Collaboration with suppliers include activities such as supplier remediation and capacity building, sharing resources, and training and development (Sisco, Chorn, Pruzan-Jorgensen, & Compact, 2011). The current

body of knowledge suggests that collaboration with suppliers enables a focal firm to develop long-term partnership with suppliers, trust-oriented relationships, and innovative green products, as well as promoting green supply chain management performance across the supply chain network (Klassen & Vachon, 2003; Tachizawa et al., 2015; Vachon & Klassen, 2006; Vereecke & Muylle, 2006).

Green Manufacturing

In recent years, green manufacturing and cleaner production methods have attracted considerable interest and firms are increasingly incorporating green manufacturing principles in their business operations. For instance, Tesco, IKEA, McDonalds, IBM, Patagonia, Walmart, and Sony have adopted a range of green initiatives to make their manufacturing processes environmentally sustainable (Baines et al., 2012; Dubey, Gunasekaran, & Papadopoulos, 2017). Green manufacturing is defined as "a collection of activities that involves conversion of inputs into desired products, such that emissions of hazardous substances which are harmful to human health and the environment are minimized without compromising product quality in an economical way" (Dubey et al., 2017, p. 197). The literature identifies several approaches and practices that help firms transform their traditional production methods into cleaner production systems. The following discussion presents the key green manufacturing approaches used in the current industrial systems to promote eneviormemntal management and achieve environmental performance.

An environmental management system (EMS) is a voluntary environmental approach, which is defined as "a transparent, systematic process known company-wide, with the purpose of prescribing and implementing environmental goals, policies, and responsibilities, as well as regular auditing of its elements" (Steger, 2000, p. 24). Environmental management systems are intended to assist organizations to incorporate environmental practices within the overall operational framework in order to protect the natural environment. The goal of Environmental management system is make environmental conservation an integral part of business strategy and operational activities. Currently, many firms globally have adopted international environmental management system standards and certifications. These standards provide detailed guidelines and a coherent framework for implementing programs by which firms obtain environmental certifications. Some of the popular environmental management system standards include ISO 14001, British standards (BS) 7750, and the European Eco-Management and Audit Scheme (EMAS).

The term eco-efficiency was introduced by the World Business Council for Sustainable Development (WBCSD) in 1992. The WBCSD states that "eco-efficiency is achieved through the delivery of competitive-priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the life-cycle to a level at least in line with the Earth's estimated carrying capacity" (IISD, 2018). The key focus areas for eco-efficiency include: reduction in material and energy intensity of goods

and services, minimized use of toxic materials, maximum use of renewable resources, reduction of greenhouse gases emission, improved recycling, and greater durability of products (DeSimone & Popoff, 2000; IISD, 2018). While the benefits of implementing eco-efficiency are well argued (DeSimone & Popoff, 2000), its critics note that there are several inherent limitations in this approach. For instance, it is argued that despite good motivations, production systems based on the eco-efficiency logic still generate large quantities of waste and pollution (Kopnina & Blewitt, 2015). Therefore, eco-efficiency promotes unsustainable production and consumption systems without addressing the root causes of the problem.

Green Logistics

Traditional logistics activities focus on the supply of goods from manufacturer to the end user; however, green logistics deals with the management of goods from manufacturer to end-user as well as the disposal of goods at the end of its useful life (Lippman, 2001). Green logistics relates with "sustainable transportation, hazardous material handling and storage, inventory control, warehousing, packaging, and facility location-allocation decisions that aim to reduce carbon footprints" (Min & Kim, 2012, p. 41).

Green Supply Chain Management and Firm Performance

The extant body of knowledge has extensively investigated the relationship between green supply chain management and firm performance. The performance impacts of green supply chain management implementation can be categorized into four dimensions, namely economic performance, environmental performance, operational performance and stakeholder value (Geng, Mansouri, & Aktas, 2017). First, the relationship between green supply chain management and a firm's economic performance is explored in several past studies. For instance, prior studies examined the impacts of green supply chain management adoption on some of the key economic variables such as growth in sales, profit, and market share. These studies suggested a positive link between green supply chain management practices and a firm economic performance (Kuei, Chow, Madu, & Wu, 2013; Zhu & Sarkis, 2004). Second, green supply chain management is associated with improving the environmental performance of the firm. In this regard, past studies revealed a positive relationship between green supply chain management practices and environmental performance (Kuei et al., 2013; Lee, Tae Kim, and Choi 2012; Tachizawa et al., 2015; Zhu & Sarkis, 2004). These studies specifically looked at key environmental variables such as energy savings, waste reduction and emissions control and their association with green supply chain management.

Third, operational performance is a central issue in supply chain management including scrap reduction, delivery time, improved inventory controls, warehouse management and capacity utilization (Corbett & Klassen, 2006). Studies reported that green supply chain management practices enable firms to enhance their operational performance (Kuei et al., 2013). Fourth, some studies have also examined the stakeholder implications of implementing the green supply chain management practices (Zailani, Eltayeb, Hsu, & Choon Tan, 2012). These studies reported that green supply chain management positively influence both internal and external stakeholder perceptions and performance of the firm. At the organizational level, green supply chain management adoption improves a firm's performance in terms of management occupational health and safety standards. Conversely, at the external level green supply chain management promotes customer loyalty and satisfaction and the firm's image management and reputation among its stakeholders.

Conclusion, Limitations, and Future Directions

This chapter critically examined the concept of green supply chain management in the New Zealand business context. The best practices framework for greening the supply chain is introduced that explicates the significance of adopting the green supply chain management approach by systematically integrating the assumptions of dominant theoretical perspectives on sustainability with the green supply chain management concept. Furthermore, the framework expounded the relationships between green supply chain management drivers and barriers to adoption, theoretical foundations and reasoning for green supply chain management implementation, key green supply chain management approaches and the performance outcomes achieved through implementation of green supply chain management concept.

The chapter contributes to theory by integrating multiple theoretical perspectives on sustainability with green supply chain management concept. Prior research has made some efforts to integrate knowledge of management theories with green supply chain management; however, there are few dedicated efforts where scholars combined multiple theories to understand the value of promoting green supply chain management approach. From a managerial perspective, the chapter offers some practical suggestions for implementing green supply chain management practices. It is argued in this chapter that green supply chain management should be viewed as a holistic concept, which suggests that improved environmental and economic outcomes can only be attained when interactions and linkages between distant but interconnected green supply chain management approaches are thoroughly aligned. Otherwise, at best, only marginal gains could be achieved by implementing isolated green supply chain management practices.

This study has some limitation. First, only secondary data were used to investigate the green supply chain management concept. Thus, future research should address this limitation by empirically investigate the implementation of green supply chain management concept in the New Zealand business context. There is ample

opportunity for future research in the Australasian context as the prior research has insufficiently addressed the issue of green supply chain management the Australasian context. Second, the theoretical framework proposed in this chapter is mostly generic in nature, not targeting any particular sector or industry. Thus, to determine the unique green supply chain management dynamics and needs for relevant practices in a particular sector, a sector specific research is suggested that could provide an in-depth understanding of appropriate issues and potential strategies to address these issues.

References

Bain, C., & Dandachi, T. (2015). "100% pure"? Private governance efforts to mitigate the effects of "dirty dairying" on New Zealand's environment. In A. Bonanno & L. Busch (Eds.), *Handbook of the international political economy of agriculture and food* (pp. 40–60). Cheltenham, UK: Edward Elgar.

Baines, T., Brown, S., Benedettini, O., & Ball, P. (2012). Examining green production and its role within the competitive strategy of manufacturers. *Journal of Industrial Engineering and Management, 5*(1), 53–87.

Ball, A., & Craig, R. (2010). Using neo-institutionalism to advance social and environmental accounting. *Critical Perspectives on Accounting, 21*(4), 283–293.

Barney, J. B. (1991). Firm resources and sustained compitative advantage. *Journal of Management, 17*(1), 99–120.

Bowen, F. E., Cousins, P. D., Lamming, R. C., & Farukt, A. C. (2001). The role of supply management capabilities in green supply. *Production and Operations Management, 10*(2), 174–189.

Brickman, C., & Ungerman, D. (2008). Climate change and supply chain management. *McKinsey Quarterly*. Retrieved from https://www.sallan.org/pdf-docs/clch08.pdf

Cantor, D. E. (2008). Workplace safety in the supply chain: A review of the literature and call for research. *The International Journal of Logistics Management, 19*(1), 65–83.

Chaabane, A., Ramudhin, A., & Paquet, M. (2012). Design of sustainable supply chains under the emission trading scheme. *International Journal of Production Economics, 135*(1), 37–49.

Chkanikova, O., & Mont, O. (2015). Corporate supply chain responsibility: Drivers and barriers for sustainable food retailing. *Corporate Social Responsibility and Environmental Management, 22*(2), 65–82.

Clayton, T., & Radcliffe, N. (2015). *Sustainability: A systems approach*. London, UK: Routledge.

Collins, E., Lawrence, S., Pavlovich, K., & Ryan, C. (2007). Business networks and the uptake of sustainability practices: The case of New Zealand. *Journal of Cleaner Production, 15*, 729–740.

Collins, E., Roper, J., & Lawrence, S. (2010). Sustainability practices: Trends in New Zealand businesses. *Business Strategy and the Enviornment, 19*, 479–494.

Corbett, C. J., & Klassen, R. D. (2006). Extending the horizons: Environmental excellence as key to improving operations. *Manufacturing and Service Operations Management, 8*(1), 5–22.

Dangelico, R. M., & Pujari, D. (2010). Mainstreaming green product innovation: Why and how companies integrate environmental sustainability. *Journal of Business Ethics, 95*(3), 471–486.

DeSimone, L. D., & Popoff, F. P. (2000). *Eco-efficiency: The business link to sustainable development*. London, UK: MIT Press.

DiMaggio, P., & Powell, W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*, 147–160.

Dubey, R., Gunasekaran, A., & Papadopoulos, T. (2017). Green supply chain management: Theoretical framework and further research directions. *Benchmarking: An International Journal, 24*(1), 184–218.

Eltayeb, T. K., Zailani, S., & Ramayah, T. (2011). Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes. *Resources, Conservation and Recycling, 55*(5), 495–506.

Epstein, M. J. (2008). *Making sustainability work: Best practices in managing, and measuring corporate social, environmental, and economic impacts*. Sheffield, UK: Greenleaf Publishing.

Esty, D. C., & Winston, A. S. (2009). *Green to gold: How smart companies use environmental strategy to innovate, create value, and build competitive advantage*. Hoboken, NJ: Wiley.

Eweje, G. (2011). A Shift in corporate practice? Facilitating sustainability strategy in companies. *Corporate Social Responsibility and Environmental Management, 18*(3), 125–136.

Foote, K. J., Joy, M. K., & Death, R. G. (2015). New Zealand dairy farming: Milking our environment for all its worth. *Environmental Management, 56*(3), 709–720.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston, MA: Pitman/Ballinger.

García-Arca, J., & Prado-Prado, J. C. (2006). Logistics improvement through packaging rationalization: A practical experience. *Packaging Technology and Science, 19*(6), 303–308.

Garvare, R., & Johansson, P. (2010). Management for sustainability: A stakeholder theory. *Total Quality Management, 21*(7), 737–744.

Gavronski, I., Klassen, R. D., Vachon, S., & do Nascimento, L. F. M. (2011). A resource-based view of green supply management. *Transportation Research Part E: Logistics and Transportation Review, 47*(6), 872–885.

Geng, R., Mansouri, S. A., & Aktas, E. (2017). The relationship between green supply chain management and performance: A meta-analysis of empirical evidences in Asian emerging economies. *International Journal of Production Economics, 183*, 245–258.

Gimenez, C., & Sierra, V. (2013). Sustainable supply chains: Governance mechanisms to greening suppliers. *Journal of Business Ethics, 116*(1), 189–203.

Giunipero, L. C., Hooker, R. E., & Denslow, D. (2012). Purchasing and supply management sustainability: Drivers and barriers. *Journal of Purchasing and Supply Management, 18*(4), 258–269.

Gold, S., Seuring, S., & Beske, P. (2010). Sustainable supply chain management and inter-organizational resources: A literature review. *Corporate Social Responsibility and Environmental Management, 17*(4), 230–245.

Gottberg, A., Morris, J., Pollard, S., Mark-Herbert, C., & Cook, M. (2006). Producer responsibility, waste minimisation and the WEEE Directive: Case studies in eco-design from the European lighting sector. *Science of the Total Environment, 359*(1–3), 38–56.

Green, K. W., Jr., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: Impact on performance. *Supply Chain Management: An International Journal, 17*(3), 290–305.

Gunasekaran, A., & Spalanzani, A. (2012). Sustainability of manufacturing and services: Investigations for research and applications. *International Journal of Production Economics, 140*(1), 35–47.

Hart, S. L. (1995). A natural-resource based view of the firm. *Academy of Management Review, 20*(4), 986–1014.

Hassini, E., Surti, C., & Searcy, C. (2012). A literature review and a case study of sustainable supply chains with a focus on metrics. *International Journal of Production Economics, 140*(1), 69–82.

Hervani, A. A., Helms, M. M., & Sarkis, J. (2005). Performance measurement for green supply chain management. *Benchmarking: An International Journal, 12*(4), 330–353.

Hirsch, P. M. (1975). Organizational effectiveness and the institutional environment. *Administrative Science Quarterly, 20*(3), 327–344.

Hoejmose, S. U., Roehrich, J. K., & Grosvold, J. (2014). Is doing more doing better? The relationship between responsible supply chain management and corporate reputation. *Industrial Marketing Management, 43*(1), 77–90.

Holt, D., & Ghobadian, A. (2009). An empirical study of green supply chain management practices amongst UK manufacturers. *Journal of Manufacturing Technology Management, 20*(7), 933–956.

IISD. (2018). *Eco-efficiency*. Retrieved from https://www.iisd.org/business/tools/bt_eco_eff.aspx

Janssen, M. A., & Jager, W. (2002). Stimulating diffusion of green products. *Journal of Evolutionary Economics, 12*(3), 283–306.

Johnson, B., & Greenwood, R. (2007). Institutional theory perspective. In M. Jenkins, V. Ambrosini, & N. Collier (Eds.), *Advance strategic management: A multi-perspective appraoch* (2nd ed., pp. 11–20). England: Palgrave Macmillan.

Jones, P., Comfort, D., & Hillier, D. (2008). Moving towards sustainable food retailing? *International Journal of Retail and Distribution Management, 36*(12), 995–1001.

Klassen, R. D., & Vachon, S. (2003). Collaboration and evaluation in the supply chain: The impact on plant-level environmental investment. *Production and Operations Management, 12*(3), 336–352.

Kleindorfer, P. R., Singhal, K., & Wassenhove, L. N. V. (2005). Sustainable operations management. *Production and Operations Management, 14*(4), 482–492.

Kopnina, H., & Blewitt, J. (2015). *Sustainable business: Key issues in environment and sustainability*. New York, NY: Routledge.

Kovacs, G. (2008). Corporate environmental responsibility in the supply chain. *Journal of Cleaner Production, 16*, 1571–1578.

Kuei, C.-h., Chow, W. S., Madu, C. N., & Wu, J. P. (2013). Identifying critical enablers to high performance environmental management: An empirical study of Chinese firms. *Journal of Environmental Planning and Management, 56*(8), 1152–1179.

Lai, K.-h., Wong, C. W., & Lam, J. S. L. (2015). Sharing environmental management information with supply chain partners and the performance contingencies on environmental munificence. *International Journal of Production Economics, 164*, 445–453.

Lee, S. M., Tae Kim, S., & Choi, D. (2012). Green supply chain management and organizational performance. *Industrial Management and Data Systems, 112*(8), 1148–1180.

Linton, J. D., Klassen, R., & Jayaraman, V. (2007). Sustainable supply chains: An introduction. *Journal of Operations Management, 25*, 1075–1082.

Lippman, S. (2001). Supply chain environmental management. *Environmental Quality Management, 11*(2), 11–14.

Liu, J., Mooney, H., Hull, V., Davis, S. J., Gaskell, J., Hertel, T., … Kremen, C. (2015). Systems integration for global sustainability. *Science, 347*(6225), 963–972.

Lee, S., Sung Rha, J., Choi, D., & Noh, Y. (2013). Pressures affecting green supply chain performance. *Management Decision, 51*(8), 1753–1768.

Mangla, S. K., Kumar, P., & Barua, M. K. (2015). Risk analysis in green supply chain using fuzzy AHP approach: A case study. *Resources, Conservation and Recycling, 104*, 375–390.

MBIE. (2017). *New Zealand tourism forecasts 2017–2023* (No. ISSN 2537-8082). Retrieved from http://www.mbie.govt.nz/info-services/sectors-industries/tourism/tourism-research-data/international-tourism-forecasts/documents-image-library/forecasts-2017-report-final.pdf

MfE. (2001). *Our clean green image: What's it worth?* Wellington: Ministry for the Environment. Retrieved from http://www.mfe.govt.nz/publications/sus-dev/clean-green-image-value-aug01/summary-leafl et-aug01.pdf

Min, H., & Kim, I. (2012). Green supply chain research: Past, present, and future. *Logistics Research, 4*(1–2), 39–47.

Ministry of Economic Development. (2011). *Greening New Zealand's growth: Report of the Green Growth Advisory Group*. Wellington: Ministry of Economic Development. Retrieved from http://www.sbc.org.nz/__data/assets/pdf_file/0004/99481/Greening-NZs-Growth-Report.pdf

O'Riordan, T. (1981). Environmentalism and education. *Journal of Geography in Higher Education, 5*(1), 3–17.

Paulraj, A. (2011). Understanding the relationships between internal resources and capabilities, sustainable supply management and organizational sustainability. *Journal of Supply Chain Management, 47*(1), 19–37.

Plambeck, E., Lee, H., & Yatsko, P. (2012). Improving environmental performance in your Chinese supply chain. *MIT Sloan Management Review, 53*(2), 43–51.
Porter, E. M., & van der Linde, C. (1995). Towards a new conception of the enviornmental-compitativeness relationship. *Journal of Economic Perspectives, 9*(4), 97–118.
Raynolds, L. T. (2004). The globalization of organic agro-food networks. *World Development, 32*(5), 725–743.
Rivera, J. (2004). Institutional pressures and voluntary environmental behavior in developing countries: Evidence from the Costa Rican hotel industry. *Society and Natural Resources, 17*(9), 779–797.
Sajjad, A., Eweje, G., & Tappin, D. (2015). Sustainable supply chain management: Motivators and barriers. *Business Strategy and the Environment, 24*(7), 643–655.
Sancha, C., Wong, C. W., & Thomsen, C. G. (2016). Buyer–supplier relationships on environmental issues: A contingency perspective. *Journal of Cleaner Production, 112*, 1849–1860.
Sanford. (2017). *Sanford anuual report—The power of and*. Auckland. Retrieved from https://www.sanford.co.nz/assets/announcements/Sanford-2017-Annual-Report.pdf
Sarkis, J. (2014). *Green supply chain management*. New York, NY: ASME Press.
Sarkis, J., Zhu, Q., & Lai, K. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics, 130*(1), 1–15.
Schnittfeld, N. L., & Busch, T. (2016). Sustainability management within supply chains: A resource dependence view. *Business Strategy and the Environment, 25*(5), 337–354.
Shekari, H., & Rajabzadeh Ghatari, A. (2013). Promoting corporate image: A reflection on green supply chain management approach. *International Journal of Management and Business Research, 3*(4), 311–324.
Shi, V. G., Koh, S. C. L., Baldwin, J., & Cucchiella, F. (2012). Natural resource based green supply chain management. *Supply Chain Management: An International Journal, 17*(1), 54–67.
Sisco, C., Chorn, B., Pruzan-Jorgensen, P. M., & Compact, G. (2011). *Supply chain sustainability: A practical guide for continuous improvement: United Nations Global Compact*. Retrieved July 19, 2018, from https://www.unglobalcompact.org/library/205
Spekman, R. E., & Davis, E. W. (2004). Risky business: Expanding the discussion on risk and the extended enterprise. *International Journal of Physical Distribution and Logistics Management, 34*(5), 414–433.
Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art litrature review. *International Journal of Management Review, 9*(1), 53–80.
Steger, U. (2000). Environmental management systems: Empirical evidence and further perspectives. *European Management Journal, 18*(1), 23–37.
Sustainable Business Council. (2017). *Leading the way: NZ business embedding Sustainable Development Goals*. Retrieved April 11, 2018, from http://www.sbc.org.nz/insights/2017/leading-the-way
Tachizawa, E. M., Gimenez, C., & Sierra, V. (2015). Green supply chain management approaches: Drivers and performance implications. *International Journal of Operations and Production Management, 35*(11), 1546–1566.
Tseng, M.-L. (2011). Green supply chain management with linguistic preferences and incomplete information. *Applied Soft Computing, 11*(8), 4894–4903.
Vachon, S., & Klassen, R. D. (2006). Extending green practices across the supply chain: The impact of upstream and downstream integration. *International Journal of Operations and Production Management, 26*(7), 795–821.
Vachon, S., & Klassen, R. D. (2007). Supply chain management and environmental technologies: The role of integration. *International Journal of Production Research, 45*(2), 401–423.
Vanalle, R. M., Ganga, G. M. D., Godinho Filho, M., & Lucato, W. C. (2017). Green supply chain management: An investigation of pressures, practices, and performance within the Brazilian automotive supply chain. *Journal of Cleaner Production, 151*, 250–259.
Vereecke, A., & Muylle, S. (2006). Performance improvement through supply chain collaboration in Europe. *International Journal of Operations and Production Management, 26*(11), 1176–1198.

Walker, H., & Brammer, S. (2009). Sustainable procurement in the United Kingdom public sector. *Supply Chain Management: An International Journal, 14*(2), 128–137.
Walker, H., Di Sisto, L., & McBain, D. (2008). Drivers and barriers to environmental supply chain management practices: Lessons from the public and private sectors. *Journal of Purchasing and Supply Management, 14*(1), 69–85.
Wolf, J. (2014). The relationship between sustainable supply chain management, stakeholder pressure and corporate sustainability performance. *Journal of Business Ethics, 119*(3), 317–328.
Wu, T., Wu, Y.-C. J., Chen, Y. J., & Goh, M. (2014). Aligning supply chain strategy with corporate environmental strategy: A contingency approach. *International Journal of Production Economics, 147*, 220–229.
Zailani, H. M. S., Eltayeb, T. K., Hsu, C.-C., & Choon Tan, K. (2012). The impact of external institutional drivers and internal strategy on environmental performance. *International Journal of Operations and Production Management, 32*(6), 721–745.
Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. (2010). Green supply chain management in leading manufacturers: Case studies in Japanese large companies. *Management Research Review, 33*(4), 380–392.
Zhu, Q., Qu, Y., Geng, Y., & Fujita, T. (2017). A comparison of regulatory awareness and green supply chain management practices among Chinese and Japanese manufacturers. *Business Strategy and the Environment, 26*(1), 18–30.
Zhu, Q., & Sarkis, J. (2004). Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises. *Journal of Operations Management, 22*(3), 265–289.
Zhu, Q., Sarkis, J., & Lai, K.-h. (2007). Initiatives and outcomes of green supply chain management implementation by Chinese manufacturers. *Journal of Environmental Management, 85*(1), 179–189.
Zhu, Q., Sarkis, J., & Lai, K.-h. (2013). Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices. *Journal of Purchasing and Supply Management, 19*(2), 106–117.

Aymen Sajjad is a Lecturer in the Massey Business School, specializing in sustainable business management. He holds a PhD degree from Massey University, New Zealand and Master of Performance Management from the University of Adelaide, Australia. His PhD focused on sustainable supply chain management in the New Zealand business context. He is an active member of Sustainability and Corporate Social Responsibility Group at Massey Business School. Aymen is also an associate editor, *Corporate Governance: The international Journal of Business in Society*. Aymen's current research interests include sustainability, corporate social responsibility, sustainable supply chain management, environmental management, green supply chain management, and sustainable development goals.