

# Sustainability in Supply Chain Management

Jacinta Austin



# Sustainability in Supply Chain Management

Sustainability is becoming a very important issues within business and organisation as the impact on the environment is important not only to consumers but the organisation. But sustainability is not only references the impact on the environment, but also the impact it may have on overall business profits and operation. However, to have an understanding of sustainability in supply chain management there needs to be an understanding of the application, what a supply chain and what simulations cause a supply chain. In an addition to this, an understanding is needed to determined what supply chain quality management is and it works within an organisation. But there is a need to be looking at the theory and evolution of supply chain management as it may relate to different organisations and have different effects on the sustainability. In addition to this, how supply chain management works in product development and looking at a retrospective view. There have been many issues that have arisen with sustainability and supply chains are also included. Looking at what sustainability issues are currently arising from supply chains and what enhancements have had an effective influence on sustainability. But also taking a look at the governance on supply chain and what role is has on supply chains and the influence of risk management. While looking at how these have affected the sustainability of supply chains. Also, looking at the collaboration and exceptions of management within different supply chains. Also, determining what challenges might supply chain management have and how management looks at these challenges. Also, how these challenges could retain a sustainable resilient with these challenges and risks within the supply chain. And how the maturity of the supply chain can be managed to determine if it can remain sustainable and effective. Then developing supply chain management from evaluations attributes on the supply chain management and the vertical collaboration within different supply chains. Sustainability in the supply chain management can be influence by a number of different industries and how an organisation operates. Looking at these differences in the industries and organisations can take different aspects and implement them into their industry and organisation. Along with this, what managerial practice promote sustainable with supply chain management with regards new product development. While, looking at how the quantifying the supply chain can provide some resilience. While looking at the different attributes above the environmental effects of supply chains are needed to be considered also. Not only with the environment but also what corporate social responsibility (CSR) does to the supply chains and looking at what affect they might have on CSR. Not only looking at the CST, but if the global standards for supply chain management could have an effect and how these standards have an affect on the sustainability within the supply chain. While looking at what consumer's awareness is and how supply chain coordination can work together to help with pollution reduction.



Jacinta obtained her International Business degree from Griffith University 2012 and a Postgraduate Certificate in Business from University of Southern Queensland in 2014. Her interested is in business and marketing. Jacinta is currently studying a Master of Business (Marketing) from Queensland University of Technology.

**a**  
ArclerPress



Austin

# Sustainability in Supply Chain Management



Arcier Press

# Sustainability in Supply Chain Management

**Editor:**

---

Jacinta Austin

**a**

**ArclerPress**

[www.arclerpress.com](http://www.arclerpress.com)

# **Sustainability in Supply Chain Management**

*Editor: Jacinta Austin*

© 2017 Arcler Press LLC

708 3<sup>rd</sup> Avenue, 6<sup>th</sup> Floor

New York

NY 10017

United States of America

[www.arclerpress.com](http://www.arclerpress.com)

ISBN: 978-1-68094-500-3

Library of Congress Control Number: 2016951362

This book contains information obtained from highly regarded resources. Reprinted material sources are indicated. Copyright for individual articles remains with the authors as indicated. A Wide variety of references are listed. Reasonable efforts have been made to publish reliable data and views articulated in the chapters are those of the individual contributors, and not necessarily those of the editors or publishers. Editors or publishers are not responsible for the accuracy of the information in the published chapters or consequences of their use. The publisher believes no responsibility for any damage or grievance to the persons or property arising out of the use of any materials, instructions, methods or thoughts in the book. The editors and the publisher have attempted to trace the copyright holders of all material reproduced in this publication and apologize to copyright holders if permission has not been obtained. If any copyright holder has not been acknowledged, please write to us so we may rectify.

**Notice:** Registered trademark of products or corporate names are used only for explanation and identification without intent of infringement.

Arcler Press LLC publishes wide variety of books and eBooks. For more information about Arcler Press and its products, visit our website at [www.arclerpress.com](http://www.arclerpress.com)

# **Sustainability in Supply Chain Management**





# About the Editor

## Jacinta Austin

Jacinta obtained her International Business degree from Griffith University 2012 and a Postgraduate Certificate in Business from University of Southern Queensland in 2014. Her interested is in business and marketing. Jacinta is currently studying a Master of Business (Marketing) from Queensland University of Technology.





# List of Contributors

**Lynn A. Fish**

Department of Management, Canisius College, Buffalo, NY, USA

**Aleš Groznik**

University of Ljubljana, Faculty of Economics Slovenia

**Jure Erjavec**

University of Ljubljana, Faculty of Economics Slovenia

**Roberta Pinna**

Department of Economics and Business, University of Cagliari, Italy

**Pier Paolo Carrus**

Department of Economics and Business, University of Cagliari, Italy

**Fabiana Marras**

Department of Economics and Business, University of Cagliari, Italy

**Anthony Halog**

School of Forest Resources, University of Maine, Orono, Maine, USA

School of Geography, Planning and Environmental Management, University of Queensland, Brisbane, Queensland, Australia

**Nana Awuah Bortsie-Aryee**

School of Forest Resources, University of Maine, Orono, Maine, USA

**Isaías Badillo**

National Polytechnic Institute, Mexico

**Ricardo Tejeida**

National Polytechnic Institute, Mexico

**Oswaldo Morales**

National Polytechnic Institute, Mexico

**Abraham Briones**

Autonomous University of Hidalgo State, Mexico

**Virgil Popa**

Valahia University of Targoviste, Romania

**Girma Gebresenbet**

Department of Energy and Technology, Swedish University of Agricultural Sciences, Uppsala, Sweden

**Techane Bosona**

Department of Energy and Technology, Swedish University of Agricultural Sciences, Uppsala, Sweden

**A.P. Barroso**

UNIDEMI, Department of Mechanical and Industrial Engineering, Faculty of Science and Technology, FCT, New University of Lisbon, Caparica, Portugal

**V.H. Machado**

UNIDEMI, Department of Mechanical and Industrial Engineering, Faculty of Science and Technology, FCT, New University of Lisbon, Caparica, Portugal

**H. Carvalho**

UNIDEMI, Department of Mechanical and Industrial Engineering, Faculty of Science and Technology, FCT, New University of Lisbon, Caparica, Portugal

**V. Cruz Machado**

UNIDEMI, Department of Mechanical and Industrial Engineering, Faculty of Science and Technology, FCT, New University of Lisbon, Caparica, Portugal

**Sekhar Chattopadhyay**

RMIT University, Australia

**Eser Kayhan Tekin**

Turkish Naval Academy, Turkey

**Alper Ertürk**

Turkish Naval Academy, Turkey

**Hakan Tozan**

Turkish Naval Academy, Turkey

**César Martínez-Olvera**

Industrial Engineering, ITESM AGS, Aguascalientes, Mexico

**Yasser A. Davizon-Castillo**

Mechatronics Engineering, Polytechnic University of Sinaloa, Sinaloa, Mexico

**Sergio Rubio**

University of Extremadura, School of Industrial Engineering, Avenida de Elvas s/n, Spain

**Beatriz Jiménez-Parra**

University of Extremadura, School of Industrial Engineering, Avenida de Elvas s/n, Spain

**Giulia Dello Stritto**

University of Rome “Tor Vergata” - Department of Enterprise Engineering, Rome, Italy

**Massimiliano M. Schiraldi**

University of Rome “Tor Vergata” - Department of Enterprise Engineering, Rome, Italy

**Xuanguo Xu**

Department of Economics & Management, Jiangsu University of Science and Technology, Zhenjiang 212003, China

**Zhongmei Liang**

Department of Economics & Management, Jiangsu University of Science and Technology, Zhenjiang 212003, China

**Wenmin Han**

Department of Economics & Management, Jiangsu University of Science and Technology, Zhenjiang 212003, China

**Cosimo Rota**

DISTAL – Department of Agri-Food Science and Technology, University of Bologna, Italy

**Cesare Zanasi**

DISTAL – Department of Agri-Food Science and Technology, University of Bologna, Italy

**Nikolai Reynolds**

IPSOS InnoQuest, Ipsos Germany, Frankfurt, Germany

**Bowon Kim**

Operations Strategy and Management Science, KAIST Business School, Seoul 02455, Korea

**Jeong Eun Sim**

Operations Strategy and Management Science, KAIST Business School, Seoul 02455, Korea

**Sonia Irshad Mari**

Industrial and Management Engineering Department, Hanyang University, 55 Hanyangdeahak-ro, Sangnok-gu, Ansan, Kyoenggi-do 426-791, Korea

**Young Hae Lee**

Industrial and Management Engineering Department, Hanyang University, 55 Hanyangdeahak-ro, Sangnok-gu, Ansan, Kyoenggi-do 426-791, Korea

**Muhammad Saad Memon**

Industrial and Management Engineering Department, Hanyang University, 55 Hanyangdeahak-ro, Sangnok-gu, Ansan, Kyoenggi-do 426-791, Korea

# Preface

Sustainability is becoming a very important issues within business and organisation as the impact on the environment is important not only to consumers but the organisation. But sustainability is not only references the impact on the environment, but also the impact it may have on overall business profits and operation.

However, to have an understanding of sustainability in supply chain management there needs to be an understanding of the application, what a supply chain and what simulations cause a supply chain. In an addition to this, an understanding is needed to determined what supply chain quality management is and it works within an organisation. But there is a need to be looking at the theory and evolution of supply chain management as it may relate to different organisations and have different effects on the sustainability. In addition to this, how supply chain management works in product development and looking at a retrospective view. There have been many issues that have arisen with sustainability and supply chains are also included. Looking at what sustainability issues are currently arising from supply chains and what enhancements have had an effective influence on sustainability. But also taking a look at the governance on supply chain and what role is has on supply chains and the influence of risk management. While looking at how these have affected the sustainability of supply chains. Also, looking at the collaboration and exceptions of management within different supply chains. Also, determining what challenges might supply chain management have and how management looks at these challenges. Also, how these challenges could retain a sustainable resilient with these challenges and risks within the supply chain. And how the maturity of the supply chain can be managed to determine if it can remain sustainable and effective. Then developing supply chain management from evaluations attributes on the supply chain management and the vertical collaboration within different supply chains. Sustainability in the supply chain management can be influence by a number of different industries and how an organisation operates. Looking at these differences in the industries and organisations can take different aspects and implement them into their industry and organisation. Along with this, what managerial practice promote sustainable with supply chain management with regards new product development. While, looking at how the quantifying the supply chain can provide some resilience. While looking at the different attributes above the environmental effects of supply chains are needed to be considered also. Not only with the environment but also what corporate social responsibility (CSR) does to the supply chains and looking at what affect they might have on CSR. Not only looking at the CST, but if the global standards for supply chain management could have an effect and how these standards have an affect on the sustainability within the supply chain. While looking at what consumer's awareness is and how supply chain coordination can work together to help with pollution reduction.

**Editor  
Jacinta Austin**



# INTRODUCTION

Supply chain sustainability is a business issue affecting an organization's supply chain or logistics network in terms of environmental, risk, and waste costs. There is a growing need for integrating environmentally sound choices into supply-chain management. Sustainability in the supply chain is increasingly seen among high-level executives as essential to delivering long-term profitability and has replaced monetary cost, value, and speed as the dominant topic of discussion among purchasing and supply professionals.[citation needed]A sustainable supply chain seizes value creation opportunities and offers significant competitive advantages for early adopters and process innovators.

Supply chains are critical links that connect an organization's inputs to its outputs. Traditional challenges have included lowering costs, ensuring just-in-time delivery, and shrinking transportation times to allow better reaction to business challenges. However, the increasing environmental costs of these networks and growing consumer pressure for eco-friendly products has led many organizations to look at supply chain sustainability as a new measure of profitable logistics management. This shift is reflected by an understanding that sustainable supply chains frequently mean profitable supply chains.

Many companies are limited to measuring the sustainability of their own business operations and are unable to extend this evaluation to their suppliers and customers. This makes determining their true environmental costs highly challenging and reduces their ability to remove waste from the supply chains. However much progress has been made in defining supply chain sustainability and benchmarking tools are now available that enable sustainability action plans to be developed and implemented.



One of the key requirements of successful sustainable supply chains is collaboration. The practice of collaboration — such as sharing distribution to reduce waste by ensuring that half-empty vehicles do not get sent out and that deliveries to the same address are on the same truck — is not widespread because many companies fear a loss of commercial control by working with others. Investment in alternative modes of transportation — such as use of canals and airships — can play an important role in helping companies reduce the cost and environmental impact of their deliveries. Collaboration platforms are emerging because of the fear of a loss of commercial control and competitive advantage by working closely with other companies.

## 6 steps for a more sustainable supply chain

Stakeholder pressure from investors, shareholders, customers and nonprofits to push sustainability into the supply chain has significantly increased in recent years, with a record number of shareholder resolutions on supply chains issued during the past two proxy seasons. The recently launched Global Reporting Initiative (GRI) G4 Guidelines also requires an increased focus on sustainability throughout the supply chain. By managing and improving environmental, social and economic performance throughout supply chains, companies can conserve resources, optimize processes, uncover product innovations, save costs, increase productivity and promote corporate values. Research shows the business case for supply chain sustainability is growing. While more companies expand their sustainability programs to include suppliers, they struggle with implementation. The UN Global Compact's 2013 Global Corporate Sustainability Report finds that companies are increasingly talking about supply chain sustainability and making solid progress on setting expectations for suppliers. However, they are not yet supporting expectations

with concrete actions that drive sustainability performance in their supply chain. Incidents such as the factory collapse and fires in Bangladesh last year highlight the need for increased and urgent actions in this area.

Incorporating sustainability into a company's supply chain is complex but the failure to act may be the biggest risk of all. Companies can take several initial steps to move toward sustainable supply chains:

### **1. Map your supply chain**

Many companies do not have a comprehensive understanding of the sustainability impacts of their supply chain. An early step is to inventory suppliers, identify the most significant environmental and social challenges they have, and prioritize efforts with suppliers.

New Balance Athletic Shoe Inc. reduced the number of suppliers it does business with, in part based on performance against sustainability criteria. The company reduced its footwear supply chain by 65 percent and is focused on forming strong, positive partnerships with its suppliers. Some criteria that may be helpful for prioritizing suppliers include level of spending, importance to business continuity, and geography as a proxy for risk.

CH2M HILL established a supply chain sustainability strategy for evaluation and election of products, complete with procedures, tools, communications, training and metrics for reporting implementation progress. Since 2010, CH2M HILL has identified suppliers with strategic or preferred status based on volume and business impact. Tier 1 and Tier 2 suppliers are required to provide information about their sustainability programs and demonstrate continuous improvement. Suppliers are classified into four groups of environmental performance, with each incorporating specific key performance indicators (KPIs). CH2M HILL's direct procurement organization has begun incorporating sustainability into the design, procurement and construction of projects by promoting the selection of suppliers and subcontractors that value sustainability.

### **2. Communicate expectations**

Focusing on sustainability within your supply chain is a great way to communicate corporate values and culture to your suppliers and customers. Establishing and communicating expectations through a supplier code of conduct is a critical step in involving suppliers in your sustainability efforts.

Many resources and tools have been created to assist companies with the development of a supplier code of conduct. For example, the United Nations Global Compact publication, "Supply Chain Sustainability — A Practical Guide for Continuous Improvement", has guidelines and tips for writing and adopting a successful supplier code of conduct. A new tool developed by the Global Environmental Management Initiative (GEMI) helps companies prioritize where in their organization's value chain they may have opportunities to improve supply chain sustainability, and then provides case studies of companies that have leveraged these opportunities.

### **3. Baseline supplier performance**

Once you know who your target suppliers are and have set compliance standards, collecting data from suppliers through a simple benchmarking questionnaire or self-assessment will provide you an understanding of your starting point.

Many organizations, such as retailers, major brands and the U.S. Federal Government, have started evaluating the performance of their suppliers through questionnaires and surveys. Increasingly, organizations incorporate all areas included in their code of conduct with special focus and weight in the self-assessments related to areas that are important to their business. Our client work shows that more companies are aligning the content of their assessments with the GRI guidelines and CDP questionnaires. Some sectors, such as the electronics (Electronics Industry Citizenship Coalition Self-Assessment Questionnaire) and pharmaceutical (Pharmaceutical Supply Chain Initiative Self-Assessment Questionnaire) industries, have developed industry wide surveys to reduce the burden on suppliers of responding to multiple requests for information that varies in content and format.

The baseline assessments form the starting point for future programs to improve supply chain sustainability and help assess where the greatest need for improvement exists. For example, Pacific Gas and Electric (PG&E) uses response from the Electric Utility Industry Sustainable Supply Chain Alliance survey to gauge performance of its top tier suppliers on important aspects of environmental performance, including greenhouse gas emissions, energy and water usage, and waste generation. The information is used to compile the environmental metric in the annual scorecards for top tier suppliers and to identify opportunities to partner with suppliers to advance business practices in target areas. Communicating back to suppliers in a constructive way is critical for future engagement and provides encouragement for improvement.

### **4. Develop training and capacity building programs**

This is an important step in improving sustainability and driving behavioral changes throughout your supply chain. Many external resources are available to support these efforts and some are tailored to specific sector needs.

In our experience, one effective way to transfer knowledge across the supply chain is to leverage the best practices and case studies from top performing suppliers at annual vendor conferences, via online training modules and through capacity building campaigns. By showcasing the success stories of selected suppliers, companies not only recognize their efforts but also demonstrate the practical benefits of sustainability initiatives to others in the supply chain. For example, HP has established supplier- and peer educator-run programs that have provided training to a large number of workers. Since the start of their

capacity building program in 2006, HP has carried out 22 training programs in 12 countries on topics such as antidiscrimination, energy efficiency, labor rights and women's health. Through programs conducted jointly with its first-tier suppliers, HP has already trained 155 second-tier suppliers, leveraging the investment and knowledge-sharing efforts dedicated to Tier 1 supplier capacity building.

## **5. Drive performance improvement**

Once supplier baseline performance is understood, an audit program can measure performance improvement over time. While in many cases, the self-assessments are completed by a corporate group, such as EHS, procurement or marketing, onsite audits can reveal local practices, behavioral challenges and practical opportunities for improvement that are difficult to identify through questionnaires alone.

Once your organization implements an audit program, be prepared to act on the findings by developing and executing corrective action plans by clearly communicating the results and your expectations to suppliers, developing a capacity-building program and, if necessary, terminating suppliers if non-compliance persists.

Assessments and audits paired with incentive programs that reward sustainability efforts have a greater ability to drive sustainability performance. Encouraging transparency and selecting or awarding more business to suppliers with stronger sustainability performance can be very effective in driving improvement. Where this is not possible, incentives — greater access to your value chain, such as access to customers or clients — also can be effective.

In an effort to avoid audit fatigue and to provide a common framework for evaluation, some industries have developed common auditing and assessment tools. For example, the Sustainable Apparel Coalition developed the Higg Index, a performance assessment tool for the apparel and footwear industries. The Electronic Industry Citizenship Coalition has developed the validated audit process that covers both social and environmental performance and includes an auditor certification program to drive for further consistency in audits. Chemical companies have formed a joint initiative called Together for Sustainability (TfS), with the mission of developing and implementing a global supplier engagement program that assesses and improves sustainability sourcing practices.

## **6. Join industry collaboration**

Many companies recognize that complex supply chain challenges cannot be solved by individual efforts and that industrywide collaboration is required. Working in a pre-competitive environment, peer companies that share similar supply chains can set common standards and best practices for sustainability performance and allow suppliers to be evaluated on the same metrics. These collaborations help prevent audit fatigue, training redundancy and mountains of paperwork for suppliers working to meet similar requirements from their customers. Working with your industry peers is a great way to share knowledge about the sustainability performance of your suppliers.

The Zero Discharge of Hazardous Chemicals Programme (ZDHC), the Sustainable Apparel Coalition, the Outdoor Industry Association and the American Apparel and Footwear Association are a few examples of industry collaborations in the apparel and footwear sector. CH2M HILL is the program manager for the highly ambitious ZDHC Joint Roadmap, which has grown from six founding brands (adidas Group, C&A, H&M, LiNing, Nike Inc., and Puma SE) into a coalition that includes Esprit, G-Star Raw, Gap Inc., Inditex, Jack Wolfskin, Levi Strauss & Co., Limited Brands, Li Ning, M&S, New Balance Athletic Shoe, Inc., PVH Corp. and United Colors of Benetton. These brands are working together to integrate higher standards of environmental and business practices for their industry by eliminating the use of 11 classes of hazardous chemicals from textile production by 2020.

If you have a more mature supplier sustainability program, your company can do even more:

- Develop and/or deploy robust tracking tools, including software solutions, to monitor supplier performance and improvement over time
- Perform a logistics assessment to determine where sustainability improvements can be made
- Integrate supply chain sustainability criteria into the procurement process
- Create a shift towards supply chain sustainability by leveraging your buying power and influence
- Expand your sustainability goals beyond your direct operations across your supply chain
- Encourage innovation

## **Overview of Supply Chain Sustainability**

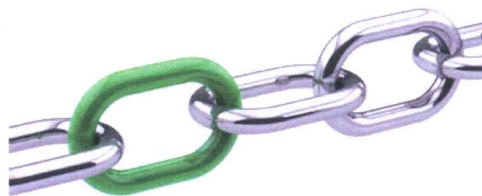
A company's entire supply chain can make a significant impact in promoting human rights, fair labour practices, environmental progress and anti-corruption policies.

However, UN Global Compact participants rank supply chain practices as the biggest challenge to improving their sustainability performance. Extending the UN Global Compact's Ten Principles into the supply chain can be difficult because of the scale and complexity of many supply chains.



The UN Global Compact encourages companies to make sustainability a priority from the top of the organization. If the chief executive sees the supply chain as an extension of their workforce and community, the company can set expectations for best practices across its supply chain. These can include key areas such as selection, training, auditing and remediation.

Doing so promotes a broader understanding within an organization of how decisions made, beyond procurement, can affect the supply chain. For example, legal staff, product developers and marketing all can have an impact. In addition, companies must look at their supply chain as a whole, and consider the suppliers that may have the most significant challenges to address.



To help, the UN Global Compact hosts a website that is a one-stop shop for materials, initiatives and business practices on supply chain sustainability. Additionally, we develop guidance, such as our recent Guide to Traceability and the Practical Guide for Continuous Improvement to assist companies in developing more sustainable supply chain practices. We also host webinars on topics such as SME supplier engagement, gender equality and occupational health and safety in the supply chain.

Because supply chain sustainability is a cross-cutting issue, we apply this work across all four UN Global Compact issue areas (human rights, labor, environment and anti-corruption).

### ***Sustainability Training***

Sustainability training consists of classes, seminars, and literature that teaches business professionals how to behave in an environmentally responsible manner. The goal of most sustainability training is to help companies transition from environmentally destructive practices to neutral or even beneficial behaviors without damaging their profit margins or efficiency. Some business experts consider sustainability training a requirement for business operation in the 21st century; since all business requires a habitable environment, sustainable operating procedures are often considered a critical part of long-term business planning and success.

A business or individual can receive sustainability training through a variety of methods. There are dozens of general guides to sustainable business practices online and through environmental organizations. These guides may contain basic tips applicable to many different types of companies, such as moving toward a paperless office to starting up recycling drives. For small businesses, general guides may be sufficient to significantly reduce environmental impact.

Larger businesses may prefer to receive sustainability training tailored to their company or industry. Environmental consulting groups may offer sustainability training that allows certified professionals to analyze each individual business's sustainability strengths and weaknesses, and work with internal personnel to develop training programs and plans for the future. Industry-wide sustainability training may be available in the form of seminars and large training courses; a company may choose to send a few workers to receive this type of training and allow them to train the rest of the workforce.



Ideally, sustainability training will help a company reduce its environmental impact without damaging business operations. Accomplishing this goal may require company-wide changes in a variety of areas, from material and supply ordering to building maintenance. Some of the topics addressed in sustainability management might include how to make the workplace environmentally friendly, how to improve supply chains to source recycled or environmentally-friendly harvested materials, and how to set sustainability goals for the entire company to achieve. In addition to incorporating sustainable practices into everyday business, training may also cover how to capitalize on these practices to improve a company's reputation, or even increase business.