Preface

INTRODUCTION

Green, or environmentally friendly, often refers to goods and services considered to inflict minimal or no harm on the environment. The world now is at the point to pursue a low carbon development roadmap that would eventually decouple economic growth from greenhouse gas and other polluting emissions, through technological and business innovations. Worldwide, the supply chain sector is among the top 3 largest carbon emission contributors. Supply chain management undoubtedly shall undertake the burden of facilitating this carbon emission reduction by pursuing a low carbon supply chain management practice. The unanimous global pursuit of a sustainable environment has called for advocating the grand challenge of low carbon supply chain management research for business and technology innovation to pave the foundation for a low carbon economy.

Measurement of carbon emissions is broadly adopted as a proxy for quantifying damage to the environment. Low carbon SCM would play a major role in carbon reduction, thus promoting a long term sustainable economy development and well being. The branding value of low carbon development as well as the sustainable development methods would strengthen comparative advantages of environmentally-aware industries, supporting economic transformation by developing a technology rich, high value added, and service oriented, low carbon economy.

Carbon competitiveness is already considered as the critical benchmark of national economic competition. Therefore, supply chain carbon competitiveness will absolutely redefine an economy’s competitive strength.

SUPPLY CHAIN CARBON MANAGEMENT

With growing concern on environmental considerations in supply chain industries, numerous corporations are facing new challenge on carbon management in supply chains. A few of the global companies which provide management services are developing various tools of carbon management. Since carbon management would exert considerable impacts with changes on supply chain activities, effective tools become critical to illustrate and measure the carbon inter-dependencies and inter-impact among activities.

For example, in the supply chain carbon management, it is inevitable to make changes on supply chain activities. Due to these activities having different connections or relationships with each other, some of them would lead to changes to the rest accordingly. In order to measure these changes, it would require tools to model and represent the inter-connection of activities, as well to calculate the impact to the rest
if any activities would change. It is necessary to develop models to represent the inter-connections of supply chain activities and calculate the change impact of carbon intensity caused by carbon management.

**CARBON IMPACT MANAGEMENT**

In supply chain carbon management, all activities could be considered competitive peers to each other, which mean each of them is wishing to fulfill their own objectives by proposing and insisting their demand for their benefit. Is it possible for each of them to reach the maximal total return at the same time? What is the carbon impact to the whole supply chain?

These questions are frequently asked when those supply chain activities are owned or executed by different interested parties respectively. All of them are pursuing the maximal interest in this carbon constrained economy.

If those activities are run by the same party, then not all activities are necessary to reach their biggest gain. It is natural to have a different priority to enforce the carbon impact to the activities in the supply chains when optimizing the carbon impact or de-carbonizing the whole chains.

With the rapid development of carbon accounting technique, a computable tool for carbon impact analysis to supply chain management is becoming viable, although still with considerable barriers ahead.

**ABOUT THIS BOOK**

This book is devoted to examining a range of major issues concerning green finance and sustainability to provide perspectives, clustered into five book sections on emerging environmentally aware business models, regulation and standard development, green ICT for sustainability, green finance and carbon market, green manufacturing, logistics and SCM, and regional low carbon development.

**Section 1: Business Models, Regulation and Standard for Sustainability**

- Chapter 1: *Towards the Transition to a Post-Carbon Society: The Crisis of Existing Business Models?* Sophie Galharret, Laurent Beduneau Wang
- Chapter 2: *Environmental Standardization for Sustainability*, John W. Bagby
- Chapter 3: *Promoting Technological Environmental Innovations: What is the Role of Environmental Regulation?* Jacqueline C.K. Lam and Peter Hills
- Chapter 4: *Quantifying Sustainability: Methodology for and Determinants of an Environmental Sustainability Index*, Kobi Abayomi, Victor de la Pena, Upmanu Lall, Marc Levy

**Section 2: Green ICT for Sustainability**

- Chapter 5: *Greener Data Centres in the Netherlands*, Theo Thiadens, Marko Dorenbos, Andries Kasper, Anda Counoutte-Potman
- Chapter 6: *Information Technology Resources Virtualization for Sustainable Development*, Malgorzata Pankowska
• Chapter 7: *An Introduction to the Green IT Balanced Scorecard as a Strategic IT Management System*, Yulia Wati, Chulmo Koo
• Chapter 8: *A New Recommendation for Green IT Strategies: A Resource-Based Perspective*, Yulia Wati, Chulmo Koo
• Chapter 10: *MSP430 Microcontroller: A Green Technology*, Mala Mitra
• Chapter 11: *Toward a Conceptual Model for Sustainability and Greening through Information Technology Management*, A.T. Jarmoszko, Marianne D’Onofrio, Joo Eng Lee-Partridge, Olga Petkova

**Section 3: Green Finance and Carbon Market**

• Chapter 12: *Price Relationships in the EU Emissions Trading System*, Julien Chevallier
• Chapter 13: *Carbon as an Emerging Tool for Risk Management*, Tenke A. Zoltani
• Chapter 14: *Voluntary Emissions Reduction: Are We Making Progress?*, Robert Bailis and Neda Arabshahi
• Chapter 15: *GHG Emissions from the International Goods Movement by Ships and the Adaptation Funding Distribution*, Haifeng Wang
• Chapter 16: *Emissions Trading at Work: The EU Emissions Trading Scheme and the Challenges for Large Scale Auctioning*, Sabina Salkic, Bernd Mack
• Chapter 17: *A Pragmatic Profile Approach to Evaluating Environmental Sustainability Investment Decisions*, Frank Lefley, Joseph Sarkis

**Section 4: Green Manufacturing, Logistics and SCM**

• Chapter 18: *Green Logistics: Global Practices and their Implementation in Emerging Markets*, Marcus Thiell, Juan Pablo Soto Zuluaga, Juan Pablo Madiedo Montanez, Bart van Hoof
• Chapter 19: *The Impact of Sustainability-Focused Strategies on Sourcing Decisions*, Ozan Ozcan, Kingsley Anthony Reeves, Jr.
• Chapter 20: *Green Logistics and Supply Chain Management*, Darren Prokop
• Chapter 21: *Greener Transportation Infrastructure: Theoretical Concepts for the Environmental Evaluation of Airports*, Jean-Christophe Fann, Jasenka Rakas
• Chapter 22: *A Conceptual Model for Greening a Supply Chain through Greening of Suppliers and Green Innovation*, H. K. Chan, T.-Y. Chiou and F. Lettice

**Section 5: Regional Development**

• Chapter 24: *The Impact of Electricity Market and Environmental Regulation on Carbon Capture & Storage (CCS) Development in China*, Zhao Ang
LOOKING FORWARD

At present, low carbon development has been penetrating into various disciplines, becoming pervasive. This low carbon trend has been arousing interests from all kinds of people, including politicians, business professionals, and academic researchers, originating from the environmental movement, towards national strategy and policy worldwide.

However, practice and adoption of low carbon technology in business or industry are not smooth. Low carbon is often associated with terms like more capital expenditure and less operation efficiency. Thus, while low carbon development is an important matter, sustainability now has to move beyond environmental concerns to a holistic view, over emerging business models, low carbon and clean technologies, technology access and finance, and policy and regulations.

I believe this book appears at the right time. I genuinely hope it will bring insights and enlarge your view into this urgent field.

Zongwei Luo