DOCTORATE IN BUSINESS ADMINISTRATION

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INTEGRATION OF GREEN HUMAN RESOURCE MANAGEMENT & GREEN SUPPLY CHAIN MANAGEMENT IN SMALL & MEDIUM ENTERPRISES

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Abstract

Over the last decade, global warming and climate change have been the most pressing issues for our world. With increasing customer demand, social expectations and regulatory pressure for companies to go green, this research aims to establish a better understanding on the impacts of integration between green human resource management (GHRM) and green supply chain management (GSCM) for small and medium enterprises (SMEs) in green adoption. The proposed study introduces an integrated GHRM-GSCM conceptual framework, using exploratory case study methodology to collect information from ten different SMEs in the manufacturing industry based in China, Taiwan and Thailand. The information collected from the case studies is to determine the impacts of GHRM on the successful implementation of GSCM in SMEs, as well as to have a better understanding of key factors impacting the adoption of GSCM in SMEs of different countries/markets.

The results from this study will provide valuable managerial and theoretical contributions to be used by SME business owners and business managers, policy makers and academic researchers to further enhance the development of new green management knowledge so as to better support the growth of SMEs in Asia. Despite limitations of size and resources, the research findings show that many SMEs in Asia have implemented some forms of green practices in GSCM so as to overcome different barriers encountered in operations. This research also indicates that integrating people-related green practices is critical to mitigate operational challenges such as hiring difficulty, high operating costs and lack of green awareness of older employees and foreign workers.

Keywords: Green Human Resource Management, Green Supply Chain Management, Small & Medium Enterprises.

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Table of Contents

Abstract…… II
Acknowledgement……III
Table of Contents ……..……..……IV
List of Tables……..……VII
List of Figures……VIII
1. INTRODUCTION……1
1.1 Overview.....…..1
1.2 Background……..…2
1.2.1 Green Supply Chain Management (GSCM)……..……3
1.2.2 Green Human Resource Management (GHRM)……3
1.3 Research Objectives…..…….. 4
1.4 Research Questions……...4
1.5 Originality and Significance……...5
1.6 Research Methodology……..6
1.7 Structure of Dissertation……..……...6
2. LITERATURE REVIEW & PROPOSED RESEARCH FRAMEWORK……..9
Part 1: Corporate Sustainability & Green Supply Chain Management
2.1 Corporate Sustainability...……...……10
2.2 Green Supply Chain Management (GSCM)…… 12
2.2.1 Challenges in Green Supply Chain Management…… 19
2.3 Theoretical Discussions on Drivers & Challenges ……..…….……..…….. 20
2.3.1 Institutional Theory…….20
2.3.2 Stakeholder Theory……23
Part 2: Integration between Green SCM and Green HRM
2.4 Green Human Resource Management (GHRM) ……..…….28
2.5 Proposed Conceptual Framework - Integrating GHRM with GSCM ……..…….32
2.6 Major Challenges in GSCM Adoption……40
Part 3: Small & Medium Sized Enterprises (SMEs)
2.7 Definition of SME……..43
2.8 Theoretical Discussion on SME……..……..45
2.8.1 The Firm Size……...…..45
2.8.2 Resource-Based View……..46
2.9 Environmental Standards and Certification……..49
2.9.1 ISO-14001……...51

2.9.2 Carbon Trust Standard (CTS)……..51
2.9.3 The Eco-Management and Audit Scheme (EMAS)……..52
2.10 Summary……..54
3. RESEARCH METHODOLOGY……55
3.1 Introduction ……...……55
3.2 Research Questions……55
3.3 Research Paradigms …...……...56
3.4 Descriptive Research……...58
3.4.1 Case Study……..…58
3.4.2 Target Selection in Case Studies ..……61
3.5 Qualitative Data Collection Methods ..……65
3.5.1 Questionnaire ..……66
3.5.2 Focus Group……...66
3.5.3 Observation……67
3.6 Pilot Study……..68
3.7 Data Analysis……69
3.7.1 Thematic Analysis……...70
3.7.2 Research Quality……71
3.8 Summary & Conclusion……...73
4. DATA ANALYSIS & INTERPRETATION ..……..75
4.1 Introduction……75
4.2 SMEs involved in Case Study Research……...75
4.2.1 Case Studies in Taiwan ……...……76
4.2.1.1 UWin Nanotech……...77
4.2.1.2 EER……...79
4.2.1.3 RDH....……....80
4.2.2 Case Studies in China……...82
4.2.2.1 BYM ...……...……..82
4.2.2.2 SDA ...……...……...……..83
4.2.2.3 YDL ……...……...……...…..85
4.2.2.4 YHS……...86
4.2.3 Case Studies in Thailand……...87
4.2.3.1 UFC……...88
4.2.3.2 TFC……90
4.2.3.3 THI……91
4.3 Data Analysis……92

4.3.1 What are the main motivations for SMEs to implement green management practices in selected Asian markets?.....93
4.3.2 What are the common green supply chain management practices used in SMEs in selected Asian markets?.....98
4.3.3 What are the main barriers/challenges in implementing GSCM for SMEs in selected Asian markets?.....114
4.3.4 Based on information interpreted from research question (4.3.3), what are the mitigations adopted by SMEs to overcome the identified barriers by integrating GHRM and GSCM?.....131
4.3.5 What are the benefits & challenges of integrating GHRM & GSCM?.....145
4.4 Conclusion ……...……...……...150
5. DISCUSSION & CONCLUSION……..……..152
5.1 Introduction……..……152
5.2 Summary of Research Findings……..……152
5.3 Enhancements of Research Framework……...……...….156
5.4 Managerial Contributions and Recommendations……..……159
5.5 Theoretical Contribution in Green Management……..……...…….165
5.6 Research Limitations……....……...……168
5.7 Recommendations for Future Research……..……...……..…..169
5.8 Final Remark……..……171
REFERENCES……..……...……..173
APPENDIX 1.0 – Research Survey Questionnaire (English)…….....….197
APPENDIX 2.0 – Research Survey Questionnaire (Chinese)…….....…201
APPENDIX 3.0 – Case Study Descriptions…….....206

List of Tables

Table Description	Page No.
Table (2.1) - Apple's IPhone supply chain suppliers	**13**
Table (2.2) - Literature on Drivers and Pressures on Green SCM Adoption	**28**
Table (2.3) - Basic HRM functions and proposed ways to support green management	**32**
Table (2.4) - Literature on the impacts of HRM on SCM	**34**
Table (2.5) - Previous research on GSCM and GHRM in other countries	**38**
Table (3.1) - EPI and GDP of Taiwan, China and Thailand	**61**
Table (3.2) - List of SMEs Selected in this Research	**65**
Table (3.3) - Arrangement of Data Collection	**66**
Table (4.1) - Basic information on ten SMEs involved in case study	**76**
Table (4.2) - Classification of SMEs in Thailand	**88**
Table (4.3) - Main Drivers in Green SCM Adoption of SMEs	**94**
Table (4.4) - Classification of Main Drivers in Green Adoption of SMEs	**97**
Table (4.5) - GSCM Practices Recorded in Case Studies	**100**
Table (4.6) - GSCM Practices under Different SCM Buckets	**101**
Table (4.7) - GSCM Practices Implemented by SMEs	**103**
Table (4.8) - Challenges/Barriers as identified by SMEs	**127**
Table (4.9) - Major Challenges Recorded During Ten Case Studies	**128**
Table (4.10) - GHRM practices implemented by the SMEs	**132**
Table (4.11) - GHRM practices adopted by individual SMEs	**132**
Table (4.12) - Mitigation of challenges by relevant GHRM practices	**144**
Table (4.13) - Challenges & benefits in integrating GHRM and GSCM	**148**
Table (5.1) - Mitigations used by SMEs to overcome respective challenges	**155**
Table (5.2) - Breakdown of GDP for All Regions	**165**

List of Figures

Figure Description	Page No.
Figure (2.1) - A generic form of forward/reverse logistics	**19**
Figure (2.2) - A Proposed Research Framework on the integration of GSCM and GHRM	**39**
Figure (2.3) - Internal and External Process for EMAS	**53**
Figure (3.1) - Research Process Flow Chart	**55**
Figure (4.1) - Organizational structure of UWin Nanotech	**78**
Figure (4.2) - Organizational structure of EER	**80**
Figure (4.3) - Organizational structure of RDH	**81**
Figure (4.4) - Organizational structure of BYM	**83**
Figure (4.5) - Organizational structure of SDA	**85**
Figure (4.6) - Organizational structure of YDL	**86**
Figure (4.7) - Organizational structure of YHS	**87**
Figure (4.8) - Organizational structure of UFC	**89**
Figure (4.9) - Organizational structure of TFC	**91**
Figure (4.10) - Organization structure of THI	**92**
Figure (4.11) - GSCM Practices by Frequency	**102**
Figure (4.12) - GHRM Practices by Frequency	**133**
Figure (5.1) - Enhanced Research Framework for Future Study	**158**
Figure (5.2) - Managerial recommendations for business owners and policy makers on green adoption for SMEs	**159**

SKEMA Business School, the Business Science Institute, and the iaelyon School of Management, Jean Moulin University do not intend to give any approval or disapproval to the opinions expressed in this thesis. These opinions must be considered as specific to its author.

Chapter 1
Introduction

1.1 Overview

Over the last ten years, due to increasing customer demand, social expectations, employees' perceptions and regulatory pressure for companies to pursue environmental sustainability, the domain of green management has gained increasing attention around the world. Many studies have looked at green adoption in large corporations in developed economies. However, this research aims to establish better understanding of the impacts of integration between green human resource management (GHRM) and green supply chain management (GSCM) for small and medium sized enterprises (SMEs) in environmental conservation. The proposed study introduces an integrated GHRM-GSCM conceptual framework, which is considered a new direction in the field of green management research. This research uses exploratory case study methodology to gain new understanding about SMEs in the manufacturing industry based in China, Taiwan and Thailand on the adoption of GSCM. The information collected from this research is to assess the mitigating effect of GHRM on the successful implementation of GSCM in SMEs, as well as to have better understandings on key factors impacting the adoption of GSCM for SMEs in different Asian markets. The findings will be useful for SME business owners and managers, policy makers and researchers, enhancing further development of new green management knowledge so as to better support green adoption by SMEs in Asia.

This chapter presents an overview of the research project with a summary of the key concepts used in the study, followed by research objectives and research questions. The final section of the chapter is an outline description of the structure of this research dissertation.

1.2 Background

According to a report published by United Nations (2019), the year 2019 is set to be the hottest year on record. Global warming due to carbon emissions and environmental pollution has been getting worse each day due to increasing industrialized activities as well as irresponsible human behaviour.

There has been increasing attention on reduction of greenhouse gas emission globally with increased regulatory control by governments around the globe. A new domain of business management practice has emerged rapidly over the last ten years, Sustainability and Environmental Management, which is at the heart of tackling climate change and has fast become a central part of today's global business environment. With increased focus from customers and shareholders, many multinational corporations have started to publish annual reports on sustainability focusing on carbon reduction. However, it is still uncommon for small and medium enterprises (SMEs) to embark on similar initiatives due to practical constraints and limitations. Since it is well known that SMEs play a significant role in creating employment opportunities as well as contributing to the local economy growth in most countries, it is necessary for academic researchers globally to devote more efforts into researching the domain of green management for SMEs.

Supply chain management (SCM) is one of the most important domains of research in the academic world. It is also a significant management practice in the industry for improved cost efficiency, overall company performance and positive customer experience. The expression of SCM was first used in 1982 by Oliver and Webber, two consultants in logistics, in a book coordinated by Professor Martin Christopher (Oliver & Webber, 1992). Over the years, there have been many studies on the connection between supply chain management and human resource management (HRM). Many of them have indicated an important linkage between HRM and SCM to improve overall company performance (Ellinger & Ellinger, 2014; Lengnick-Hall et al., 2013; Gowen & Tallon, 2003; McAfee et al., 2002). Likewise, this research attempts to explore a similar linkage between green SCM and green HRM by conducting extensive

case studies on ten different SMEs from three Asian economies – Thailand, China and Taiwan.

In the following section an introduction of the key concepts and theories relevant to this research is presented:

1.2.1 Green Supply Chain Management (GSCM)

There have been different green management practices developed over the last ten years, some of them having tangible impacts on the day-to-day management of businesses. With the growing attention on environmental sustainability in the 21st century, GSCM is gaining traction among practitioners and researchers of supply chain and operations management (Akkucuk, 2015). The increasing significance of GSCM is driven mainly by the worsening environmental conditions, e.g. unbearable air pollution, diminishing raw material resources and overflowing dumping sites (Kumar & Chandrakar, 2012). GSCM, also referred to as Sustainable Supply Chain Management (sSCM), can be defined as "green procurement + green manufacturing + green distribution + reverse logistics" (Ninlawan et al., 2010). According to Hervani et al. (2005), "the idea of GSCM is to completely remove or minimize waste (solid wastes, energy, chemical/hazardous, emissions) along supply chain". Gilbert (2000) also asserted that GSCM involves traditional SCM practices integrating environmental related criteria or considerations into the purchasing decision-making process of the organization and long-term relationships with vendors and suppliers.

1.2.2 Green Human Resource Management (GHRM)

Human resource management has been around for many years and it is an important management domain helping organizations to manage employees so as to achieve goals and objectives as a team. Due to the real threat of earth warming because of climate change, more and more organizations have started to plan for environmental sustainability. This has triggered a need to prepare their employees with knowledge of environmental conservation as well as behaving responsibly for the environment. Green HRM can be defined as the application of human resource practices to enhance environmental

performance of a company (Renwick et al., 2013; Jackson & Seo, 2010) and as well as to support “the creation of a green workforce, who understands, appreciates, and practices ecological initiatives” (Ahmad, 2015).

1.3 Research Objectives

With the aim of contributing to the new knowledge of green management and environmental sustainability for SMEs, this research will seek to study the commonly implemented green practices under GSCM and GHRM, so as to identify the impacts and motivations on the overall adoption of green management on SMEs in selected Asian economies. The objective of this research also includes the investigation of the major barriers impacting the successful implementation of green SCM as well as how to mitigate these barriers by integrating green HRM into green SCM. The following is a summary of research objectives of this study:

a) To contribute to the new knowledge of green management and environmental sustainability in SME management
b) To investigate the key drivers for SMEs to go green in their supply chain
c) To investigate the major challenges that affect the adoption of GSCM for SMEs
d) To evaluate the interrelationship of GHRM and GSCM in order to assess the benefits and mitigating effects to overcome the major challenges for successful green adoption.

1.4 Research Questions

In order to successfully achieve all these research objectives, it is necessary to answer the following research questions:

1) What are the main motivations/drivers for SMEs to implement green management practices in selected Asian markets?
2) What are the common green supply chain management practices used by SMEs in selected Asian markets?
3) What are the major barriers/challenges to implementing GSCM by SMEs in selected Asian markets?

4) Based on information received from (3), what are the mitigations adopted by SMEs to overcome the identified barriers by integrating GHRM and GSCM?
5) What are the benefits and challenges of integrating GHRM and GSCM?

1.5 Originality and Significance

It is easy to search research literature on supply chain management or human resource management. There are also large volumes of studies linking HRM to SCM with applications in different industries globally. However, there is very limited research on the integration of Green HRM and Green SCM (Teixeira et al., 2015; Nejati et al., 2017; Zaid et al., 2018; Longoni et. al; 2018). Furthermore, there was no similar field study on integration between GHRM and GSCM in SMEs for Asian countries during the time this research was commissioned. In addition, unlike other research on the application of green management in global MNCs such as studies by Coca Cola and Eastman Chemical (Hasan, 2013); Ikea (Business Case Studies, 2014); Walmart (Heying, 2009), Hitachi and Toshiba (Cortez & Cudia, 2011), this research takes a different approach and attempts to study the impacts and relationship of the proposed integrative GHRM-GSCM research framework for SMEs in multiple Asian markets - China, Taiwan and Thailand.

This proposed study is consistent with the recommendation of Pagell and Shevchenko (2014) and Jabbour and de Sousa Jabbour (2016), who called for future research to assess the consistency and legitimacy of the integrated GHRM-GSCM framework through qualitative investigation such as interviews and multiple case studies.

This study makes both theoretical and managerial contributions by examining the interface between GHRM and GSCM. More specifically, it examines the mitigating effects of GHRM functions on GSCM. The findings will not only help researchers to better understand the interrelationship of these two important management domains in environmental sustainability, but will also guide business owners and managers working in SMEs making constant adjustments in GHRM and GSCM practices to achieve desired objectives and goals.

1.6 Research Methodology

This study of the integration between GHRM and GSCM for SMEs is of an exploratory nature. The direction of this research is post-positivism with the objective of adopting an open-minded approach to uncover rich information on green management and environmental sustainability under SME management. Hence, the qualitative research method is selected in this study and multiple case study is used with the application of focus group discussions, onsite observations and face-to-face interviews.

The selection criteria for the three Asian economies (Thailand, China and Taiwan) are based on multiple factors: size of GDP, Environmental Performance Index (EPI) and ease of access to data collection. All ten SMEs selected to participate in this research must have received full certification on ISO-14001, which is one of the most widely accepted environmental management systems available today. As this research is focusing on supply chain management, it is necessary for the selected companies to have manufacturing activities in the factory.

All information collected during the case studies is to be analyzed using thematic analysis. Five steps to be carried out systematically under thematic analysis on the data are: 1. familiarizing with the data, 2. generating initial codes, 3. searching for themes, 4. reviewing themes and 5. defining and renaming themes. Detailed discussions on the research methodology will be presented in Chapter 3.

1.7 Structure of Dissertation

This doctorate dissertation starts with the first chapter of introduction that covers background, research objectives and questions, research methodology and the structure of dissertation of each subsequent chapter:

Chapter 2 – Literature Review

This is an important chapter where the researcher reviews all available research carried out by other scholars on the topics of green management and SME management. The key concepts covered in this chapter are corporate

sustainability, green supply chain management, green human resource management, institutional theory, stakeholder theory, small and medium sized enterprises, environmental standards and certifications.

Chapter 3 – Research Methodology

In Chapter 3, a detailed discussion on the research methodology is presented. This is a vital chapter providing justification for the choice of the research methods used in this project in addition to the approaches in data analysis so as to produce a high quality doctoral research. The key concepts reviewed in this chapter are research paradigms, qualitative research, case study, qualitative data collection, pilot study, data analysis, thematic analysis, validity, reliability and generalizability.

Chapter 4 – Data Analysis & Interpretation

Ten different SMEs from Thailand, China and Taiwan were selected and agreed to take part in this research. On-site visits with face-to-face focus group discussions were conducted to collect as much data and information as possible relevant to this research. In this chapter, each company is presented with a basic background introduction and its organizational structure.

This chapter also presents findings of this research after conducting detailed data analysis and interpretation to answer the respective research questions. Relevant research areas covered in this chapter are the most commonly adopted green practices in GSCM and GHRM in the ten case studies, major challenges in implementing GSCM, challenges and benefits of integrating GHRM and GSCM and main motivations (drivers) for SMEs to go green. Cross-market analysis is also carried out in this chapter to identify any unique observations from SMEs located in different markets, which are likely to be influenced by the local business and regulatory environment.

Chapter 5 – Discussion & Conclusion

This final chapter carries out self-reflection and in-depth discussions on areas such as suggested enhancements of the conceptual research model, theoretical research contributions, managerial implications and

recommendations, challenges and research limitations and recommendations for future research.

Chapter 2

Literature Review & Proposed Research Framework

The main objective of conducting a literature review in an academic research is to gain in-depth understanding of the on-going research and debates of a given field or specific area of study, and to present the review in an organized and systematic manner for scholastic reporting (Western Sydney University, 2017).

In this chapter, a comprehensive literature review is carried out to understand more about relevant key concepts and trends in the domain of environmental sustainability. Google's search engine was used initially to scan through any latest research activities and theoretical frameworks in the fields of corporate sustainability, green supply chain management and green human resource management. Popular online research databases such as Emerald Insight, Science Direct, ProQuest, EBSCO and MDPI were used extensively to retrieve the latest research papers related to the relevant key concepts.

According to the pre-determined research objectives, this chapter is set up to discuss in detail under four sections: corporate sustainability, green management strategies, proposed conceptual frameworks and SMEs that are relevant to the research study. Corporate sustainability is a relatively new domain in corporate management in recent years related to Corporate Social Responsibility (CSR). It covers three different dimensions of Social, Economic and Environmental. Green management is a subset of corporate sustainability and it is the main research theme in this project with two different categories, Green Supply Chain Management (GSCM) and Green Human Resource Management (GHRM), coming together as an integrated framework to enhance the adoption rate of GSCM by SMEs.

Part 1: Corporate Sustainability & Green Supply Chain Management

2.1 Corporate Sustainability

Over the last 20 years, a growing number of enterprises have voluntarily integrated social and environmental measures into their business models and day-to-day operations through the adoption of relevant corporate policies in sustainability (Eccles et al., 2011). Today, companies big and small are expected to go beyond the narrow and short-term financial focus, and expand into encompassing economic, environmental, and social sustainability (Haffar & Searcy, 2017).

As one of the most important growth engines of the world economy, the manufacturing sector has accounted for about 16% of global GDP based on one study by McKinsey (2012). However, the manufacturing sector is also a major industry creating negative impacts on the environment and other social dimensions. In order to tackle the negative impacts caused by the manufacturing industry, a new management research domain, the concept of Corporate Sustainability (CS), has been introduced over the last ten years. It "seeks to translate sustainable development into the corporate level, and is a key approach from which to better align and understand how the manufacturing sector can contribute to sustainable outcomes" (Schrippe & Ribeiro, 2019; Ashrafi et al., 2018). Corporate sustainability is a sub-category of the macro-level of Sustainability Development as formally introduced by the United Nation's World Commission on Environment and Development in 1987 as "an agenda to examine and guide the global environment and development" (Acquaye, 2017).

In general, Corporate Sustainability has three different dimensions: Economic, Social and Environmental (GRI, 2018). These dimensions cover many of the challenges we face in today's world such as unemployment rate, climate change, income disparity, deforestation, human rights violation, gender inequality, child labour, etc. Many global companies have started to publish a Corporate Social Responsibility (CSR) report annually in order to report on their

works and achievements in these three different sustainability buckets; some good examples are 3M, Philips and Timberland (Godelnik, 2012).

There is continuous debate on the importance of corporate sustainability to business enterprises. This is especially critical for less developed countries due to lower Gross Domestic Product (GDP), corruptions, poor legal systems and enforcement and lower standards of living (Mteki et al., 2017). These problems are causing enterprises to overlook the importance of sustainability by only focusing on profitability, making it challenging to implement corporate sustainability in emerging economies (Cobbinah et al., 2015).

Although incorporating sustainability into corporate governance is getting increasing attention in many developed countries in recent years, there are still major challenges to the adoption of sustainable practices in many companies. Perera and Putt del Pino (2013) provide the following barriers to adoption of corporate sustainability:

a) Improved environmental sustainability is not valued in internal capital allocation decisions.
b) The goals of corporate sustainability teams and financial teams are not well-aligned.
c) Companies lack metrics to account for external environmental costs.
d) Environmental factors, such as climate change and water scarcity, are not being fully integrated into long-term business strategy.

One major challenge that is actively being researched in the academic world is the measurement of the total sustainability of an organization. There is a high degree of complexity in the measure of total sustainability due to multiple dimensions of this concept (Moldavska, 2017). Although there are some recommended KPIs (such as the Dow Jones Sustainability Index) being developed to try to assess the total level of sustainability (Robinson et al., 2011), it is argued that each of the three dimensions of sustainability should be measured separately in order to provide better information for operational decision making (Alshehhi et al., 2018).

Even though there are three different dimensions under corporate sustainability (economic, social and environmental) in this research, the focus of sustainability is only on environmental sustainability. As is commonly known, climate change is the world's biggest threat based on a global survey conducted by Pew Research (2019), it is necessary for scholars to devote more time and resources to explore ways to reduce global warming on business entities before it is too late.

As related to corporate sustainability, Corporate Social Responsibility (CSR) is “a type of international private business self-regulation that aims to contribute to societal goals of a philanthropic, activist, or charitable nature by engaging in or supporting volunteering or ethically-oriented practices” (Lee & Kotler, 2013). Increasingly, CSR has been used as a corporate strategy “which is closely associated with financial and competitive performance goals” (Lee, 2008). According to McWilliams and Siegel (2001), many firms have used CSR as “a strategic resource to improve the bottom line performance of the corporation”. In addition, CSR is generally perceived as “a strategic initiative that contributes to a brand's reputation” (Johnson, 2019).

Based on the recent research, a few scholars have affirmed that “CSR and the efficient management of the supply chain generate significant quantitative and qualitative benefits for businesses” (Hanh, 2012; Müller et al., 2017; Graafland, 2018). Similarly, in a study done by R. Geng et al. (2017), the results of their meta-analysis indicate that the green SCM practices lead to “better performance in three aspects: economic, environmental, and operational”. Therefore, the following discussion is devoted to Green Supply Chain Management (GSCM) which is a key strategy under corporate sustainability and is now gaining rapid momentum in the manufacturing industry around the globe contributing to positive impacts to the enterprises.

2.2 Green Supply Chain Management (GSCM)

Supply Chain Management (SCM), as an important strategy for companies, has been around for decades. The concept of SCM was first mentioned in an article featured in the Financial Times during the 1980s (Handfield & Nichols, 1999)

and gradually, it has gained popularity in operations management over the years.

In recent years, due to increasing pressure from investors to reduce operating costs and increase business revenue year over year, many major listed companies have started to move their operations overseas. However, many researchers have asserted that managing a global supply chain is far more challenging than managing a supply chain within a domestic market (MacCarthy & Atthirawong, 2003; Wood et al., 2002). Such a trend has caused a fragmentation of supply chain activities that involved many players in different countries jointly producing one final product for consumers. The following is one good example from Apple's IPhone supply chain suppliers (Lockamy, 2017):

Suppliers	Location
Hon Hai Precision Industry Co.	Taiwan
Pegatron Corp	Taiwan
Quanta Computer Inc.	Taiwan
Samsung Electronics	South Korea
LG Display Co. Ltd.	South Korea
Sharp Corp.	Japan
Compal Electronics	Taiwan
Taiwan Semiconductor	Taiwan
Jabil Circuit Inc.	USA
Schneider Electronics	Germany
Gungho Online Entertainment	Japan
Japan Display Inc.	Japan

Table (2.1) Apple's IPhone supply chain suppliers (Lockamy, 2017)

This example (Table 2.1) clearly illustrates the globalized nature of Apple's supply chain activities which spread across multiple continents around the world. This is very common for many major global corporations as it is impossible to source all parts and materials and produce the products entirely in one location. It is also important to take note that many of these major suppliers also outsource portions of their production to smaller sub-contractors in order to better manage their costs as well as enhance operational agility (Somuyiwa et al., 2011). This globalized trend of supply chain management has thrust millions of SMEs into an integral part of an ecosystem with a big impact in economic contribution.

In the past century, the global economy has been growing at a rapid pace. According to data from the World Bank (Roser, 2019), the total output of the world economy was merely at USD 3.42 trillion in 1900. However, it was about USD 108 trillion in 2015, an astounding expansion of 32 times over 120 years. Rapid economic growth not only creates an abundance of opportunities for everyone and transforms the lives of millions in developing countries, it also has severe negative impacts on our living environment.

Over the last two decades, while facing increasing challenges in global warming and environmental pollution, more and more governments in different countries have introduced new environmental regulations to mitigate negative impacts on our environment. Similarly, with enhanced environmental awareness in consumers, employees and the community, firms are under intense pressure to introduce green management strategies to ensure minimum environmental impacts due to their business activities.

"Green management refers to the integration of enterprise behavior and environmental consciousness" (Backer, 2002). Under Green Management in the company, environment-related measures could be incorporated into product design, sales and marketing, accounting, purchasing, production, logistics and all other areas to ensure these business activities will not cause any negative environmental impacts. In general, the three "Rs" strategy is used in all business activities in order to go green: Reduce, Re-use and Recycle

(Yadav & Shankar, 2015). This three “Rs” strategy will help to reduce carbon emissions and environmental pollution due to waste produced during economic activities. Relentless pursuit of the three “Rs” will help to reduce deforestation and over consumption of natural resources that are the main causes of global warming.

Focusing on environmental sustainability of the manufacturing sector, the most relevant green management strategy adopted by manufacturers is Green Supply Chain Management (GSCM). With the growing attention on environmental sustainability in the 21st century, GSCM is gaining increasing traction among practitioners and researchers of supply chain and operations management (Akkucuk, 2015). The growing significance of GSCM is driven mainly by the worsening environmental conditions, e.g. unbearable air pollution, diminishing raw material resources and overflowing dumping sites (Kumar & Chandrakar, 2012). Also called Sustainable Supply Chain Management (sSCM), it is defined as “green procurement + green manufacturing + green distribution + reverse logistics” (Ninlawan et al., 2010). According to Hervani et al. (2005): “the idea of GSCM is to completely remove or minimize waste (solid waste, energy, chemical/hazardous, emissions) along supply chain”. Gilbert (2000) also asserted that GSCM involves traditional SCM practices integrating environmental related criteria or considerations into the purchasing decision-making process of the organization and long-term relationships with vendors and suppliers.

A study conducted by Bowen et al. (2001) identified three different types of green supply chain: “greening the supply process, product-based green supply, and advanced green supply”. To further illustrate the different types of green supply chain:

1. “The first type of green supply is based on environmental considerations which include collecting and analyzing environmental information on performance.
2. The second type is on the changes in the product’s inputs such as use of raw materials, packaging and recycling which requires close coordination with suppliers.

3. Finally, the third type of green supply consists of proactive measures such as technology programs partnering with suppliers" (Bowen et al., 2001)

To understand more about GSCM, it is necessary to explore the four basic components as outlined by Ninlawan et al. (2010):

(a) Green Procurement

In general, procurement includes the process of selecting suppliers, negotiating payment terms, strategic evaluation, establishing of contracts and actual purchasing of goods. Because of the environmental concerns, green procurement has become top priority for many organizations (Geng & Doberstein, 2008). Green procurement incorporates environmental performance criteria into the conventional procurement mechanisms (Giudice et al., 2006). Looking at the available literature, there are different definitions of green procurement. Based on Blome et al. (2014), three different categories have been identified similar to the traditional research stream on procurement:

(1) The focal firm adjusts its demand to greener products on the supply side (e.g. design of products for disassembly, recycling);

(2) The focal firm tries to increase its environmental performance by selecting suppliers delivering greener products in a greener manner (e.g. waste reduction of supplier, ISO certificates); or

(3) The focal firm works collaboratively with the supplier to improve green performance (e.g. joint planning activities, supplier development with the help of the focal firm)

(b) Green Manufacturing

Green Manufacturing is defined as "the process of designing, manufacturing, delivering; and disposing of products that produce minimum negative effects on environment and society and are economically sustainable" (Mittal & Sangwan, 2014); in other words, manufacturing that minimizes waste and pollution. The goals of eliminating pollution and waste are often achieved through product and

process design (Thomas, 2001). Asefeso (2013: 119) offered a more concise definition of Green Manufacturing:

> *"The term "green" manufacturing can be looked at in two ways: the manufacturing of "green" products, particularly those used in renewable energy systems and clean technology equipment of all kinds, and the "greening" of manufacturing — reducing pollution and waste by minimizing natural resource use, recycling and re-using what was considered waste, and reducing emissions"*

Many large MNCs around the world are conscious of forthcoming overseas (Europe & Japan) environmental controls and the increasing demand from customers for environmentally friendly products or services. These large corporations have started to respond proactively, examples include Toyota, Adidas, Nissan and Ikea. Some companies have embraced the notion that green products and green production techniques can in fact enhance the competitive edge of the organization. But for those smaller manufacturers, they are still failing to acknowledge and address the environmental concerns of consumers and governments (Dutt, 2016).

(c) Green Distribution

Green distribution or green logistics is greening of logistics and distribution with the integration of environmental measures to minimize the environmental impact of logistics activities, together with the overall management of transportation and warehousing operations (Fahimnia et al., 2015).

Green logistics management is a direct reflection of organizational ability on waste elimination, resource conservation and operational efficiency improvement to meet social expectations in protecting our environment. According to Ramanathan and Yun (2009); "beside internal activities such as product design and development as well as manufacturing processes, managing physical product flows is considered crucial for environmental sustainability from the logistics and global business perspectives". However, due to globalization and increasing pressure to reduce business costs, many companies relocate their manufacturing activities offshore to low-cost locations

which increases the complexity of logistics and distribution: this is contributing to added challenges in the greening of logistics operations from a global perspective.

(d) Reverse Logistics

Reverse logistics has gained increased popularity in academic research since the 1990s. It is a complex process that comprises of “all recovery actions in which a company obtains economic benefit directly or indirectly” (Fleischmann, et al., 1997). According to Chan et al. (2012), reverse logistics has become a necessary business process because of product recall, end of life or after sales warranty for most products and industries. A more detailed definition of reverse logistics is “the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods, and related information from the point of consumption to the point of origin for the purpose of creating or recapturing value, or proper disposal” (Rogers & Tibben-Lembke, 1999). According to Lee and Lam (2012), reverse logistics can “positively affect the company’s economic, social and environmental sustainability by recapturing value remaining in the returned product”. Similarly; reverse logistics has become more and more important because many organizations, whether they are big or small, are constantly under increasing pressure from various stakeholder groups such as; shareholders, customers, employees, suppliers, supply chain partners, government agencies, nonprofit organizations and the community (Vachon & Klassen, 2006) due to continuous concerns on environmental pollution created by their products or services. One good example is the lithium battery used in electronics products such as laptops and mobile phones. Some established global brands such as Apple, Microsoft and Motorola (Clancy, 2015) have already set up reverse logistics operations in major cities in order to recycle electronic waste due to their products.

Reverse logistics (Fig. 2.1) can be very costly for any enterprise; however, there are various factors or drivers for companies to engage reverse logistics in their supply chain. Ranade (1999) suggested that marketing, economic and regulatory control are the most common drivers for implementing reverse logistics and Ravi et al. (2005) identified that economic, legislation corporate

citizenship and environmental related issues are the key motives for investing in reverse logistics.

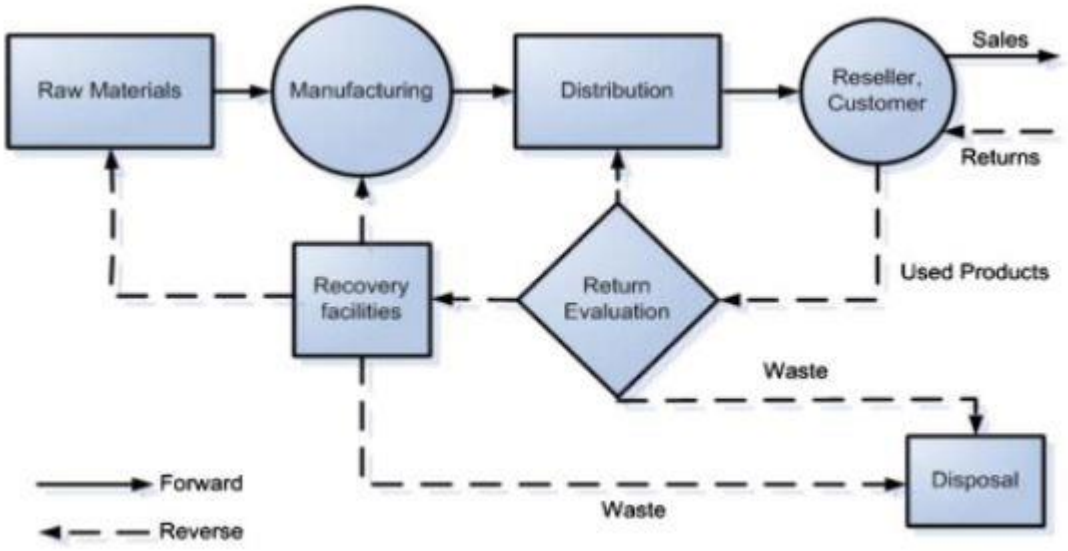

Figure (2.1) A generic form of forward/reverse logistics (Tonanont et al., 2008)

2.2.1 Challenges in Green Supply Chain Management

As GSCM is a subset of sSCM, in a study conducted by Abbasi and Nilsson (2012), they have classified five major challenges of sSCM that are also relevant to GSCM: “increasing costs, operationalization of sustainable development, changing cultures and mindsets, strains in control and management of uncertainties and tradeoffs as well as the complexity of problems”.

Walker et al. (2008) also discussed the conflict in the adoption of GSCM. They have discovered that cost could be the most challenging barrier since most customers are always looking for lower priced products and this is going against the green purchasing mindset as recommended under GSCM.

In a comparative study conducted by Pereseina et al. (2014), there is a big conflict on many enterprises in the struggle between short term economic gains versus long term environmental damage and economic growth in the pursuit of GSCM. This can only be the rationale according to the norms and values in that particular society.

Another challenge that is getting increasing attention is the confusion of too many different environmental reporting requests from different stakeholders (Chaffee, 2010). As local government as well as environmental authorities in overseas markets are looking for environmental metric reporting, manufacturers are overwhelmed with many different requests that can be extremely costly to cope with. To understand more about how these challenges are being induced and triggered, it is necessary to analyze them by using established theories in the domain of organizational studies.

2.3 Theoretical Discussions on Drivers & Challenges

To address the relevant research question on major challenges in implementing green management practices, it is necessary to explore different theoretical frameworks in the literature review. As a relatively newer management practice in the industry, the adoption of green management practices can be impacted due to conflicting drivers and challenges. To better apprehend green management in organizations, there are different theoretical contexts in strategic management to be considered. Two complementary theories to be discussed in this research are commonly found in the CSR literature (Fernando & Lawrence, 2014; Martínez et al., 2016): Institutional Theory and Stakeholder Theory.

2.3.1 Institutional Theory

Under this particular organizational theory, all organizations' decision making is strongly influenced by external pressures (Scott, 1998). Institutional theory suggests that managers in any organization usually have no control over the external environment; as Furusten (2013) postulates: "The framework of action for any organization is limited by institutional constraints in the surrounding environment – what is technically, economically, socially and culturally possible in different contexts". Similarly, Banerjee et al. (2003) also posit that "as supply chain management involves the cooperation and interaction among multiple stakeholders, the decision to adopt the GSCM strategy may have more to do with the institutional environment in which a firm is situated".

Under the context of adoption of environmental management practices, enterprises are regularly being pressured “governments, customers, competitors, communities and environmental interest groups and industry associations are likely to dictate environmentally responsible behaviour” (Delmas & Toffel 2004). As identified by DiMaggio and Powell (1983), there are three different types of pressures under Institutional Theory: Normative Pressure, Coercive Pressure and Mimetic Pressure.

(a) Normative Pressure

Normative pressures are presented as a consequence of professionalism within certain organizational fields (Johnson, 2013). All firms in a particular industry exhibit norms and cultural behaviours that are associated with their line of business. The increasing adoption of green management practices in an industry will have direct influence on the associated firms to follow the norms in order not to be perceived as unaware of environmental issues that cause a negative company image (Cai et al., 2008).

(b) Coercive Pressure

Coercive pressure is a form of institutionalized pressure on an organization experienced from another organization or entity (such as governmental agencies or regulators) which they are dependent on, to act or perform in a certain conduct (DiMaggio & Powell, 1983). In many of the studies conducted in recent years, environmental regulations and regulatory enforcement have been cited as the main reasons for adopting green management practices (Jennings & Zandbergen 1995). According to Bansal (2005): “Failure to comply with these regulations may result in the loss of earnings, a damaged reputation and even the loss of the license to operate”.

(c) Mimetic Pressure

Based on DiMaggio & Powell (1983), mimetic pressure in organization theory refers to “the tendency of an organization to imitate another organization's structure because of the belief that the structure of the

latter organization is beneficial". As opposed to coercive pressure, mimetic pressure is voluntary and usually to reduce the level of risk in the operating environment, firms will imitate the structures and activities of similar firms (DiMaggio & Powell, 1983). Hoejmose et al. (2014) suggests that: "Technological or environmental uncertainty or the lack of clear objectives might result in firms copying and imitating their successful competitors".

Another interesting observation from many institutional theorists is, organizations that adopt new technology or management practices that achieve organizational benefits and improvement are being legitimized in the operating environment. Williams et al. (2009) suggest that "when all organizations within the same industry adopt a similar kind of institutionalized practices and decision-making approaches, it depicts an attempt by them to legitimize themselves". Similarly, Meyer and Rowan (1977) also argue that "often these institutional myths are merely accepted ceremoniously in order for the organization to gain or maintain legitimacy in the institutional environment". Hence, Tate et al. (2011) posit that legitimacy in institutional theory is relevant to the adoption of green management practices because organizations operate in a way that meets social and legal expectations that legitimatized the adoption. These changes may or may not have any economic benefits.

Institutional logic is another important concept under institutional theory. It is related to the broader social values, expectations and belief systems on the behaviour of organizations. The term "institutional logic" was introduced by Alford and Friedland (1985):

> *"Institutional logics are systems of cultural elements (values, beliefs, and normative expectations) by which people, groups, and organizations make sense of and evaluate their everyday activities, and organize those activities in time and space".*

Thornton (2004) also provides a clear definition of institutional logics as "assumptions and values, usually implicit, about how to interpret organizational reality, what constitutes appropriate behavior, and how to succeed". In various research, it is possible for firms and organizations to encounter conflicting

institutional logics over time. The following are some studies related to contrasting organizational logics:

- The constant struggling between marketing logic and editorial logic in the publishing industry (Thornton & Ocasio, 1999).
- Greenwood et al. (2010) evaluate different logics that are competing against each other such as family logic, regional logic and market logic.
- Maysara et al. (2017) assert that many companies planning to implement sustainable supply chain management are in regular conflict between sustainability logic and financial logic.

2.3.2 Stakeholder Theory

Stakeholders are defined as any group within or outside an organization that has a stake in the organization and/or its performance (Daft et al., 2007). Under the conventional view of a company, only the owners or shareholders of the business are regarded as important with their interests to be protected. However, based on Freeman (1984): “there are other stakeholders involved in the business operations, including employees, customers, suppliers, financiers, communities, governmental bodies, political groups, trade associations, and trade unions”. This implies that any group or individual that is directly or indirectly impacted due to the business activities of the firm can be considered a stakeholder (Huang, 2013).

Under stakeholder theory that is relevant to green adoption in a company, employees are considered as the primary internal stakeholders since they are usually the executors as well as the receivers of any environmental policies set by the company (Daily & Huang, 2001). However, like any major strategy to be launched in a company, new initiatives will not be successful without strong support and commitment from upper management. Hence, management of a company is also viewed as a key internal stakeholder in the adoption of green practices (Huang, 2013). As for external stakeholders, relevant environmental agencies or regulators are the most significant stakeholders that can severely impact the day-to-day operations of a company due to the enforcement of environmental regulations (Backer, 2007). Another equally important external stakeholder is the customers. Since all products and services produced in a

company are to be sold to the final customers, any requirements on green measures from customers will directly influence the adoption of environmental improvement initiatives (Handfield et al., 1997). This can be witnessed from many multinational corporations requesting their suppliers to be certified with ISO-14001 as well as other related environmental management systems as the basic requirement to do business with them.

During the literature review on available research journals, table 2.2 shares some of the relevant literature on the determinants and drivers for the implementation of green management practices classified under either Stakeholder or Institutional Theory or both:

Relevant Research Papers	Category of Factors	Details
Carter and Carter (1998)	Stakeholder Theory	This study examined various possible factors influencing green management practices. It concluded that only consumer-related pressure displays a positive and significant impact on the level of environmental purchasing.
Gonzalez-Benito and Gonzalez-Benito (2006)	Stakeholder and Institutional Theory	Two dimensions of drivers were identified (governmental and non-governmental) in this study on 186 large and medium sized companies in Spain.
Hall (2006)	Stakeholder Theory	In this study of a few major supermarket retailers in the United Kingdom, the potential environmental risk incurred to the supermarkets from suppliers is one major factor in implementing a green supply chain.
Bansal (2005)	Institutional Theory	A separate study conducted in Canada with the oil and gas, mining, and forestry

		industries discovered that both resource-based and institutional drivers were relevant to sustainable development within corporations.
Chu et al. (2017)	Stakeholder and Institutional Theory	In this most recent study on 241 Korean manufacturing firms, the research finding shows significant impact from customers and competitors on the implementation of green SCM in these companies.
Mwirigi (2016)	Stakeholder Theory	In this PhD project, five drivers were tested on 70 Kenya manufacturing firms: regulatory pressure, customer pressure, perceived business benefits, CSR and internal stakeholders. Results show that internal stakeholders played a major role in decisions implementing green practices; priority of CEO and/or Board of Directors, high cost of production inputs and high energy costs were also major factors.
Rao (2007)	Stakeholder and Institutional Theory	This study on Philippine firms has indicated that customer pressure and the desire to avoid any potential export limitations due to environmental issues are the key determinants for firms to implement GSCM.
Zhu and Sarkis (2006)	Stakeholder and Institutional Theory	This research has cited that pressures from customers, suppliers and regulators, as well as internal management factors are impacting the decision to get involved in GSCM for local Chinese companies.

Baresel-Bofinger (2016)	Institutional and Stakeholder Theory	In this study, the drivers to go green in supply chains for manufacturing companies in Greece are legislative pressure, cost benefits and demands of big customers. The barriers to the implementation of GSCM are the lack of a formal strategy, mental resistance of employees and partners, and a lack of state support and control.
Huang (2013)	Institutional and Stakeholder Theory	In a study on SMEs based in the Chang Chiang Delta region of China, the top three drivers being cited by small businesses on the adoption of GSCM are regulatory pressure, customer pressure and public pressure.
Laari (2016)	Stakeholder Theory	In this study about adoption of GSCM in Finland's enterprises, eco-branding has been cited as the top driver for companies to go green in GSCM. Customer demand is another top driver pushing the Finnish enterprises to adopt GSCM.
Zulkefli et al. (2019)	Institutional and Stakeholder Theory	In this particular green management study on the Malaysian construction industry, financial constraints, organizational change and lack of technical expertise are the internal challenges for green adoption. External challenges are regulations from government, supplier cooperation and lack of suitable green materials.

Drohomeretski et al. (2014)	Stakeholder Theory	In this automotive industry research from Brazil, the motivations for companies to go green are cost reduction and meeting customer demand. The challenges in implementing GSCM are the cost of implementation and the resistance of suppliers.
Handayani, et al. (2019)	Institutional and Stakeholder Theory	In this study, government regulations, cost reduction, and pressure from stakeholders such as customers, suppliers and competitors are the major drivers for builders in Indonesia to go green in supply chains. Barriers and challenges to implement GSCM are lack of experts and suppliers of green knowledge and materials, lack of awareness in environment conservation from employees and additional costs in greening SCM.
Aslam et al. (2018)	Stakeholder Theory	In this study of manufacturing firms in Pakistan, the major drivers for GSCM identified were enviropreneurship and customer pressure.
Kormych et al. (2019)	Institutional and Stakeholder Theory	In another survey carried out among 2000 Ukrainian manufacturing companies, the top barriers for GSCM adoption are high cost of implementation, lack of demand from customers, public awareness, market competition and lack of government support. The main drivers to go green are export to overseas markets,

		customers, market, competitors, cost reduction and regulatory enforcement.

Table (2.2) Literature on Drivers and Pressures on Green SCM Adoption

Under this section of theoretical discussion, both institutional and stakeholder theory are relevant to this research as the proposed research framework is to be built based on these two complementary theories. In addition, these concepts will also be used in the analysis of case studies in different markets when evaluating possible drivers in GSCM adoption. In the next section, detailed discussion will be tabled on Green Human Resource Management (GHRM), which is a key pillar in establishing proposed conceptual framework to be used in this research project.

Part 2: Integration between Green SCM and Green HRM

2.4 Green Human Resource Management (GHRM)

Human resource management (HRM) is "an important function in organizations designed to maximize employee performance in service of an employer's strategic objectives" (Johnason, 2009). It typically consists of many functions that involve employees. The following is a list of common functions as outlined by Štangl Šusnjar et al. (2013):

a) Training & Development
b) Recruitment
c) Payroll
d) HR Information System
e) Benefits
f) Selection
g) Pension
h) Workforce outplacement/reduction

As supply chain management is heavily dependent on human resource, when many key activities are still being carried out by human employees as opposed

to full automation, HRM is a key ingredient in any successful execution of supply chain strategies. According to Bombiak and Marciniuk-Kluska (2018):

> "It is the human factor which stimulates practices oriented at the improvement of organizations' environmental effectiveness. Eco-oriented management is performed exclusively by humans expressing a positive attitude towards the environment, competent in ecology, and bearing a sense of responsibility for the environmental implications of their actions."

As discussed in the earlier sections, in order to respond to increasing demands of the social dimensions from different stakeholders; many companies have implemented CSR initiatives for environmental and social enhancements on top of the traditional economic pursuit. According to Herrera and Heras-Rosas (2020), "CSR and HRM can give a company a competitive advantage by aligning its practices towards business and environmental sustainability". There are quite a few studies conducted by researchers on case studies of companies adopting HRM in pursuing CSR in different countries:

a) The Multinational Companies in Western Romania (Obrad & Gherhes, 2018)
b) A Japanese MNC in China (Chi, 2018)
c) A Study of Large New Zealand Organizations (Sarvaiya, 2014)

In the last few years, Green HRM has slowly emerged as a new area of research under the domain of environmental sustainability. It is broadly defined as the application of human resource practices to enhance the environmental performance of a company (Renwick et al., 2013; Jackson & Seo, 2010) and is being developed to support "the creation of a green workforce, who understands, appreciates, and practices ecological initiatives" (Ahmad, 2015). Milliman and Clair (1996) were the first of a few researchers to suggest an investigation of a direct linkage between HRM and environmental management. Both researchers built a ''Model of Environmental HRM practices'' involving four main steps for any enterprise:

- Step 1 –develop an environmental vision as a guideline for shaping its strategy
- Step 2 – provide adequate training in order to enable all employees to understand company's philosophy of environmental vision through its goals and strategy
- Step 3 – make use of appropriate performance measurement systems to evaluate employee's environmental performance in line with these goals
- Step 4 – redesign the company's reward programmes in order to recognize pro-environmental activities carried out in the workplace

There are discussions on the relationship between CSR and GHRM in recent years (Cheema & Javed, 2017; Chowdhury, et al., 2017). Due to the rising demand for CSR, this leads to the application of GHRM in some organizations to achieve the objectives of environmental sustainability. Daily and Huang (2001) indicated that all stages of an environmental management system (EMS) requires particular support of a human resource practice, such as hiring and selection, training, performance review and evaluation, as well as recognition for employees. These HRM practices are also equally applicable for supporting new product/service development to reduce environmental impacts (Govindarajulu & Daily, 2004). In addition, Opatha (2013) also proposed that; "the formulation of the HR function aims not only at the category of economic interest but also at ecological areas, so as to generate added value for stakeholders".

Arulrajah and Opatha (2014) have proposed some ways to make HRM functions green for an organization. In table 2.3, basic elements of HRM are directly linked with recommended green policies or procedures to support green management:

HRM Functions	***Green policies, practices or procedures***
Job analysis	• Environmental responsibilities as a duty to be included in job description.

	• Environmental competencies as a special element to be included in job specification.
Recruitment	• Green criteria to be clearly communicated in all recruitment messaging. • To communicate concerns from the staff on environmental conservation during recruitment.
Selection	• To give higher priority to candidates who are adequately aware of environmental sustainability. • Candidates who have been actively engaging in environmental conservation as consumers to be prioritized higher.
Induction	• All new hires will be briefed on company's efforts on environmental conservation during induction and orientation. • Orientation programmes showing positive behaviour of environmental conservation from existing employees to be shared with all new hires when onboard.
Training	• All employees to go through dedicated training to acquire knowledge and skills on environmental conservation. • Detailed analysis to be carried out so as to identify training needs of all staff on environmental conservation.
Performance evaluation	• Employee's performance to be evaluated with reference to green-related criteria setup during job analysis. • A separate standing item on progress of greening to be discussed during performance review and feedback.

Rewards management	• Employees with good green performance on the job to be rewarded monetarily. • Intangible rewards such as compliments and acknowledgements should also be given to staff with good greening behaviour.
Discipline management	• Clear polices/rules of conduct pertaining to environmental conservation to be established and published for all employees to follow. • To implement a disciplinary system to reprimand staff who violate the company policies of environmental conservation.

Table (2.3): Basic HRM functions and proposed ways to support green management (Arulrajah & Opatha, 2014)

Although there are a few studies on the benefits of implementing GHRM in an organization (Berrone & Gomez-Mejia, 2009; Ji et al., 2011), Mishra (2017) stated two main challenges in his study on six Indian firms: top-management support and involvement, and integration between activities across departments. Any implementation of important strategic initiatives cannot be successful without strong support and involvement from upper management. Similarly, for any firm wishing to implement green management practices, it is necessary to ensure full alignment between different functions to enable effective communication, harmonization and integration of green activities across multiple departments.

2.5 Proposed Conceptual Framework - Integrating GHRM with GSCM

According to Miles et al. (2014); "the conceptual framework of one study, is a system of concepts, assumptions, expectations, beliefs, and theories that supports and informs your research – is a key part of one`s research design". In other words, a conceptual framework "represents the researcher's synthesis of literature on how to explain a phenomenon to be used as the researcher's map in pursuing investigation of a particular subject" (Regoniel, 2015). Teece (2007) also emphasized that a conceptual framework is usually abstract from

reality; “it is less rigorous than a model as it is sometimes agnostic about the particular form of the theoretical relationships that may exist”.

After going through an extensive review on relevant literature in different domains of green management strategies, this section aims to present the proposed research framework to be used in this project. Supply Chain Management (SCM) and Human Resource Management (HRM) as fields of study have been treated distinctly by tradition, even though they are being “intimately linked” in almost all business environments (Barnes & Liao, 2012). Indeed, Taylor and Taylor (2010) proposed the importance of HRM related as a new research theme regarding operations management. Over the last few years, there have been many studies emphasizing the importance of links between HRM and SCM (Ellinger & Ellinger, 2014; Lengnick-Hall et al., 2013; Gowen & Tallon, 2003; McAfee et al., 2002). Based on the literature review, table 2.4 lists some of the research findings on the impacts of HRM on SCM:

Researcher(s)	HRM practices	Findings
Gómez-Cedeño et al. (2014)	• Compensation & benefits • Training & development • Communicative Management Style • Recruitment & Selection • Cultural Awareness & Diversity Management	This empirical research revealed that “HRM had substantial direct and indirect impacts on SCM outcomes and implementations”. The finding also concluded that “HRM played a mediating role in the relationships between HRM and SCM outcomes via significant impact on customer satisfaction and organizational performance”.
Ellinger et al. (2005)	• Supervisory coaching behaviour	In an earlier study on the impact of HRM on SCM, this study’s findings pointed out that “warehouse workers at distribution centers in the U.S. encounter low levels of supervisory coaching behavior”. However, major positive correlations were found between “worker job satisfaction, supervisory coaching behavior and supervisors’ perceptions of their employees’ job-related performance, despite minimum levels of supervisory coaching”.

Khan et al. (2013)	• Training • Selection • Evaluation • Compensation	This research discovered that "SME performed moderate levels of HRM and SCM practices and there is a direct association between HRM practices that contributes to supply chain success". Furthermore, as compared to other HRM related factors, training contributes greater to SCM success.
Kumari et al. (2013)	• Compensation • Employee empowerment • Employee motivation • Organizational socialization • Evaluation	Practical rationalization for a framework that recognizes important elements of HRM and SCM practices was emphasized in this study. Research findings indicated that increase in HRM and SCM practices can indeed contribute towards superior customer satisfaction in an organization.
Huo et al. (2015)	• Employee skill training • Employee incentives • Employee participation	This particular study, using empirical survey data collected from ten different countries, provides clear evidence of the link between a set of high-involvement HRM practices that aim at improving employee behaviours and performance and Supply Chain Integration (SCI). Also, high-involvement HRM practices that are designed for entire company could facilitate SCI further.
Bulut and Atakisi (2015)	• Selection • Compensation • Training • Evaluation	This research concluded the influence of HRM on a Supply Chain and as a key component of any Supply Chain process. Without a high level of employee engagement and dedication under the domain of HRM, the performance of SCM could be impacted negatively. This analysis also provided a thorough discussion on the contribution from HRM practices on the effective implementation of SCM and the findings concluded that HRM practices play a major role in the enhancement of a Supply Chain's qualitative performance.

Table (2.4) Literature on the impacts of HRM on SCM

As indicated above, there are many studies globally on the integration of HRM and SCM and the impact on a firm's success; therefore, in the Green SCM context, there must be support from Green HRM. Nonetheless, there are no existing studies dedicated to an in-depth review of an integrative framework and initial agenda (Jabbour & de Sousa Jabbour, 2016). Similarly, according to Nejati et al. (2017), integration of the 'green version' of SCM and HRM is still under-researched. So far, limited research has been carried out pertaining to the integration of Green HRM and Green SCM. Based on a recent search of international journals, only a few field studies relevant to these two green domains were identified; none of them is related to SMEs in Asian economies (Table 2.5):

Researcher(s)	GHRM practices	Findings
Teixeira et al. (2015)	Green Training	This group of researchers conducted a survey on Brazilian firms with certification of ISO 14001 and the research results indicated that green training contributed positively to the improvement of green SCM of the firms as well as successful implementation of green purchasing.
Nejati et al. (2017)	Green Training Pay & Reward Employee Empowerment	This research surveyed 161 manufacturing firms in Iran and found (i) a positive impact of GHRM on GSCM, "confirming the general call for integration between HRM and green management"; (ii) three GHRM practices have the most positive influence on GSCM: training and development, pay and reward and employee empowerment; and (iii) "Resistance to Change" has a moderating effect on the linkage between GHRM and GSCM in the area of hiring and recruitment.

Zaid et al. (2018)	Green Hiring Green Training and Involvement Green Performance Management and Compensation	A total of 121 manufacturing firms in Palestine took part in a research survey. The results from this research revealed that GHRM practices had a direct effect on sustainable performance, with the GSCM practices mediating this effect.
Masri and Jaaron (2016)	Green Recruitment and Selection Green Training and Development Green Performance Management and Appraisal Green Reward and Compensation Green Employee Empowerment and Participation Green Management of Organizational Culture	This research used a qualitative survey on 110 Organizations in Palestine operating in three manufacturing sectors (i.e. food, chemical, and pharmaceutical) that have implemented GHRM practices at varying levels. This study showed that GHRM practices have positive impacts on the environmental performance of companies in the manufacturing sector.
Yusliza et al. (2019)	Top Mgmt Commitment Corporate Social Responsibility	A self-administered questionnaire was sent to a sample of 400 Malaysian manufacturing and service organizations to analyze the relationship between top management commitment, CSR and

		GHRM. Research findings indicate a significant positive relationship between top management commitment and CSR, as well all dimensions of GHRM.
Chaudhary (2019)	Green Recruitment and Selection Green Training and Development Green Performance Management Green Compensation and Rewards Green Employee Involvement	This paper aimed to examine the status of implementation of GHRM practices in the Indian automobile Industry. Data was collected from 91 employees working in automobile industries in India. The finding showed that, among the five GHRM practices conceptualized in the study, only two practices, green training and development and green involvement, are more commonly implemented in the automobile industry in India.
Singh and Misra (2020)		This study focused on identifying the factors and their relative importance in the implementation of the Green Supply Chain Management (GSCM) process in Indian construction industry. The study showed that involvement of government in promoting the importance of green practices in organizations was the most important factor.
Ragas et al. (2015)		The aim of this paper was to determine the moderating role of green lifestyle to the impact of GHRM on employee's job performance from various industries in the Philippines and a possible spillover of GHRM to employees' lifestyles. A

		survey questionnaire was distributed to 332 respondents from various private industries which were randomly selected and the findings showed that the implementation of GHRM had an effect on an employees' lifestyles and also on their job performance.
Longoni et. al. (2018)	Green Performance Management and Compensation Green Training and Involvement Green Hiring	The study is to assess GHRM and GSCM's impact on both environmental and financial performance. A questionnaire survey was sent to 140 firms in Italy; the findings showed that GHRM and GSCM exert those impacts in a joint fashion and GSCM plays a mediating role in the relationship between GHRM and performance.
Cheema et. al. (2015)	Green Training and Development Green Performance Management Green Recruitment	The main focus of this research paper is to explore the different aspects of GHRM practices with a survey on 140 employees from 42 SMEs based in Pakistan. Research results showed a positive relationship between green HR practices and employee performance.

Table (2.5) Previous research on GSCM and GHRM in other countries

The above listing on previous research in either GHRM or GSCM clearly illustrates only five studies that looking at the interrelationship between both concepts, but they are all from other regions outside of Asia – Italy (Europe), Brazil (South America), Palestine and Iran (Middle East).

Pagell and Shevchenko (2014) argued that, a multidisciplinary approach connecting different emerging fields of research in green practices is a great opportunity to contemplate truly sustainable supply chains. Hence, an integrative conceptual framework of GHRM/GSCM is developed in this proposal (figure 2.2) based on the review of existing literature on relevant green practices of HRM and SCM.

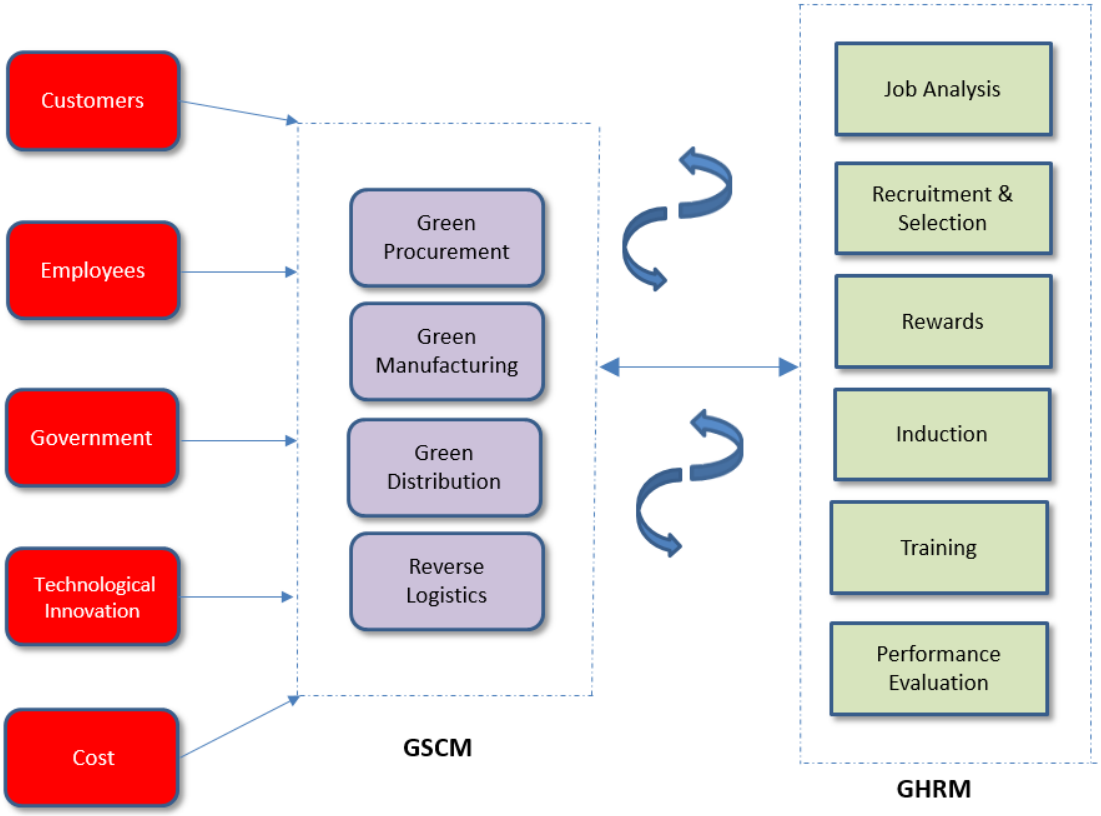

Figure (2.2) A Proposed Research Framework on the integration of GSCM and GHRM

In this conceptual framework, six functions of HRM are used as a basis for GHRM: job analysis; recruitment and selection; rewards; induction; training and performance evaluation. In addition, four basic elements of SCM are proposed as core components of GSCM: green procurement; green manufacturing; green distribution and reverse logistics. Using this framework, the study will explore the impact of GHRM on GSCM, contributing to the successful implementation of GSCM in SMEs. Unlike the research carried by Zaid et al. (2018), this proposed framework will not link to any business performance of

the enterprises, as the main focus is to enhance the level of adoption of GSCM in SMEs.

2.6 Major Challenges in GSCM Adoption

As all enterprises, whether large or small, are constantly facing non-stop challenges on multiple fronts, it is imperative to recognize that the integrative nature of this proposed framework calls for the constant interactive exchange of knowledge and information between GHRM and GSCM. With the use of Stakeholder and Institutional Theory in this proposed framework, five major challenges and/or stakeholders are identified as the inputs influencing the adoption of green practices in the small enterprises:

(a) Customer

Due to increasing awareness of global warming, air pollution and carbon emissions, more and more consumers are changing their purchasing behaviour towards greener products (Barber, 2010; Okada & Mais, 2010). This is commonly termed “Green Consumerism”, when consumers everywhere around the world are likely to buy more products or services which are not harmful to our living environment as well as our health ((Tekade & Sastikar, 2015; Xie et al., 2014). According to Brindley and Oxborrow (2014): “much of the green movement is driven by consumers, who then make their needs known through the supply chain, helping in turn to green the supply chain and markets”. With the increasing advertisements on environmental friendly products and services, together with news coverage in drastic climate change, being one of the most important stakeholders in any business transaction; consumers today are getting more and more knowledgeable about environmental conservation; they are now becoming a major factor in influencing companies to go green.

(b) Technological Innovation

Technological innovation in environmental protection can be termed Green Innovation. It can be defined as “the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organization (developing or adopting it) and which results, throughout its life cycle, in a reduction of environmental risk, pollution and other

negative impacts of resource use (including energy use) compared to relevant alternatives" (Kemp & Pearson, 2007). Another simplified definition given by Chen et al. (2006) on green innovation is; "hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy-saving, pollution-prevention, waste recycling, green product designs, or corporate environmental management". In the same research, Chen et al. (2006) conclude that many new technologies and innovations were "found to have been instrumental in environmental performance and compliance to environmental regulations", which is a key driver in the adoption of green management practices. In another study conducted by Umar et al. (2016) on the adoption of GSCM for SMEs in Nigeria, technological innovation was found to be a mediating factor between GSCM implementation and green performance.

(c) Employee

For most SMEs in the manufacturing industry, their operations are usually manual and labour intensive due to the lack of financial resources to invest in high tech factory automation. This has resulted in a direct linkage between employees' cooperation and successful implementation of any new policy in SMEs. Employees in small businesses are the key stakeholders that can determine the failure or success of the organization. In extension to the implementation of GSCM, employees' acceptance or resistance to any new internal green policies and practices is crucial to the successful adoption of GSCM in that company. In a recent study conducted by Nejeti et al. (2017) on 161 Iranian companies in the manufacturing industry, resistance to change from the employees had a direct impact on the implementation of GSCM. In addition, research by Sharma (2014) summarized that "high employee engagement has helped in building the healthy GSCM practices and continues to do so specifically in terms of the role of employees in decision making to these initiatives".

(d) Government

After the signing of the Paris Agreement by 195 countries or economies in 2016, governments around the globe are under increasing pressure to rectify

domestic environmental regulations to ensure they are able to fulfill their respective commitments as agreed in Paris. In general, any new regulations introduced by government are considered as coercive institutional pressure (Rivera, 2004), as these regulatory control measures demand reduction in carbon emissions or the use of energy efficient machinery in production that have direct business impacts on the enterprises. However, initiatives from government can also be viewed as positive incentives to encourage green adoption among local businesses. It is common for governments to provide low interest financing to SMEs in green technology adoption such as installation of solar panels and water treatment systems or the use of electric vehicles (Chan et al., 2017). Some governments also provide training grants to SMEs in order to send their employees for external training on green management and certification.

(e) Cost

It is widely known that SMEs are usually financially disadvantaged compared to multi-national corporations, hence, the perceived high cost in implementing GSCM is considered one of the major barriers in green adoption for SMEs (Min & Galle, 2001; Hervani et al., 2005). Similar discussions can also be found in studies from Zaabi et al. (2013) pertaining to the high cost of eco-friendly packaging, as well as the high cost of waste disposal (Goninan, 2014). Another relevant barrier to the implementation cost of green practices is the low financial return after investment (Barve & Muduli, 2013), since the expensive green technology may not break even within a few years of implementation, and this will create an un-necessary financial burden on these small businesses with limited capital.

In summary, based on the review of Institutional and Stakeholder Theory in the earlier section, pressure arises from different groups comprising governments, employees and consumers (Dai & Blackhurst, 2011; Sarkis, 1998) together with advancement of technological innovation as well as the cost of green adoption; this proposed conceptual framework will be used in the field study of 10 SMEs in different countries/economies.

With the use of qualitative research methods, the proposed conceptual framework aims to answer the following research questions that are relevant to small enterprises which are planning to adopt GSCM in their day-to-day operations:

1. What are the main motivations/drivers for SMEs to implement green management practices in selected Asian markets?
2. What are the common green supply chain management practices used in SMEs of selected Asian markets?
3. What are the major barriers/challenges in implementing GSCM for SMEs in selected Asian markets?
4. Based on information received from (3), what are the mitigations adopted by SMEs to overcome the identified barriers by integrating GHRM and GSCM?
5. What are the benefits and challenges of integrating GHRM and GSCM?

In part 3 is a detailed review focused on small and medium sized enterprises (SMEs), as this is the main subject of research in this study. SMEs are selected to be involved in this project mainly because they are usually the largest source of employment in many countries, as well as the key contributors of carbon emissions. These small businesses are likely to be much more vulnerable and resource-constrained compared to multinational corporations (MNCs), which makes the adoption of green management even more challenging.

Part 3: Small & Medium Sized Enterprises (SMEs)

2.7 Definition of SME

Small and medium sized enterprises (SMEs) are small businesses operating in many countries today. They can be either small food stalls along the street or a leather factory with fifty production workers located in an export processing zone. According to Peacock (2012), the two fundamental characteristics of small businesses which separate them from large corporations are “their smallness and their rate of turnover and failure rate”.

As commonly known by most economists and governments around the world, small and medium sized enterprises are a key pillar in any country on employment rate as well as economic development. SMEs are also identified to be the forerunners in the economic reconstruction of many nations (Ihua 2009). However, it is not easy to give a specific definition on what an SME is. As there is no one standard definition on SMEs globally, there are many different definitions of SMEs based on various institutions and in each country. All studies point to a common conclusion on the significant contribution of SMEs to the global economy (Aktas, 2010):

- At least 95% of all registered enterprises around the globe are classified as SMEs.
- In the EU, these small and medium firms employ roughly 75 million people and account for 67.4% of total employment. The economic contribution to the overall EU economy was about 58% in 2009 based on value added terms.
- In the United States, more than 50% of the nonfarm private GDP is contributed by SMEs, this is estimated to create about 75% of the net new jobs in the economy.

In general, an SME can be defined under two attributes: number of employees and total annual turnover. The following are some of the definitions of SMEs by major economies:

- European Union: Enterprises with employees up to 250 and annual turnover equal or smaller than 50 million Euro (European Commission, 2018a).
- United States: Enterprises with employees up to 500 or annual revenue equal or smaller than USD 25 million (USITC, 2010).
- South Africa: Enterprises with staff up to 200 or annual turnover equal or smaller than ZAR 50 million (NCR, 2011).
- Brazil: Enterprises with employees smaller than 500 or annual gross income less or equal to BRL 90 million (Mello, 2012).

Besides the sheer number of SMEs in most countries today, it is important to also take note of the increasing impacts of environmental pollution caused by these small enterprises with reference to the larger ones. According to the example of the UK, the Marshall Report (1998) estimated that at least 60% of total carbon emissions is linked to SMEs. These smaller firms are also accountable for more than 40% of all serious industrial pollution incidents as well as 60% of commercial waste. Furthermore, about 60% of the workforce is employed by SMEs in the UK, hence it is especially vital that these smaller enterprises take steps to engage their staff continuously on the subject of sustainability (Bristow, 2012).

Similarly, a study conducted by the World Bank and the Ministry of the Environment of Korea (2004) asserted that SMEs are causing more environmental pollution to developing countries mainly due to (i) the rapid proliferation of SMEs during to higher economic growth; (ii) Lack of adequate awareness in environmental management among employees and management of SMEs and finally (iii) these small businesses usually lack resources in manpower as well as funding to improve environmental control.

2.8 Theoretical Discussion on SMEs

Before the global financial crisis triggered by the collapse of Lehman Brothers in 2008, small firms were usually considered as a transitory phenomenon unsuitable for the attention of mainstream economic theory (DiTommaso & Dubbini, 2000). With the sharp downturn in economic growth of many countries after 2009, their governments were forced to introduce different economic policies and incentives to encourage young people to start up their own ventures to mitigate the increasing unemployment rate. This has indirectly triggered growing interest in entrepreneurship and small firms as major research themes for academic researchers. The following are the main theoretical frameworks related to SMEs in the scholarly research:

2.8.1 Firm size

This is the most discussed topic under the literature of SME research. According to Casson (1999) and Penrose (1959): “the administrative structure

and size of the firm reflect the founder's (leader's) vision, personal characteristics, organizational capabilities, and leadership qualities, as well as the pattern of volatility in the industry". Firm size can be described under different definitions: total number of employee hired, total sales per year or capital assets or market capitalization (Trigueiros, 2000).

The rationale of firm size of any enterprise is related to the economies of scale under economic theory. As suggested by DiTommaso and Dubbini (2000), higher production volume is an important enabler for an organization to take full advantage of specialization of labour that greatly enhances operational efficiency. The increase in production volume also helps to improve cost efficiency in procurement when dealing with suppliers (Wilson & Roy, 2009). The concept of economies of scale traces its root all the way to the 18th century as suggested by Adam Smith, a renowned economist in Scotland. This concept originated from the doctrine of "division of labour" as introduced in his book: operational efficiency and work quality can be greatly improved by assigning smaller and specialized tasks to each worker under high volume production.

SMEs are being penalized by lack of economy of scale due to smaller production volumes. However, based on Buckley (1997) and Pleitner (1989), by utilizing specific advantages or strengths in specialized areas, SMEs are able to compete with larger competitors in niche markets. This is exactly what most of the successful SMEs in Germany are doing in exporting their products globally as world market leaders in their niche sectors (Bayley, 2017). Some great examples are Koenig & Meyer, the world market leader in music and microphone stands, and Albert Handtmann, a high-end precision machine tools and machines supplier (Schmidt & Guldner, 2018). In a paper published by Coviello et al. (1998), smaller firms are not scaled down versions of larger enterprises, they usually have different organizational structures and management styles, these differences help to increase organizational flexibility and a quicker decision-making process and response to market demand and competition.

2.8.2 Resource-Based View

The framework of the Resource-Based View (RBV) has been regarded as one of the most useful theories helping to understand firm strategy in emerging economies (Hoskisson et al., 2000). The simple definition of RBV is "the long-term competitiveness of a company depends on its endowment of resources that differentiate it from its competitors, that are durable and that are difficult to imitate and substitute" (Porter, 1991; Stalk et al., 1992; Amit & Schoemaker, 1993). However, not all tangible and intangible resources possessed by a firm are considered important. The firm should only focus on critical and strategic resources, "those that are the basis of the company's sustainable competitive advantage" (Rangone, 1999).

Under an RBV framework, two major interrelated characteristics of SMEs have been identified by Erramilli and D'Souza (1993): a) resource constraints and b) resource commitments under conditions of environmental uncertainty. These two characteristics greatly influence the behaviour of SMEs as they do not have as many financial resources compared to their larger competitors. This is also directly related to their conservative attitude towards investment in major projects such as environmental conservation and pollution control. Hence, the theory of the RBV provides a framework under strategic management to explain how a small firm can "identify suitable measures to overcome growth obstacles, have better access to technology resources, manpower resources, financial resources, natural resources, and infrastructure, and access to the market" (Nguyen et al., 2008).

In general, resources can be categorized under three sub-groups: tangible assets, intangible assets and capabilities. However, under the framework of the RBV, only intangible assets are counted as major sources of sustainable competitive advantage for the firm (Pearson et al., 2015). Intangible resources such as organizational culture, human capital and employee knowhow, product reputation or brand image can be strategically critical and vital for any company to its long-term success. According to Pearson et al. (2015), companies can monetize the value of these intangible resources by renting them via licensing or patenting, or even selling the brand for good financial return. A methodology

called VRIN has been developed by Barney (1991) to assess the value of different resources a firm possesses so as to enhance the sustainability of competitive advantage:

- Valuable – strategic resources must provide value or counteract threats posed by competitors
- Rare – resources must be rare and not easily acquired by market competitors
- Inimitable – similarly, these resources must not be able to be copied and replicated easily by the competition
- Non-substitutable – a critical resource cannot be substituted by any other resource

Although the RBV framework has been widely researched over the last twenty years, there are also criticisms of its weaknesses and limitations. The following are the six major limitations of the RBV framework based on academic research:

1. The RBV lacks practical managerial implications or operational validity (Priem & Butler, 2001).
2. The RBV's applicability is too narrow and should only be applied to bigger firms with significant market and financial power (Connor, 2002).
3. As the market is dynamic, the RBV's claim on sustainable competitive advantage is not achievable even with the required strategic resources (Eisenhardt & Martin, 2000).
4. With the lack of empirical support for the RBV, resources under VRIN alone are not sufficient for sustainable competitive advantage, other factors are needed in a competitive market (Newbert, 2007).
5. The RBV framework is not a useful theory that can be tested as "it does not contain the law-like generalizations that must be expected" (Priem & Butler, 2001).
6. The definition of "resource" under the RBV is overly inclusive and unworkable, since everything in a firm can be classified as a strategic resource in Barney's (2001) definition (Kraaijenbrink et al., 2010).

Despite criticisms of the RBV framework, it is still regarded as a key concept used in research on the theory of firms (Baumane-Vitolina, 2013). As outlined in this section of SME literature, as a large pool of business entities, SMEs contribute a large impact on economic and environmental aspects as “the backbone of most economies” (Chaston & Baker, 1998). This is an important justification to spend considerable efforts on the research on SMEs, especially in green management adoption.

In order to ensure this research can be carried out in a meaningful way relevant to green management, it is necessary to select suitable SMEs for case study with appropriate levels of green management experience and qualification. In the final section of this chapter, a detailed introduction of various types of Environmental Management Systems (EMS) is presented to help understand what is available out there in the business world and how selection of one suitable system is necessary for the qualification of case study candidates in this research.

2.9 Environmental Standards and Certification

As part of a sustainability improvement strategy, an Environmental Management System (EMS) supports all types of organizations to detect, track and control environmentally related issues in a comprehensive and all-inclusive manner. An EMS comes with a set of environmental standards with certification requirements that are usually assessed by a third party and is voluntary. Such standards and certification are developed to assist organizations to achieve eco-friendly processes that can be important to internal and external stakeholders. With more than 20 years of history, environmental standards are normally verified by a certification process in order to be effective and measurable. Corporations or organizations are required to show what internal controls they have installed to demonstrate clear evidence in maintaining the strict standards of environmental conservation in their entire business activities. The certification can be carried out annually or once every few years as mandated by the certification body.

Although the application of environmental certification is voluntary, some of the main objectives for companies to pursue in the implementation of an EMS are:

- To enhance the environmental performance of the organization through the implementation of a certified EMS. This will also raise compliance standards with all relevant environmental regulations in waste and pollution reduction (Barla, 2007).

- Empirical research provides positive evidence of the association of ISO 14001 to business cost savings:

  a) "Related to materials and energy" (Kuryllowicz, 1996; Klassen & Whybark, 1999);
  b) "Management of both hazardous and not hazardous waste" (Ammenberg el at., 2002);
  c) "Waste recycling" (Jump, 1995); and
  d) "Reduction of material handling, storage and packaging costs" (Kuryllowicz, 1996) due to the implementation of EMS.

- Complying with customers' environmental requirements has become a critical prerequisite for the adoption of an EMS, especially dealing with major global corporations and local governments (Hillary, 2004). Similarly, an EMS can help enterprises to entice green minded customers who view environmental conservation as important feature of a product or service taking into account overall considerations together with other factors such as quality, price, or after sale service (Cronin, el at., 2011; Luo & Bhattacharya, 2006).

There are a few different types of environmental certification programmes available in different countries. As opposed to local environmental regulations or licensing requirements which are mandatory, it is a certification scheme for any organization to apply and implement based on the prescribed requirements and procedures outlined for environmental protection and conservation. Some of the most prominent environmental certification schemes are:

2.9.1 ISO 14001

ISO 14001 was created by the International Organization for Standardization (ISO) in 1996. According to Goh et al. (2006); “ISO 14001 is the world’s most recognized EMS framework that helps organizations both to manage better the impact of their activities on the environment and to demonstrate sound environmental management”. The universal programme of ISO 14001 was established to ensure uniform standards can be applied to assess the environmental improvement works of different companies.

According to the International Organization for Standardization (ISO, 2018a): “ISO 14001 is an internationally agreed standard that sets out the requirements for an environmental management system. It helps organizations improve their environmental performance through more efficient use of resources and reduction of waste, gaining a competitive advantage and the trust of stakeholders”. Basically, ISO 14001 does not set any minimum required performance of environmental performance in an organization. It defines an effective framework for the organization to follow to improve the respective performance in environmental conservation in their business activities. ISO 14001 covers environmental controls in many areas, such as air pollution, waste water sewage control, waste management, soil contamination, energy use and efficiency.

Although ISO 14001 is the most widely implemented EMS today with more than 300,000 certifications in 171 countries (ISO, 2018b), there have been some drawbacks reported in some research literature over the last few years. One major problem of ISO 14001 is “the lack of rigor, focus, and confidence of audits carried out by third parties” (Heras-Saizarbitoria et al., 2013). The other common complaint about ISO 14001 is “the excessive bureaucratization required by the system” (Boiral, 2011). These criticisms have concluded that, the adoption of ISO 14001 does not necessary enable a firm to achieve positive results in handling environmental related issues (Yin & Schmeidler, 2009).

2.9.2 Carbon Trust Standard (CTS)

The CTS was created in 2008 by a company based in the UK. According to the Carbon Trust Standard (2018a), "CTS certification provides a framework for organizations to enhance their operational sustainability, improving efficiency and resource management at the same time as cutting costs". CTS provides certification on energy use, greenhouse gas emissions, water use and water output for organizations that are interested in improving their environmental performance.

Compared to the internationally recognized scheme of ISO 14001, CTS is considered a relatively new and less popular environmental management system with only ten years of history. However, according to the literature published by the Carbon Trust Standard (2018a), there are more than 1,000 companies and non-profit organizations being certified under CTS such as GSK, Coca Cola, Heathrow Airport and Standard Charter Bank.

Based on the press releases issued by Carbon Trust Standard, one important benefit of getting CTS certification is to be able to get access to financial assistance in corporate financing on green related projects. Some examples are:

- Providing interest-free loans to SMEs in Wales to commission energy saving related projects (Carbon Trust Standard, 2018b).
- The Carbon Trust has been selected by the Inter-American Development Bank's Multilateral Investment Fund (IDB-MIF) to take part in the implementation of its EcoMicro technical cooperation programme in the Caribbean. This is to support micro, small and medium-sized enterprises (MSMEs), and low-income households to implement projects related to climate change (Carbon Trust Standard, 2018c).

2.9.3 The Eco-Management and Audit Scheme (EMAS)

EMAS is a voluntary green resource management instrument established in the European Union in 1997. It is a management and assessment programme which allows all types of organizations to improve their environmental performance and obtain relevant green recognition after a

successful audit. EMAS is quite similar to ISO 14001 but with some distinct differences (NQA, 2018):

- EMAS covers all aspects of environmental issues under an organization.
- The organization under assessment must report a set of eco indicators such as material usage efficiency, energy efficiency, waste management, biodiversity and greenhouse gas emissions.
- All participating organizations under EMAS must publish an annual report documenting environmental performance. The report must be verified by a certified third party registered under the European Union.

According to European Commission (2018), EMAS goes through a 4-step PDCA internal process before external audit (Fig. 2.3):

Figure (2.3) Internal and External Process for EMAS (Source: European Commission, 2018b)

After reviewing several established EMS certification schemes available in the market today, ISO-14001 has been selected as the basic criteria for the selection of case study candidates participating in this research. This is mainly because it is widely recognized and accepted globally by most enterprises, either large or small, due to its ease of use and comprehensive coverage in

environmental management. In addition, the International Organization for Standardization (ISO) is a well-respected global organization established since 1947, and it is easier to verify any certification with ISO compared to other quality and standards agencies.

2.9 Summary

In this chapter, thorough reviews on the key concepts of Corporate Sustainability, Green Supply Chain Management, Green Human Resource Management, Small & Medium Sized Enterprises and Environmental Management Systems have been conducted to better understand their respective definitions and scope, as well as research gaps and criticisms. Major challenges and barriers to the adoption of green management practices in any organization are also presented including theoretical discussions on previous studies from other scholars. This literature review also presented a structured and organized argument to propose a conceptual research framework on the integration of GSCM and GHRM for SMEs in Asia on the adoption of GSCM.

In the next chapter, a detailed discussion on the research methodology is presented. This important chapter illustrates the justification of the choice of the research paradigm and methods used in this project as well as the approaches in data analysis so as to produce a high quality doctoral research.

Chapter 3

Research Methodology

3.1 Introduction

Research is “a systematic process of collecting and logically analyzing data for a given purpose” (McMillan & Schumacher, 2010). In any research project, a carefully planned research strategy is critical to ensure the success of the project. In this chapter, the research design and research methods used in this dissertation are clearly outlined and discussed.

A research strategy entails different components of a research project: research focus areas, research design and research methods. As discussed in Chapter 1, this research project focuses on the investigation of SMEs in different Asian economies adopting the integration of Green Supply Chain Management and Green Human Resource Management to achieve environmental sustainability. A research process is developed to undertake this project as follows (Fig. 3.1):

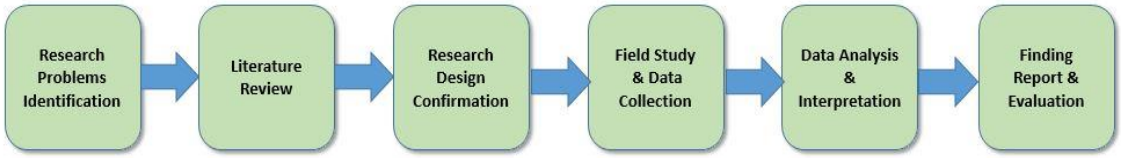

Figure (3.1) Research Process Flow Chart

In this chapter, thorough discussion is presented on the research questions, research paradigms, descriptive research, data collection methods, pilot study

and data analysis techniques. These key concepts are critical to the success of this doctorate research so as to produce relevant scholastic outputs for new knowledge contribution.

3.2 Research Questions

Due to increasing customer demand, social expectations and regulatory pressure for companies to go green, this research aims to establish better understanding of the impacts of integration between green human resource management (GHRM) and green supply chain management (GSCM) for small and medium enterprises (SMEs) in Asia. The project introduces an integrated GHRM-GSCM framework, using exploratory case study methodology to collect information from SMEs in the manufacturing industry based in China, Taiwan and Thailand. The information collected from the case studies is to determine the impacts of GHRM on the successful implementation of GSCM in SMEs, as well as the key factors impacting the adoption of GSCM in SMEs of different countries/markets. The following is a recap of the research questions in this study:

1. What are the main motivations/drivers for SMEs to implement green management practices in selected Asian markets?
2. What are the common green supply chain management practices used in SMEs in selected Asian markets?
3. What are the major barriers/challenges in implementing GSCM for SMEs in selected Asian markets?
4. Based on information received from (3), what are the mitigations adopted by SMEs to overcome the identified barriers by integrating GHRM and GSCM?
5. What are the benefits and challenges of integrating GHRM and GSCM?

3.3 Research Paradigms

A research paradigm is defined as a “set of common beliefs and agreements” shared by researchers regarding “how problems should be understood and addressed” (Kuhn, 1962). There are two main philosophical paradigms in

conducting research; positivism and interpretivism. In order to embark on management research, it is critical to confirm which philosophical paradigm is to be used, as this will determine the types of research methods to be applied in the project.

Under positivism, the positivist ontology believes that “the world is external” (Carson et al., 1988) and that there is “a single objective reality to any research phenomenon or situation regardless of the researcher’s perspective or belief” (Hudson & Ozanne, 1988). In other words, according to Merriam (2009), a positivist orientation assumes that “reality exists ‘out there’ and that it is observable, stable and measurable”.

As opposed to the approach of positivism, interpretive research assumes that “reality is socially constructed, that there is no single, observable reality” (Merriam, 2009). Interpretivism emphasizes that differences in humans’ roles as social actors should be taken into account. As a consequence, it is impossible to study or analyze humans in the same way as objects (Bryman, 2016). According to Saunders and Bezzina (2015), a human’s meanings and actions are continuously adjusted as a result of their interpretations of their interactions with others. This has created different possibilities and realities for the researcher instead of one single objective reality as purported by positivists.

Another relevant research approach that is useful for this study is the post-positivism paradigm. Positivism has always been criticized for “ruling out various sources of understanding of the world including those deriving from human experiences, reasoning or interpretation as inappropriate for scientific enquiry” (Fox, 2008). However, according to Fox (2008), while the quest for new knowledge remains an important objective of social scientific enquiry for post-positivists, “the concept of an absolute truth may be seen as an aspiration rather than something that can be discovered once-and-for-all”. In a nutshell, post-positivism can be considered as a mixed paradigm combining positivism and interpretivism (Petter et al., 2004; Kock, 2008). Post-positivism focuses on “researching issues in the context of involving the experiences of the majority and announcing the results of what the majority says is acceptable” (Wildemuth, 1993; Fischer, 1998).

This research is based on the post-positivism paradigm. It is a management research on GSCM and GHRM in SMEs which is an area not well researched compared to the implementation of GSCM in large multinational corporations. In addition, environment-related topics in local enterprises are less explored in Asia than those in Europe or North America; therefore, it is necessary to use both quantitative and qualitative approaches to uncover rich insights and valuable information on the integration of GHRM and GSCM in the selected SMEs that will contribute to the creation of new knowledge in the adoption of green management for smaller firms in Asia.

3.4 Descriptive Research

"Not everything that can be counted, counts; and not everything counts that can be counted" – Albert Einstein

Whether we are conducting quantitative or qualitative research, it is important to understand that both methods involve using a well-planned, disciplined and systematic approach that is auditable in answering the research questions. As a mixed methods approach in this study using a post-positivism paradigm, descriptive research uses many different research methods to collect information systematically, and organize and interpret information that generates novel insights into phenomena that are difficult to quantify. As defined by Fox and Bayat (2007), descriptive research is "aimed at casting light on current issues or problems through a process of data collection that enables them to describe the situation more completely than was possible without employing this method."

The main justification of using descriptive research methods in this project is there is limited research on green management on SMEs in Asia. It is even more challenging to find any relevant literature and past research on GHRM and GSCM for SMEs in Asian economies since this is a relatively novel research domain. By conducting an in-depth study using descriptive research, a lot of useful information and insights could be uncovered on the integration of GHRM and GSCM for the SMEs.

3.4.1 Case Study

There are different research techniques under descriptive research methodology. Case study research is one of the most commonly used techniques (Stake, 2000), it represents a broader view in “conducting an empirical investigation of a contemporary phenomenon within its natural context using multiple sources of evidence” (Yin, 2003). Case study is a research approach “that involves empirical investigation of a particular contemporary phenomenon within its real-life context, using multiple sources of evidence” (Saunders et al., 2015). The three typical attributes of a case study consist of the following:

a) Case study research focuses on an individual representative of a group or cluster (eg; a small firm in a country), more often it addresses a specific phenomenon (eg; green supply chain management).
b) The phenomenon being researched is studied in its natural context, bounded by space and time (eg; in a particular country or city within the last few years).
c) Case study research is richly descriptive, because it is grounded in deep and varied sources of information (Hancock & Algozzine, 2006).

Case study can also be described as be an intensive study, which is defined as an in-depth study of a few units with multiple variables (Woods & Calanzaro, 1980). The main objective of intensive study is to get as complete a picture as possible of a situation, a phenomenon or event (Jacobsen, 2002). There are many advantages of using case study in a research project:

a) Case study research is suitable in dealing with “the understanding and change of interwoven complexities associated with interpersonal processes that emerge in a wider social context” (Cronin, 2014).
b) Case study can be used to “close in” on real-life situations and test views directly in relation to phenomena as they unfold in practice” (Flyvbjerg, 2006).
c) As an intensive study method, a case study is able to obtain detailed and relevant data which is a major strength of this research method (Jacobsen, 2002).

d) When analyzing current or contemporary situations when it is not possible to manipulate relevant variables, case studies are preferred compared to other research methods (Merriam & Nilsson, 1994).
e) Case study research is useful in creating hypotheses (Jacobsen, 2002). These hypotheses are important in framing future research and this is essential in contributing to continuous knowledge advancement for any particular field (Merriam, 2009).
f) Another advantage of case study is it is able to add existing experience and improve humanistic understanding to any research (Stake, 1978).

Although there are many advantages in using case study in descriptive research, this method has some limitations:

a) Highly labour intensive – according to Miles (1979), running case study research requires an added degree of energy since it can be very labour-intensive and time consuming. This is directly responsible for generating stress on the researchers, and is especially common for a lone researcher.
b) Practical problems in execution - Execution of case study research may lead to practical problems such as access to information, value imputation by different actors, manipulation by actors and bias introduced due to internal organizational political dynamics (Schell, 1992).
c) Cannot generalize from a single case - There may be certain difficulties generalizing case information to other situations. This is especially true when there are few cases of a critical phenomenon (Flyvbjerg, 2006).

The last point on generalization is one of the biggest concerns and most common critiques against case studies; as “it lacks scientific generalizability” (Soy, 1997). However, Ritzén et al. (2016) claim that case studies are generalizable to theoretical assertions rather than to populations or universes. The objective of the case study is “to extend and generalize theories (analytical generalization) and not to count frequencies (statistical generalization)” (Yin, 2003). With the same argument, Yin (2013) suggests that case study is useful

"in evaluating highly broad and complex initiatives; for example, systems reforms, service delivery integration, community and economic development projects, and international development". This research is a complex initiative on integration of two different green domains in the scope of international development, therefore using the case study method is appropriate and justifiable.

The method of case study can be either one single case or multiple cases that uses detailed data collection from multiple sources of information (Bryman, 2016). In this project, exploratory and descriptive case studies are used to identify impacts of green HRM integrating with green SCM for SMEs in three different markets, as the researcher will want to carry out cross-market comparison for further enhancing the knowledge in corporate sustainability and environmental management. Hence, it is a multiple case study research – several cases are being reviewed and examined thoroughly, to understand the similarities and differences between these cases. According to Yin (2003), multiple case studies can be either:

(i) "a literal replication – predicts similar outcomes/results; or
(ii) a theoretical replication – predicts contrasting outcomes/results but for predictable reasons".

3.4.2 Target Selection in Case Studies

According to Yin (2009), "multiple cases are chosen for theoretical reasons such as replication, extension of theory, contrary replication, and elimination of alternative explanations". In this research, the three economies in Asia (China, Taiwan and Thailand) were selected based on multiple factors: size of GDP (IMF, 2017), Environmental Performance Index (EPI) and ease of access to data collection (Table 3.1):

Economies	GDP Estimate (2017) in USD billion	EPI Ranking (2018)
China	11,937	120
Taiwan	571	23

Thailand	437	121

Table (3.1) EPI and GDP of Taiwan, China and Thailand

- China has an economy with second largest GDP in nominal terms, after the United States. However, it is ranked poorly under the Environmental Performance Index (EPI) as compiled by Yale University which covers both Environmental Health (50%) and Ecosystem Vitality (50%) in the final index computation (Yale, 2018). As China is a large country ruled by the Communist party with challenging environmental conditions, SMEs operating in such a business atmosphere can offer rich insights into facing continuous challenges and pressures due to increasing demand for eco-friendly products from internal and external stakeholders.

- Taiwan is considered a mid-sized advanced and democratic economy ranked 22nd in terms of GDP based on IMF computation. It is ranked 23rd in the EPI (2018) which is considered one of the best among Asian economies (beside Japan). Studying Taiwan's SMEs in this research is important to uncover valuable understanding of a greener economy in the aspect of environmental conservation.

- The third economy selected in this research is Thailand, led by a military-linked government and located in South East Asia. Similar to China, Thailand is a developing country with strong focus on manufacturing exports. However, Thailand has a much smaller GDP according to IMF data. It is ranked next to China in the EPI assessment with lots of opportunities for continuous improvement on green management. The three SMEs selected in this research are actually founded by foreign investors (Japan and Taiwan). These astute businessmen not only invested in funding but also advanced management knowledge that helps to improve environmental protection in Thailand.

The most important factor to consider when choosing cases for research is the accessibility to data collection. Although it is ideal to plan ahead on which markets and companies are best suitable for the research, the practical

limitation facing all academic researchers is whether the selected targets are willing to offer full cooperation during the case study. Due to the fact that the researcher has many years of overseas working experience in these three markets, a strong local support network has been established to approach and request selected SMEs to provide full cooperation in this research. The ten selected enterprises in Taiwan, China and Thailand involved in this project provided great support during data collection and on-site visits to their factories; this has contributed to the overall success of this study.

Using three different Asian economies in the selection of case studies will help to enhance the proposed theoretical framework based on SMEs operating in different external environments with various levels of green development in the society. The other criteria used in the case selection for the SMEs in each of the three economies are:

a) As this research is focusing on green supply chain management, selected targets must be in the production or manufacturing industries with at least one production facility (factory setup). Such enterprises usually have larger environmental impacts on society compared to firms in the service industry.
b) In order to ensure the selected cases are relevant to green management, all the enterprises involved must be certified with an ISO-14001 environmental management system.
c) All selected enterprises must agree to provide full access to one of their production facilities to enable successful collection of research data.

The following is a list of small enterprises which were selected and participated in this research in the three different economies (Table 3.2):

Country / Economy	Company	Managers involved in Case Study	Type of trade	Location
Taiwan	Uwin Nanotech Co. Ltd.	GM/CEO/Founder – 8 years' experience Human Resource Manager – 7 years' experience	Electronic Waste Recycling	New Taipei

		Logistics Manager – 6 years' experience Production Manager – 6 months' experience		
	EER	General Manager – 20 years' experience Section Head of HR Dept. – 4 years' experience Process & Regulatory Manager – 8 years' experience	Electric Appliances Recycling	Taoyuan
	RDH	GM - 15 years' experience Safety Manager – 11 years' experience	Metal Smelting	Taoyuan
China	BYM	General Manager – 10 years' experience	Leather Manufacturer	Fuding, Fujian
	YDL	Deputy General Manager – 12 years' experience Factory Manager – 4 years' experience	Leather Manufacturer	Fuding, Fujian
	SDA	Vice General Manager (production) – 10 years' experience Logistics Manager – 5 years' experience	Seafood Manufacturer	Ningde, Fujian
	YHS	MD – 4 years' experience	Seafood Manufacturer	Ningde, Fujian
Thailand	TFC	HR Manager – 27 years' experience Maintenance/Safety Manager – 26 years' experience Export/Import/Warehouse Manager – 2 years' experience	PVC Piping Manufacturer	Nakhon Pathom
	UFC	Quality Control & Assurance Manager – 28 years' experience	Sweetener Manufacturer	Samutprakan

		Human Resource Manager – 2 years' experience Production Manager – 16 years' experience		
	THI	Production Control Manager – 16 years' experience QC Manager – 1 years' experience	Brass Part manufacturer	Pathum Thani

Table (3.2) List of SMEs Selected in this Research

Please take note that, only Uwin in Taiwan was willing to use its true company identity in this research, the other nine companies have requested their real company names not be disclosed in the study due to commercial confidentiality.

3.5 Qualitative Data Collection Methods

This research was conducted with a combination of questionnaires survey being sent to the lead person of the company in advance to solicit inputs in writing, followed by face to face discussion during on-site factory visit. Focus group discussion was used when there are more than one respondent joining the dialogue. The following Table 3.3 is the summary of different data collection methods used in each case:

Method	Arrangement for data collection
Questionnaire survey	All companies received a set of questionnaire before researcher visiting their factory. All questionnaires were returned to researcher one week before site visit, however, many of the questions were not answered properly.
Interview	One on one interview was conducted in the following cases: a) MD of UWin

	b) GM of BYM c) MD of YHS d) Vice GM and Logistics Mgr of SDA – both of them working in different offices.
Focus group discussion	Focus group discussion was carried out in all companies except BYM, YHS and SDA.

Table (3.3) Arrangement of Data Collection

To illustrate further, the following are the three data collection methods chosen and used in this project:

3.5.1 Questionnaire

A questionnaire survey can be structured or unstructured. In most cases qualitative researchers usually apply "semi-structured" interviews which consist a number of open ended questions based on the subject areas that the researcher would like to cover. Open-ended questions offer richer insights and information from respondents as they are not bound by a limited choice of answers. However, there are some disadvantages in using open-ended questions in research if they are not applied appropriately:

(1) Poor or irrelevant responses from interviewees as they may not fully understand the questions.
(2) Bad answers from respondents when the open-ended questions are administered via online or by post. Researchers usually have difficulty analyzing and interpreting the responses under such an arrangement.
(3) It is usually more time consuming answering a questionnaire with open-ended questions. This also impacts the response rate and quality of the responses.

3.5.2 Focus group

In general, focus group interview is another commonly used tool for qualitative research where a small group of people are selected and consulted about their

views or perceptions about a particular subject (Krueger, 2002). The questions asked are usually semi-structured and open-ended to ensure more information is exchanged during the discussion. In some cases, the focus group interview was used during face-to-face on-site visits at the selected SMEs in this study.

According to Krueger (2002), the preferred size of a focus group should be 6-8 participants; however, the number of interviewees participating in focus group discussions was only 2-3 in this research project. Because of the limited number of management staff from these small enterprises, it was impossible to expect 6-8 managers to join a 3-hour focus group discussion during busy working hours.

The challenge faced in the focus group discussions and individual interviews was the use of local language – Mandarin (Chinese) in China and Taiwan, Thai language in Thailand. As the researcher is bilingual in English and Mandarin, the interview transcripts could be translated into English without any difficulty. However, a local translator was hired in Thailand to support in the face-to-face interviews and translation of data sources if they were in the local Thai language.

3.5.3 Observation

On-site observation is used in this research to validate some of the claims provided by the respondents during interview. 2-3 hours of on-site observation at the factory was required to observe some of the green management practices as shared by the respondents. On rare occasions, the researcher was allowed to take photos during on-site observations. However, photo taking was strictly prohibited in most cases as the companies considered their anonymity.

The other limitation in the observational method was the restricted access to the production facilities of the selected SMEs. Due to the confidentiality of the production process, as well as shop floor safety issues, the researcher could only access the facility partially in some cases.

To ensure higher quality data could be obtained for this study, two stages of data collection were employed. A questionnaire (Appendix 1.0 & 2.0) was sent to selected respondents via email to be returned within 14 days. An on-site visit

to the factory followed when the researcher conducted a second round of data collection face to face via focus group discussion in order to seek further clarification on the questions asked. This helped to improve the quality of the responses from the interviewees. In this study, the researcher visited the factory premises of all ten SMEs for one day (7-8 hours) to conduct focus group discussions as well as for on-site observation.

3.6 Pilot Study

A pilot study can be defined as a "small study to test research protocols, data collection instruments, sample recruitment strategies, and other research techniques in preparation for a larger study" (Steward, 2004). It is an important step in any research project to uncover any weaknesses and gaps in the survey instruments (such as questionnaires) and overall arrangement before replicating over to other cases. It is critical to conduct a pilot study using an exploratory case study to improve the reliability of the research findings, but also to avoid wasting other people's time during on-site visits and observations if not planned carefully.

Uwin in Taiwan was used as the pilot study in this research to assess the appropriateness and completeness of the questions asked in the focus group discussion as well as the total time taken to complete on-site interviews and the factory visit. The following issues were identified and rectified for the other case studies:

i. Not all the management staff interviewed in the case study fully understood the concepts of GSCM and GHRM. Some of them asked the researcher to quote some examples of green practices as implemented in other companies.
ii. Some of the questions used in the interview were not clear to the participants in the company. The responses given by them had to be modified after further clarification during face-to-face discussion.
iii. Although the researcher is bilingual and had no problem communicating with the participants in Mandarin, some of the

technical jargon used in Taiwan was different from that commonly used in China or Singapore.

In order to rectify the above issues, the following enhancements were made before the start of actual case studies:

(a) A supplementary document was provided to all participants with simple definitions of each element under GSCM and GHRM to assist them in better understanding the key concepts used in the research.

(b) Some questions were rephrased to ensure all participants could understand them easily.

(c) The technical jargon used in the questionnaire for China and Taiwan was revisited a few times to ensure correct terms were used. This was important to avoid confusion, unnecessary mistakes and misunderstanding.

Learning from the pilot study, it was also important to know that not all the managers were available to meet and discuss during the focus group sessions. In view of the limited availability of everyone (including the researcher), arrangements had to be planned in detail with consultation with the company coordinator to ensure the researcher could meet as many managers as possible.

3.7 Data Analysis

This is the most important step of any research project. After spending a lot of time with the selected enterprises in collecting data through the questionnaire surveys, face-to-face interviews, focus group discussions and on-site factory observations, the next step was an in-depth content review of the interview transcripts, photographs, observational notes and additional documents (company brochures, job descriptions, company handbooks and standard operating procedures).

Content analysis has been used in this research. It can be defined as "an overall approach, a method, and an analytic strategy that entails the systematic examination of forms of communication to document patterns

objectively" (Marshall & Gretchen, 1995). According to Trace (2001): “content analysis is generally applied to narrative texts such as political speeches, transcribed interviews, and published literature, and seeks to elucidate, through close examination of the content and language of these texts, what can be learned about authors’ or respondents’ understanding of phenomena and terminology, as well as their beliefs”. Content analysis is a category of research methods “at the intersection of the qualitative and quantitative traditions” gaining increasing popularity among organizational researchers (Duriau et al., 2007).

3.7.1 Thematic Analysis

Thematic Analysis is an important technique under the category of the content analysis method. It is the process of identifying patterns or themes within qualitative data (Maguire & Delahunt, 2017). The aim of thematic analysis is to identify patterns of meaning across a dataset that provide an answer to the research question being addressed (University of Auckland, 2018). In general, there are two different ways of thematic analysis:

- Inductive approach – coding and theme development are strongly linked to the data because assumptions are data-driven (Boyatzis, 1998)
- Deductive approach – coding and theme development are linked to existing theories or concepts, the analysis of data is usually restricted to the preconceived frames (Crabtree, 1999)

In this research, qualitative data analysis is largely based on the inductive approach except on the portion of major barriers in GSCM adoption, which is based on the deductive approach with predetermined categories provided to the respondents.

According to Braun and Clarke (2006), the following six-phase process is used to carry out thematic analysis:

1. Familiarization with the data – this first step involves reading and re-reading the transcripts to ensure the researcher is very familiar with the content before any coding can be done.

2. Generating initial codes – This step involves generating simple labels to identify important features of the data that might be relevant to answering the research questions.
3. Searching for themes – As defined by Maguire and Delahunt (2017); “a theme is a pattern that captures something significant or interesting about the data and/or research questions”. In this step, the initial codes are examined and some of them may be classified together into potential themes.
4. Reviewing themes – In this step, the broader themes identified in step-3 are further reviewed, modified and refined. This is to ensure they are relevant and making sense to the research questions. Preliminary themes are sometimes split, combined, removed or refined under this phase.
5. Defining and renaming themes – This is an important step to develop a full story on each selected theme that is relevant to the research question. The detailed scope and definition of each theme are clearly determined, as well as these themes being named officially so they can be easily understood by readers.
6. Writing up – The final step in thematic analysis is to write the research report by linking all relevant literature, theories and concepts together with the identified themes pertinent to the research. This is vital to ensure research findings can be shared and discussed by other researchers for knowledge contribution.

In this research, the six-phase approach is used to analyze the data from the case studies. Although there are many off-the-shelf software packages available to be used for thematic analysis, the researcher used Microsoft Word to analyze the data manually. Even though it is quite tedious, it is still manageable and cost effective.

3.7.2 Research Quality

In academic research, the three common factors influencing research quality are validity, reliability and generalizability. These concepts are heavily linked

to positivist epistemology in quantitative research, however, there has been increasing attention in the discussion of qualitative research.

In order to improve validity in this research, triangulation was used to validate the data and results by capturing different dimensions of the same phenomenon (Regmi, 2014). Similarly, according to Yin (2009): “drawing on a variety of sources allows the researcher to provide a richer and more detailed picture and at the same time makes the results and conclusions of the research more accurate and convincing”. As stated, a questionnaire survey was sent to the respondents in advance to collect the initial data. This was followed by an on-site visit to the SMEs for face-to-face discussion to uncover more insights. This is in line with what was suggested by Jick (1979); “Survey became more meaningful when interpreted in light of critical qualitative information just as other statistics were most useful when compared with content analyses or interview results”.

The use of different methods in this study is to reduce the potential risk that the research results or conclusions maybe distorted due to “the systematic biases or limitations of a specific method” (Pasutham, 2012). Additional information is also used in this study; the following is a list of additional sources of secondary data retrieved and used to validate the data obtained in the interviews and on-site observations:

a) Company website
b) Government reports and database on green enterprises
c) Product brochures
d) Internal SOPs
e) Job descriptions (JDs)
f) Company policies
g) News from public media

As discussed by many scholars and researchers on the suitability of measuring reliability in qualitative research, the terms of consistency, applicability and neutrality are relevant to assess the credibility of a qualitative research project (Lincoln & Guba, 1985). To enhance these dimensions, the following actions were implemented:

1) The multiple case study method is employed to account for similarities and differences. This is to ensure various perspectives are clearly documented and discussed.
2) Biases are acknowledged in case selection and ongoing critical reflection of research methods to ensure sufficient depth of data is collected and analyzed (Sandelowski, 1993).
3) Validation with respondents – Actively discussing with the respondents after preliminary data analysis and seeking opinions on "whether the final themes and concepts created adequately reflect the phenomena being investigated" (Long & Johnson, 2000).
4) Continuously demonstrating clarity in terms of thought processes and to keep a clear decision trail to ensure interpretations of data are consistent and transparent throughout the entire research (Sandelowski, 1993).

Generalizability can also be referred as transferability. Transferability can be defined as "the degree to which the results of qualitative research can be transferred to other contexts or settings with other respondents" (Lincoln & Guba, 1985). In simple terms, transferability implies that knowledge which was acquired in one study will be applicable in another and researchers who carry out research in a separate study will be able to utilize certain concepts and learnings which were initially developed. In order to enhance the transferability of one study, it is important for the researcher to provide "a thick description" on the research process as well as results and findings. As suggested by Lincoln and Guba (1985), this is to enable other researchers "interested in making transfer to reach a conclusion about whether a transfer can be contemplated as a possibility". This is exactly what is being done in this research, detailed descriptions of each case study are presented in this thesis, together with thorough discussion on the data analysis and interpretation covered in the subsequent chapters, to provide sufficient information for any researcher who may be keen to use some of the concepts and results in another study.

3.8 Summary & Conclusion

Due to the full-time work commitments of the researcher, this research was conducted under a part-time arrangement with the university. The main challenge of part-time doctorate research is the constant struggle for time. This problem can be aggravated when the researcher is required to travel overseas for frequent business engagements. Another major challenge in this research was to find suitable SMEs that were keen to take part in the research. These challenges were mediated by strong discipline and time management, together with good support from local friends and business networks in the search for suitable SME candidates for case study.

This chapter outlined the research strategy of this research project. As a descriptive research, this chapter provided justification for using case study as the main research methodology, together with different data collection methods (questionnaire, focus group and observation). A detailed explanation of the selection criteria of the case study targets was also provided in this chapter based on the three selected economies in Asia. Equally important is the discussion on using thematic analysis in the data analysis phase, together with strong measures used in the project to ensure high research credibility in the attributes of validity, consistency and transferability.

Chapter 4

Data Analysis & Interpretation

4.1 Introduction

In the previous sections, the researcher embarked on a comprehensive review of all available research literature relevant to this study, together with a proposed integrative research framework. Thorough evaluation of different types of research methodologies and techniques was also carried out to determine the appropriate research methods and tools to be applied in this project.

In this chapter, detailed background and organizational structures of the ten SMEs taking part in this research are shared. This is followed by in-depth analysis of the GSCM and GHRM practices adopted by these enterprises, as well as their motivations for, and barriers to, green adoption. A dedicated section focuses on the investigation of the impacts of GHRM on GSCM in these enterprises. Lastly, this chapter presents a discussion of the benefits and challenges on the implementation of GHRM practices as discovered after working with these SMEs.

4.2 SMEs Involved in Case Study Research

All the ten SMEs involved in this research were from Thailand, China and Taiwan. The following is a quick recap of the basic information of these companies (Table 4.1):

Country / Economy	Company	No. of Managers involved in Case Study	Type of trade	Location
Taiwan	Uwin Nanotech Co. Ltd.	4	Electronic Waste Recycling	New Taipei

	EER	3	Electric Appliances Recycling	Taoyuan
	RDH	2	Metal Smelting	Taoyuan
China	BYM	1	Leather Manufacturer	Fuding, Fujian
	SDA	2	Seafood Manufacturer	Ningde, Fujian
	YDL	2	Leather Manufacturer	Fuding, Fujian
	YHS	1	Seafood Manufacturer	Ningde, Fujian
Thailand	UFC	3	Sweetener Manufacturer	Samutprakan
	TFC	3	PVC Piping Manufacturer	Nakhon Pathom
	THI	2	Brass Part manufacturer	Pathum Thani

Table (4.1) Basic information on ten SMEs involved in case study

4.2.1 Case Studies in Taiwan

Taiwan, officially referred as the Republic of China (ROC), is an Asian economy located in East Asia. The total population of this island is around 23.5 million with about 95% Han Chinese. Based on IMF estimates, Taiwan's GDP in nominal USD is around 602 billion, 24th in world ranking (IMF, 2019). The major industries in Taiwan are electronics, petroleum refining, chemicals, machinery, consumer products and pharmaceuticals.

According to the department of Small and Medium Enterprise Administration (SMEA) which is under the Ministry of Economic Affairs, the following is the definition of SMEs in Taiwan for firms that fulfill any of these conditions (SMEA, 2017):

1) In the manufacturing, construction, mining and quarrying industries, a paid-in capital of NT$80 million (US$2.42 million) or less; or
2) In the manufacturing, construction, mining and quarrying industries, the number of regular employees must be less than 200.

There were more than 1.43 million SMEs in Taiwan (SMEA, 2019) in 2017 accounting for 97% of all enterprises. In this research, three SMEs were involved in the case study, the details of the cases as well as responses from the interviewees are presented in the following section.

The three companies took part in this research are outlined as follows:

4.2.1.1 UWin Nanotech

UWin Nanotech was selected as the pilot study candidate in this research, it is based in New Taipei City which is in the northern part of Taiwan. Uwin Nanotech is a high-tech recycling manufacturing company with a total annual revenue of USD 3 million. This company was founded in 2009, specializing in designing and producing environmental metal strippers for the electronic Printed Circuit Board ((PCB) industry. Since inception, the company has been active in quality and environmental improvement. In May 2014, Uwin Nanotech successfully certified with ISO 9000 (quality management systems) and ISO14001 (environmental management systems).

Uwin Nanotech was recommended to take part in this case study by the Environmental Bureau of Taiwan due to its active involvement in green SCM in Taiwan as well as internationally. Four executives, with average tenure ranging from 6 months to 8 years were involved in the focus group discussion to understand the implementation of integrated Green SCM and Green HRM in UWin Nanotech.

Organizational Structure

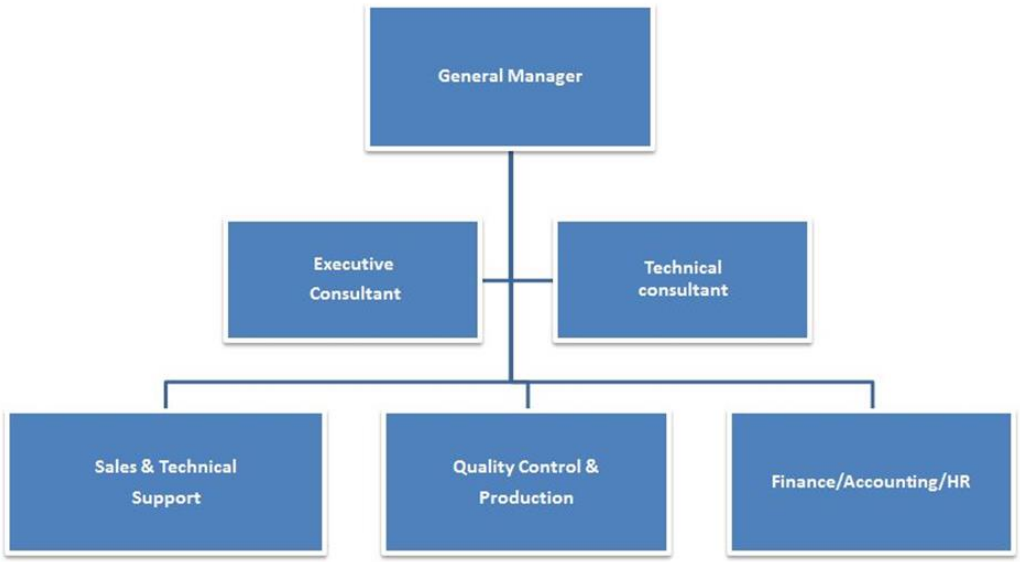

Figure (4.1) Organizational structure of UWin Nanotech

UWin Nanotech is a small enterprise with 16 staff. The company is run by the General Manager (GM), who is also the founder and CEO of the company. He is assisted by two consultants with strong technical expertise and know-how in the green technology for PCB waste recycling. According to the organization chart (Fig. 4.1), there are three major departments under the GM:

- Sales & Technical Support This group of employees are fully responsible for bringing in customers and sales, as well as for providing technical support to clients during after sale support.
- Quality Control & Production – This department is fully in charge of manufacturing final products. It also handles shipping and quality control.
- Finance, Accounting & HR – This is the admin department providing back-office support for the day-to-day administrative activities. The purchasing function is also under this department.

The most common method of processing electronic waste generated from the PCB production is open burning. However, this method generates hazardous gases as well as emitting large volumes of carbon dioxide, causing severe air pollution. UWin Nanotech has invented a new recycling technique using a hydrometallurgy process to recycle electronic waste from the PCB industry, this

new technique has been patented in many countries. With this new procedure UWin Nanotech supplies different recycling tools and machines to waste recycling service providers as well as providing recycling services for electronics waste.

This case was used as the pilot study. The founder of UWin Nanotech had no problem with full disclosure of company identity and information in this research. However, this was the exception; all other SMEs interviewed in this project wanted to maintain anonymous due to commercial confidentiality.

4.2.1.2 EER

EER is a recycling service provider of used electrical household appliances such as washing machines, televisions, refrigerators and electric fans. The company was founded in 1998 with the HQ office located in Taipei city, and two factories in Taoyuan County. The main investors in this company are major household electric products manufacturers from Japan and Taiwan. The main objective is to recycle used electric household items in order to prevent any environmental pollution due to the disposal of used appliances.

EER has been certified under ISO-14001 environmental management systems since 2004. In addition, the company also obtained the certification of the Electronic Industry Citizenship Coalition (EICC) and ISO 50001:2011 under energy management systems. The two recycling plants in Taoyuan County had a total head count of 125 in Jan 2018 and they have been listed on the stock exchange of Taiwan since March 2018. About 40% of the company's income is from government subsidies and the other 60% is from the sales of used electronic parts after recycling.

EER was introduced by a local contact in Taiwan to take part in this research project. Three management staff were interviewed during an on-site visit in early 2018.

Organizational Structure

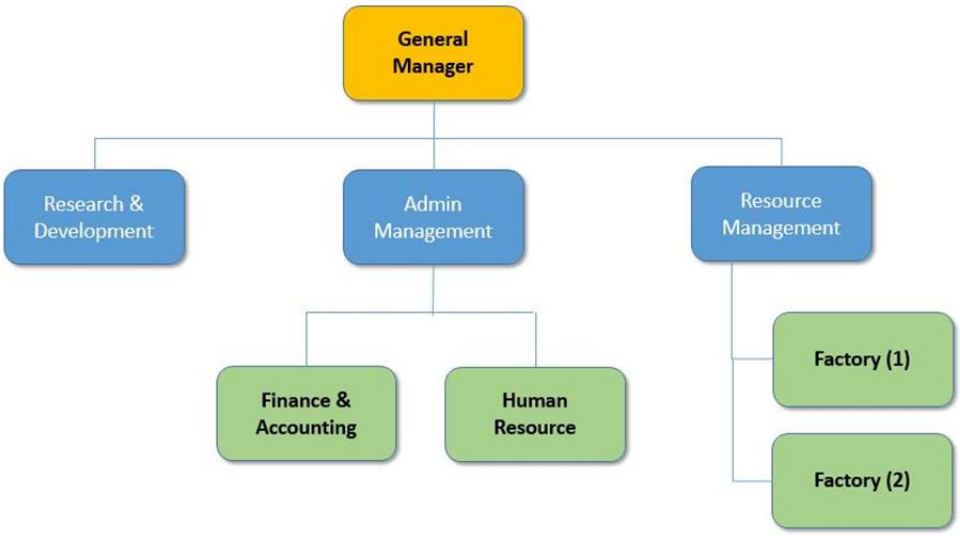

Figure (4.2) Organizational structure of EER

As mentioned previously, EER was founded by a group of electrical home appliances makers from Taiwan and Japan. Based on the organizational setup (Figure 4.2), the company is led by a general manager reporting to the board of directors consisting of representatives from the major shareholders. The two factories located in Taoyuan County have recycling operations together with logistics and warehouse functions. This company has a relatively flat and simple organizational structure: there are three departmental managers in-charge of R&D, Administration and Resource (Production) with section managers supporting in different sub-sections such as plant management, human resource, finance and accounting.

4.2.1.3 RDH

RDH is a tin metal smelting and recycling company based in Taoyuan city of Taiwan. It was founded in 1995 with only four employees (including the founder). After 23 years, the company has grown into a medium sized enterprise that has 130 staff today. RDH is a licensed recycling service provider specializing in recycling PCBs (Printed Circuit Boards) and extracting tin materials for re-use. The extracted tin is molded into tin bars with purity up to 99.95%. They are now being sold in both local and international markets. The company has successfully obtained the ISO-14001 certification, as well as ISO-

50001 certification on efficient energy management in 2010. RDH is also a current member of the Electronic Industry Citizenship Coalition (EICC) from the Responsible Business Alliance. This membership can only be achieved after a thorough audit by qualified assessors to evaluate the company in the social, economic and environmental conditions of its global electronic supply chain through the use of a standardized code of conduct.

This case study was made possible through the referral from the founder of UWin Nanotech. The General Manager and the Manager of Safety & Environment Control agreed to take part in the focus group discussion during the on-site visit.

Organizational Structure

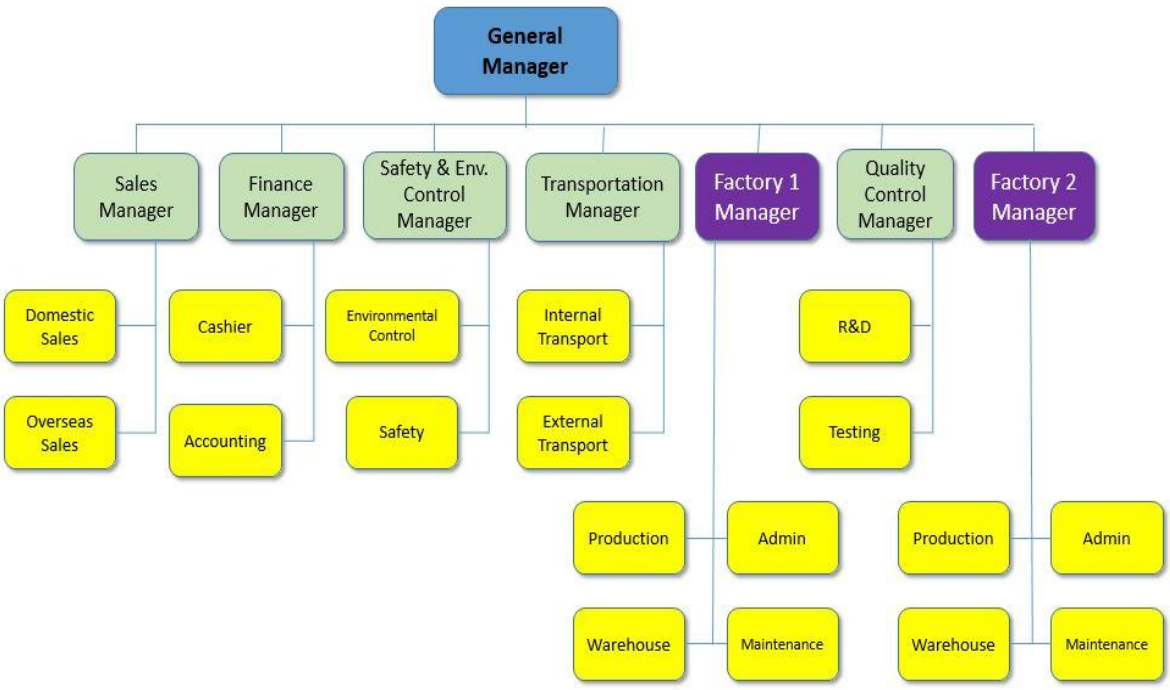

Figure (4.3) Organizational structure of RDH

The daily operations of RDH are managed by a general manager (GM) who is the second son of the founder. He is supported by several managers under different departments as shown in Figure 4.3. During the onsite visit in Dec 2017, RDH had two factories in operation and the third plant was under construction. According to latest update, they plan to expand their operations with a fourth factory in the next 12 months.

4.2.2 Case Studies in China

China (the People's Republic of China) is a developing country in Asia with the world's largest population of about 1.4 billion. Based on the latest data from the IMF, the nominal GDP of China was about USD 14.17 trillion in 2018 (IMF, 2018), which is second after the USA. China has grown at a rapid pace over the last 30 years, with an average GDP growth rate of 9.58% from 1989 to 2018 (Trading Economics, 2019). As the world's factory, manufacturing is the largest industry in China, together with the service and agriculture sectors, which are also big in economic and employment contribution. China is the world's largest exporter that supplies most of the electronic consumer products and home appliances to many countries.

According to the SME Promotion Law of China as published in 2003, any enterprise under a specific industry with a total employee count of less than 300, or annual revenue less than 30 million RMB can be classified as a SME. The number of SMEs in China is very large, and they currently make up about 97.9% of all enterprises in China (Hoffmann, 2017). Furthermore, the total number of employees in SMEs is about 82% of the overall employees in China. Four SMEs located in China have been involved in this research. All of them, based in Fujian province, were introduced to the researcher by local contacts.

4.2.2.1 BYM

BYM is a leather manufacturer based in Fuding city of Fujian Province, China. It was founded in 2006 with a registered capital investment of 41 million RMB. BYM's main products are synthetic leather, microfibre leather and filling acrylic resin. Their manufacturing plant is located in Long-An industrial development park, which is a specially designed economic development zone for leather manufacturing companies.

In order to ensure the company is in compliance with basic environmental conservation best practices, BYM applied for and successfully obtained ISO-14001 environmental management system certification in 2015.

Organizational Structure

The following is the basic organization structure of BYM:

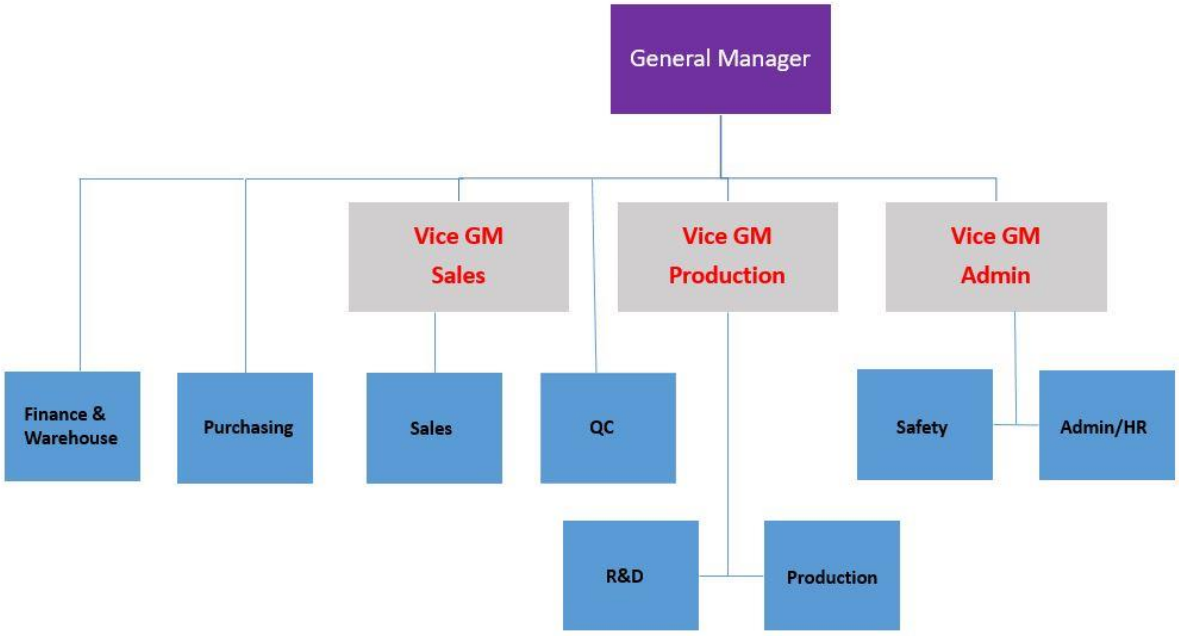

Figure (4.4) Organizational structure of BYM

As presented under the organizational structure (Figure 4.4), the overall business of BYM is managed by a general manager, together with three vice GMs assisting him in running various functions: Sales, Production and Admin. He has direct responsibility for other functions such as Finance and Warehouse, Purchasing and Quality Control. The total workforce of this company is about 200.

This case study was conducted in Nov 2017 with a one-day onsite observation at BYM factory and a face-to-face interview with the general manager.

4.2.2.2 SDA

SDA is a local SME based in Fujian province, which is located in the South-East coastal area of China. It was founded in 2007 with a capital investment of 28 million RMB. SDA is a seafood manufacturer, with main products ranging from fish, sea cucumbers, abalones, prawns and scallops. Not only producing frozen seafood products for exporting to foreign markets such as the USA,

Canada, Japan, South Korea and Australia, they also produce dried food products mainly catering for domestic consumers in China. The manufacturing facility is located on the outskirts of Fuzhou with more than 30,000 square metres, using the latest food production equipment and techniques to ensure high product quality.

SDA has a permanent workforce of 230 employees, about 15% of them are university graduates, mostly working in management and back office support functions. Besides passing the annual inspection by the local Environmental Bureau, this company also successfully obtained the certification of ISO-14001 in 2014 for their manufacturing facility. In order to study this enterprise, a one-day observation was carried out at their manufacturing facility, together with face-to-face discussions with two of their senior management staff.

Organization Structure

SDA is managed directly by the founder who is also the General Manager of the enterprise. As an experienced entrepreneur for many years, the founder is quite popular and well respected in the local business community. In SDA, he is supported by four Vice General Managers in charge of different portfolios as outlined under the following organization chart (Figure 4.5). The HQ office and the production facility are all under one roof located in Ningde city of Fujian province.

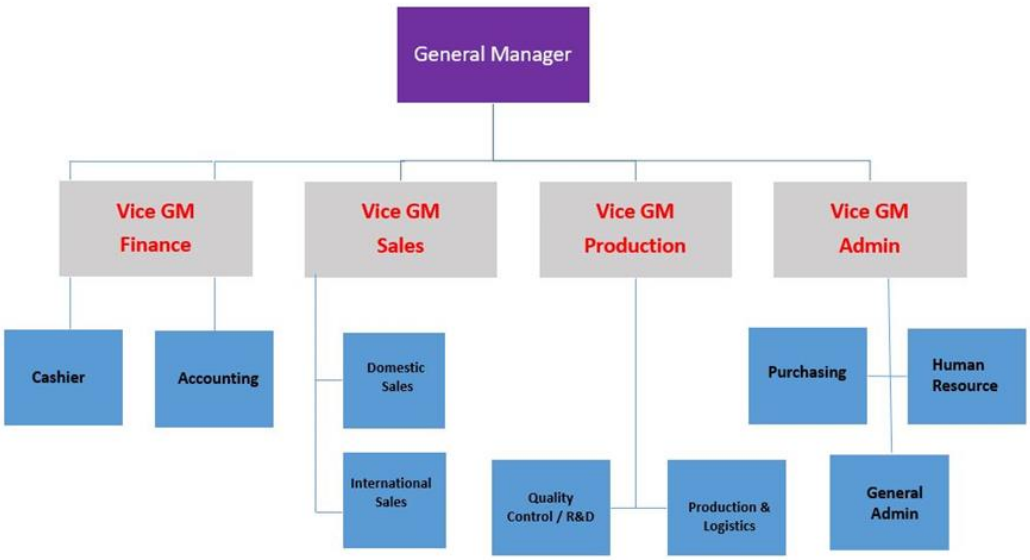

Figure (4.5) Organizational structure of SDA

4.2.2.3 YDL

YDL is a leather material manufacturer located in the special leather export processing zone of Fuding city. It was founded in April 2006 with a paid-up capital of 6.8 million RMB. The main products of YDL are synthetic leather and microfibre resin. It is a small enterprise which had about 195 employees in 2017. YDL has been an ISO-14001 certified company since 2011. They have introduced both Green Human Resource and Supply Chain Management in their day-to-day operations to minimize negative impacts to the environment. However, based on a report (2017) from the local environmental bureau of Fujian province, YDL was listed as one of the potential enterprises with higher risk in environmental pollution.

Organizational Structure

The organizational setup of YDL is relatively simple (Figure 4.6), the company is headed by a general manager with full support from a deputy GM. There are two departmental managers under them: factory manager and safety and admin manager. The largest department is Production which has about 75% of the total workforce. They are supported by the admin groups that have sales, procurement, finance and HR functions. Warehouse operation is part of the

finance group in order to ensure better control over raw materials and finished goods.

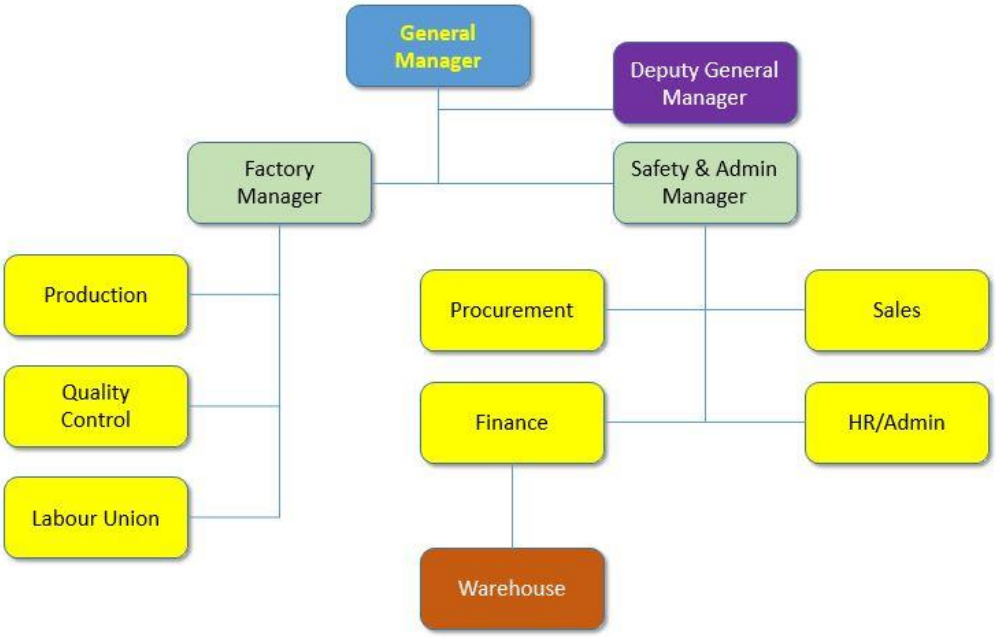

Figure (4.6) Organizational structure of YDL

4.2.2.4 YHS

YHS is a seafood manufacturer based in Ningde city of Fujian Province in China. It was established in March 2001 with a paid-up capital of 30 million RMB. YHS is a small enterprise with about 200 employees, 20% of the workforce are management staff. During the early days of start-up, YHS worked closely with Fujian Agriculture and Forestry University to develop a full range of seafood products based on yellow croaker fish, which is a species of marine fish commonly found in the ocean of the south east region of China. Besides selling to different cities within China, most of these seafood products are exported to Japan, South Korea, Australia, South East Asia, Taiwan and Hong Kong. Currently, the company has established a research partnership with the local universities to setup cold-chain logistics services, this is a project supported by the Provincial Government in Fujian with research funding. YHS has been certified under the ISO-14001 environmental management system since 2010.

Organizational Structure

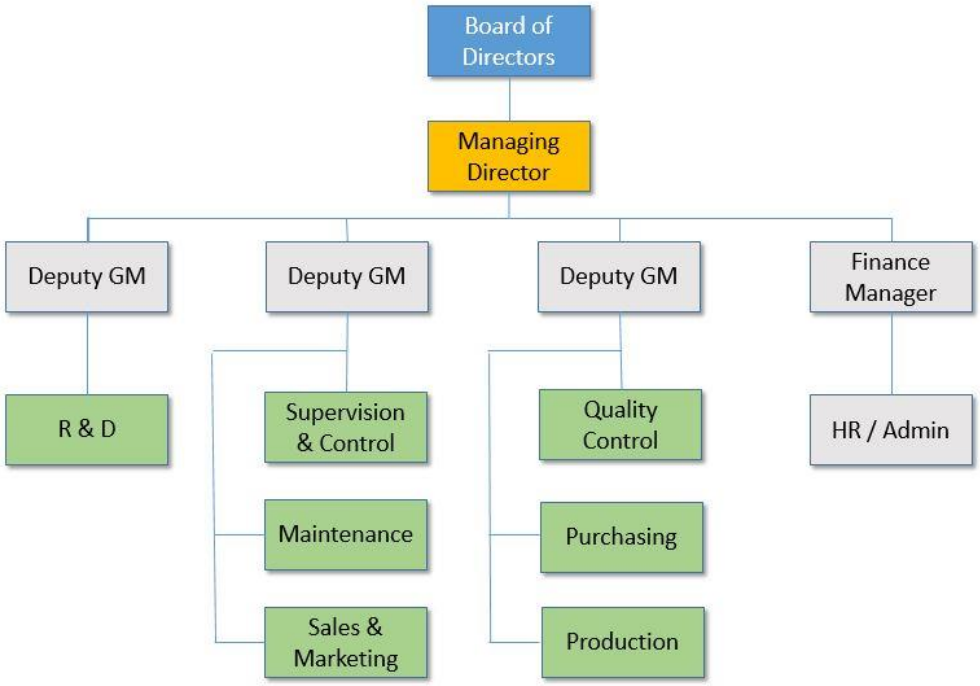

Figure (4.7) Organizational structure of YHS

According to the organizational structure (Figure 4.7), YHS is managed by a managing director who has been with the company for four years. He reports to a board of directors consisting of major shareholders of the company. The MD is assisted by three deputy general managers and one finance manager, looking after different functions of the company. Human resource and general administrative management are under the charge of the finance manager.

4.2.3 Case Studies in Thailand

Thailand is an emerging economy in South East Asia. It is one of the founding members of ASEAN (Association of South East Asian Nations) with a population of about 68 million in the Kingdom. Most commonly known as the "land of smiles", Thailand is famous for hospitality and tourism with friendly local people, fascinating culture and rich heritage. The major industries in Thailand are automobile, tourism and financial services; these top three sectors contribute the largest share of economic growth every year. According to the IMF (2018), Thailand's nominal GDP was USD 524 billion US in 2018.

According to the Ministry of Industry of Thailand, small and medium enterprises (SMEs) can be defined by number of employees or value of total fixed assets (excluding land). The following table (4.2) is the official categorization of SMEs based on different types of industry:

Type	Small		Medium	
	No. of Employee	Fixed Asset Excluding Land (THB Mil.)	No. of Employee	Fixed Asset Excluding Land (THB Mil.)
Manufacturing	50 or less	50 or less	51-200	>50 to 200
Services	50 or less	50 or less	51-200	>50 to 200
Wholesale	25 or less	50 or less	26-50	>50 to 100
Retail	15 or less	30 or less	16-30	>30 to 60

Table (4.2) Classification of SMEs in Thailand (Source: Ministry of Industry, September 2002).

Based on this official definition, there are about 3 million small firms in Thailand, these SMEs providing over 10 million workers nationwide (Christianty, 2018). In the following section, three case studies in Thailand are presented. Due to the language barrier, a local translator was hired to provide translation support during focus group discussions.

4.2.3.1 UFC

UFC is a manufacturer of sugar-free sweeteners based in an industrial estate outside of Bangkok city. It was set up in 1998 by some major investors from Japan. The main products of this company are Sorbitol and Maltitol powder used in the production of candy, beverages or bakeries which are lower in calories. The final products of UFC are exported to many countries, primarily to Japan as well as China, South East Asia, Australia, Canada and the USA.

With a modern manufacturing plant on a 13-acre site, UFC has 190 employees and is classified as a medium enterprise in Thailand. Except a small percentage of the scientists and senior management staff that are from Japan, most of the staff were locally hired and have been with the company for many years with relatively strong employee loyalty. UFC has been certified with ISO

-14001 since 2001, together with many other international quality certifications in food safety such as GMP and ISO-22000.

Organizational Structure

According to the information provided by the company (Figure 4.8), UFC in Thailand is led by a Factory Manager who reports directly to the President of the holding Company in Japan. He is assisted by a Vice Factory Manager who directly supervises the entire day-to-day operations. An Executive Manager reports to the Vice Factory Manager with six main departments under him:

- Purchasing & Accounting
- QC/QA
- Production
- Distribution/Warehouse
- Admin/Safety
- Engineering

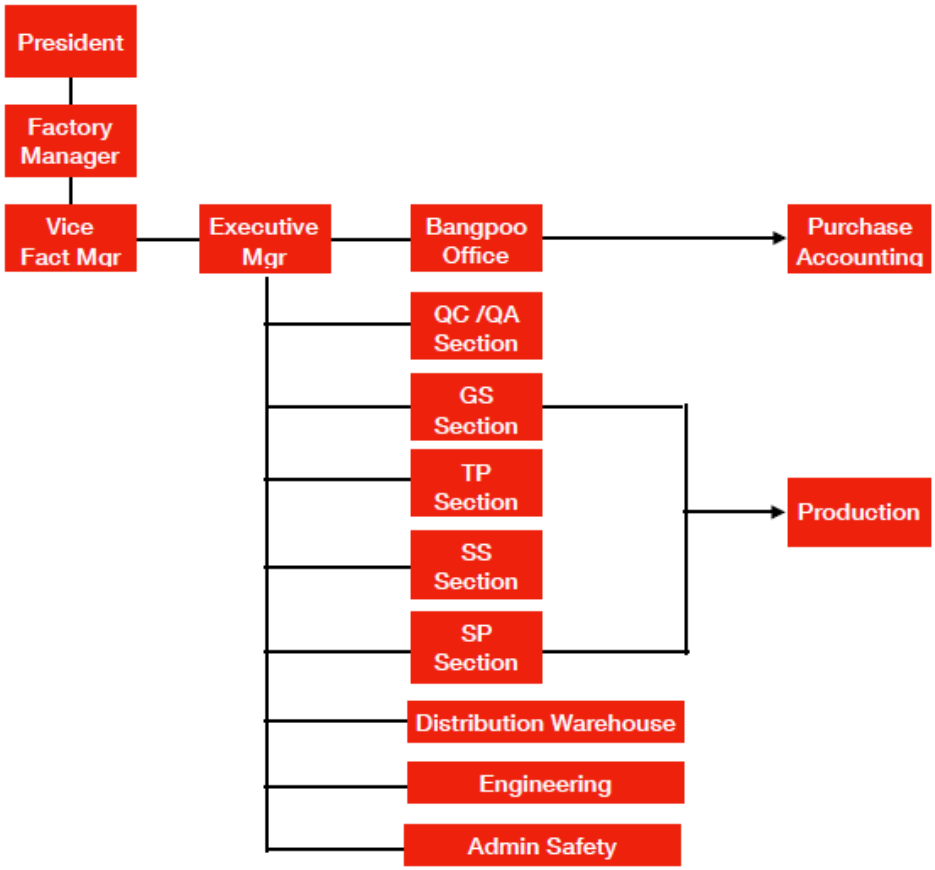

Figure (4.8) Organizational structure of UFC

4.2.3.2 TFC

TFC is a traditional manufacturing firm specializing in producing high quality PVC valves for building installation. This company has been in business for 28 years since 1990. As the founders were originally from Taiwan, there is still a strong connection with the Taiwan government and industry in technology and business exchange. Registered under the Board of Investment (BOI) in Thailand, over 80% of their products are exported to overseas markets such as Europe, Japan and North America.

The manufacturing facility of TFC is located in Nakhon Pathom Province, which is on the outskirts of Bangkok. Currently, there are 150 employees in the company, many of whom have been with TFC for more than 10 years. This company obtained ISO-9001 quality management certification in 2003 and ISO-14001 environmental management system in 2005. Due to the excellent quality of their products, TFC also won a national award of Thailand's Brand in 2007.

Organizational Structure

TFC is a family business, managed by the founder as Managing Director since day one. As outlined in the organization chart (Figure 4.9), the company has four departments running core functions in Production, Safety, Human Resources and Quality Control. As this is a small enterprise, the manager in-charge of HR, who has been with the company since the first year, is also assigned to look after other sections such as molding, technical and maintenance teams. The children of the founder also work in the company after completion of tertiary study, they are under training and development in preparation to take over the company in the near future.

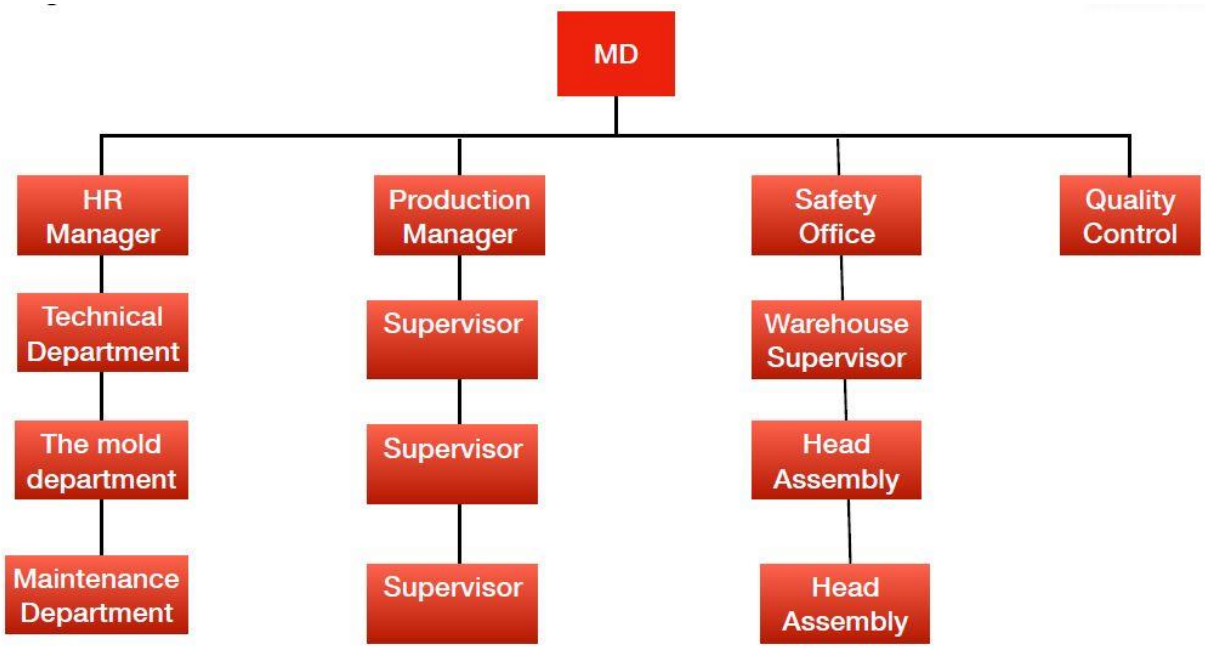

Figure (4.9) Organizational structure of TFC

4.2.3.3 THI

Established since 1995, THI is a manufacturer of brass parts for air conditioners located near Bangkok. The factory is based in Pathum Thani Province (north of Bangkok) with about 130 employees. This company was set up by a group of Japanese investors in the early 1990s to serve as the parts supplier for major Japanese customers in air conditioning industry. Even today, the senior executive management positions are still occupied by Japanese who run the entire company.

THI's main products are distributors, flare nuts, unions, and nut orifices that used in air conditioners. Besides standard parts, they also accept customized design and fabrication orders based on customers' requests. THI supplies most of their products to Japanese customers based in Thailand and Japan such as Daikin Industries, Amagasaki Pipe, Mitsubishi Electric Consumer and Okayama. In July 2007, THI successfully obtained the quality certification of ISO-9001. A year later in July 2008, the company was certified under ISO-14001 under environmental management control.

Organizational Structure

THI is a medium sized enterprise that has a flat organizational structure (Fig. 4.10). The company is led by a Managing Director with a few managers assisting him in running day-to-day operations. Two major functions under the organization are factory and general management. A factory manager is tasked to run the daily production with additional sales responsibility. The General Manager is in-charge of office admin, inclusive of finance and human resource. Other supporting departments are engineering and quality control which are key to ensuring product quality as well as the factory running at optimum efficiency.

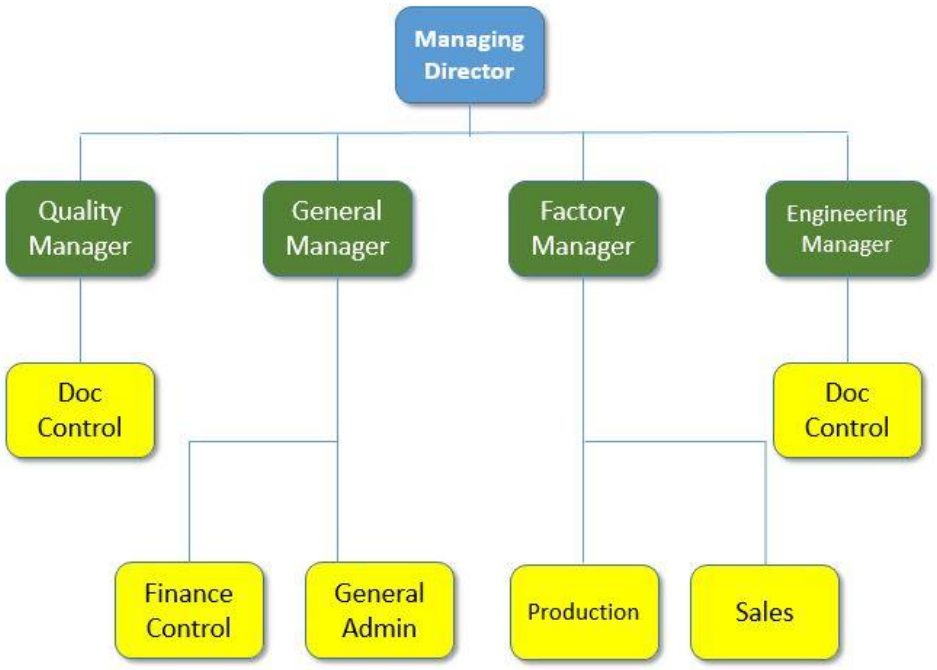

Figure (4.10) Organization structure of THI

4.3 Data Analysis

The first part of this chapter provides the background and organizational structure of the ten SMEs involved in this project. In this section, detailed analysis of the collected data from the case studies is to be carried out in accordance to the five research questions. In the following analysis, the collected data is interpreted thoroughly to answer research questions systematically:

4.3.1 What are the main motivations for SMEs to implement green management practices in selected Asian markets?

The first part of the data analysis is about the motivations of these SMEs to implement green management to be eco-friendly. This research is keen to find out what are the main drivers pushing these resource-strained small businesses to go above and beyond to implement green practices. The following information in table 4.3 highlights the main drivers as shared by different enterprises during the case study discussions:

SME	Quotes from respondents
UWin	*(1) Company Policy: "Care: Love and care lead to a better world. UWin applies this concept by preserving the environment, focusing on traditional value, respecting humanity and taking the responsibilities of being an international company, as well as a global citizen" (UWin-Nano, 2018)* *(2) Customer Demand: "You cannot imagine how serious is the commitment (on environmental protection) of these major global brands; many of their customers only buy their products if they are being perceived as green…In a way, we are helping them to improve their brand image by recycling many electronic parts used in their products"* *(3) Global Trend: "Whether we like it or not, global warming and environmental damage are something real and threatening all living creatures on earth today… it is good to see many governments around the world to put in efforts to slowdown warming, reduce pollution…we are business enterprise that have to contribute our share too"*
EER	*(1) Regulatory pressure: "our company was established to support waste recycling by the government, naturally we have to lead by example to implement green supply chain management…"* *(2) Company image: "We are in the process to apply IPO in the local stock market, having a positive company image is absolutely important for us…"* *(3) Cost reduction: "With careful planning, we are able to achieve good cost reduction in our monthly energy expenses, the saving is good for small company like us…"*
RDH	*(1) Customer demand: "Some of our customers are big global brands, to be honest, they are very demanding and sometimes arrogant…Green image is very critical to their brand!"* *(2) Corporate Culture:* *" Environmental – Zero Waste and Sustainability as our main aim and concern;* *Innovation – Improving recycling technology continuously; and* *Satisfaction – Proper handling, leaving you with no worries." (mission statement)*
BYM	*(1) Regulatory pressure: "We are in a dirty trade…many cities refuse to let us continue our production, if we don't change, we would either be punished by government heavily or out of business…"* *(2) Customer demand: "furthermore, all our customers like Zara and H&M also demand for greener materials, what to do?"* *(3) Company image: "it is definitely a right direction for us to go green in order to improve company image"*
SDA	*(1) Company image: "Green image is getting more and more important for overseas markets such as Europe and Japan, these are our focused markets now…"* *(2) Global trend: "The global trend now is environmental protection; it is better for us to embrace green practices earlier than later"* *(3) Increase in green awareness: "The younger people these days are very sensitive to working environment…if they see the factory is dirty and the production process is polluting environment, they will not report to work tomorrow…"*
YDL	*(1) Regulatory pressure: "In our country, if there is any policy that needs to enforce strictly, the local government will take very firm actions to ensure every company conforms to the regulations…having a cleaner and greener living environment is one of the top objectives of our leaders, we have to work closely with our government to achieve this goal…"*

	(2) Customer demand: *"We regularly receive overseas customers to visit our factory. They like to conduct on-site environmental audit before deciding giving us the orders…if we do not implement green supply chain, maybe you will not see this factory today as we will not be able to survive without these big overseas customers…"*
YHS	(1) Customer demand: *"These days, most customers are quite direct in requesting us to be green before they give us any order…you will be surprised, not only the overseas customers, even our domestic clients also demand greener products too!"* (2) Company image: *"As one of the most famous brands in China, we need to be as green as possible…also to be a good corporate citizen in corporate social sustainability…"* (3) Contribute to society: *"With this funding (CSR funding), we are able to setup a seafood laboratory not far from this factory… every week, we have professors and graduate students from nearby universities coming to teach the local fish farmers how to increase their production using greener methods, this initiative is really well received and popular!"*
UFC	(1) Customer demand: *"Japan is more advance than us in Thailand, the customers over there are very environmentally conscious, they demand for greener products as we have to make changes to adapt…"* (2) Company commitment: *"To serve our communities responsibly by protecting our natural ecology and utilizing environment-friendly technologies that makes optimum use of resources".*
TFC	(1) Global Trend: *"Under the on-going trend of protecting the environment globally, it is important for individuals, enterprises and all stakeholders to be green conscious so as to play a role in pursuing greener future for our earth…"* (2) Customer demand: *"Some big companies will conduct annual quality and sustainability audits in our factory, this is getting more and more common these days…"* (3) Contribute to society: *"CSR is getting important in Thailand now, we need to be a socially responsible corporate citizen to give back to our society…"*
THI	(1) Cost reduction: *"Our cost on waste disposal has dropped since implementing waste recycling control…also for our monthly electricity bill because of new LED lighting…"* (2) Global trend: *"Every day you read the news, the earth is getting warmer and the weather is getting more and more erratic…everyone needs to do their part to protect our earth before it is too late"* (3) Company policy: *"Our big bosses are from Japan, they are very eco-conscious…They usually lead by example and all of us follow…"*

Table (4.3) Main Drivers in Green SCM Adoption of SMEs

After compiling all the inputs from the respondents, nine different drivers were identified during the research. To facilitate learning, the identified drivers/motivations of these SMEs to adopt green management are explained in detail below:

1) Customer demand: Seven companies cited customers as the most critical drivers in pushing them into the journey of environment conservation. Most of the selected SMEs taking part in this research sell their products to overseas customers. Due to local environmental regulations, countries such as Japan, Canada, Australia, Germany, France and New Zealand have stringent controls on imported goods to prevent environment contamination. In these developed countries, if customers are public companies listed on major stock exchanges, they are required to publish a CSR report annually. Such public companies

are likely to only deal with vendors and suppliers with appropriate environmental management certifications (eg; ISO-14001). Vendors and suppliers need to transform their supply chain in order to meet the CSR requirements of their customers. Some respondents in the case study shared that an annual onsite quality and environmental audit is required by large global customers, and this has resulted in added pressure for SMEs to implement green measures in their operations.

2) Company image: Four companies cited this factor as the main motivation in their quest to go green. This factor can also be referred to as brand image. The common feedback is having greener operations as well as green products will help to boost the overall company image positively. The analogy is simple: as more and more customers are aware of global warming and environmental pollution, companies with an eco-friendly brand image will likely do better in sales.

3) Global trends: Similarly, four SMEs selected this factor as the main driver in pushing them to achieve environmental sustainability in their organization. Some respondents shared that the issues of global warming are in the news almost every day and discussed frequently by everyone around the globe. Under such global movement, it is unavoidable to be environmentally conscious as an individual and as a company.

4) Regulatory pressure: Three companies cited regulatory pressure from the local environmental bureau as their main motivation to go green. Due to the signing of international climate agreements, some countries have implemented stringent environment regulations on factories for carbon emissions and waste reduction, especially for highly polluting industries. In this research, selected SMEs in China and Taiwan are required to install state of the art air and water treatment systems to prevent environmental contamination. This is mandated under local environmental laws.

5) Company policy: Three SMEs shared that one of the main drivers pushing them to move into environmental sustainability is company policy. The argument for this driver is there are clear rules and procedures on green management stated in company policies that all staff are required to observe and follow. Two companies from Thailand citing this driver are the overseas subsidiaries of the Japanese parent company and all their company policies are directly transferred from Japan. The managers interviewed in this research had limited knowledge on the background of the motivation behind the Japanese parent company's intention to include in green management in the company policies.

6) Contribute to Society: Two SMEs have shared that the reason why they decided to go green is because of the motivation to contribute to society. According to the respondents of these two companies, this driver is related to the concept of CSR (corporate social responsibility) when a responsible corporate entity should try their best to do good and contribute to society. One good example is YHS from China, who have set up a fund to support the local fish farming community in sustainable fishing that can help to protect the environment as well as improve the local economy, which is a great contribution to society.

7) Cost reduction: One interesting reply shared by two companies on the driver to go green in their organization is cost reduction. Based on their inputs, going green helps to reduce operating costs in the company. Both EER and THI have rolled out initiatives such as using LED lighting and renewable energy to successfully reduce electricity usage every month. The managers shared during discussion that such cost saving initiatives are easy to justify financially due to quicker investment payback.

8) Corporate culture: One company shared that the culture of the company is pushing the organization to go green. RDH from Taiwan has clearly stated in their company's mission statement on environmental

conservation to achieve zero waste and improving recycling technologies continuously in their company. However, this input from RDH may not be the fundamental source of motivation to go green as the green corporate culture of RDH is more of an effect of a cause and not the main driver.

9) Increased green awareness: This driver is shared by SDA from China. The rationale is about the increase in green awareness by the younger generation. This has a direct impact in hiring and retention of employees in the company. According to the manager, younger workers are likely to shun dirty and polluted factories; hence, SDA is determined to go green to attract better talent and reduce staff turnover.

Cross-Market Analysis

Based on the data collected during case studies, interesting observations can be extracted from the feedback. All nine drivers as shared by the SMEs can be grouped under either external or internal factors (Table 4.4):

External Factors	Internal Factors
Customer demand	Company image
Global trend	Cost reduction
Regulatory pressure	Company policy
Increase green awareness	Contribute to society
	Corporate culture

Table (4.4) Classification of Main Drivers in Green Adoption of SMEs

External factors are those drivers coming from the external environment that are beyond the control of these SMEs. Internal factors are drivers related to internal company management and these SMEs have absolute control over these internal drivers.

Based on the feedback, it is interesting to observe from Chinese SMEs that as they are being managed directly by the founders themselves, company image (or brand image) is very important to them. Hence, three out of four companies cited company image as one of the key drivers for them to achieve environmental sustainability in their operations.

As mentioned previously, those SMEs that are setup by Japanese parent companies are likely to cite company policy as the main driver to adopt to green management. Two SMEs in Thailand and one SME in Taiwan all cited this factor in their feedback. According to them, the green policy is directed from head office of their parent company in Japan or Taiwan, which has a stronger corporate culture of environmental sustainability.

Another observation from this section is there is no mention of regulatory pressure from SMEs in Thailand. During face-to-face discussion, there was minimum information shared by respondents in Thailand on strong enforcement from the local environmental officers. This could be due to less stringent enforcement of government agencies in Thailand compared to China or Taiwan, despite the availability of several environmental regulations already implemented by the Thai government.

4.3.2 What are the common green supply chain management practices used in SMEs in selected Asian markets?

Based on the feedback gathered during the case studies, there are altogether 28 different green practices deployed under supply chain management by the ten small businesses. The following tables (4.5 & 4.6) provide summarized listings of green practices:

	Types of Green SCM Practices	**Code ID**
1	Waste classification	WCL
2	Incoming materials inspection	IMI

3	Vendors with environmental management system certification	VEC
4	Machine’s energy efficiency certification	MEC
5	Use of certified third party waste management service provider	CWP
6	Retrofit existing machine with energy efficient features	EMM
7	Installation of in-house wastewater and/or air treatment systems	IWT
8	Vehicle engine must be shut down while on company premises	SCE
9	No colouring or chemical ink used on packaging materials	NCP
10	Customers to return defective products for rework/disposal	RDD
11	Conduct on-site audit on vendors	VOA
12	Install LEDs in all company premises	LED
13	All in-house vehicles are Euro-4 standard compliant	ESV
14	Recycling of packaging materials	RPM
15	Annual management report on waste control for performance assessment	WMR
16	Recycling to energy of heat generated during production	HRE
17	Cargo consolidation/direct delivery for improved logistics efficiency	CCL
18	24-hour online monitoring of toxic gas and waste water in factory	OWM

19	Re-design of product/process to improve energy efficiency, waste reduction and pollution prevention	RDP
20	Final production testing on pollutants/chemicals	FPT
21	Use of environmentally friendly and recyclable materials/office supplies	EFM
22	Coaching and training local suppliers on quality and environmental protection	CTS
23	Green advice printed on packing materials	GAP
24	Provide regular feedback to suppliers on product redesign to reduce environmental pollution	FPD
25	Upgrade production line to latest green technology	UGT
26	Use of GPS in monitor vehicles of waste collectors	GPS
27	Use of renewable energy to power office/factory/vehicles	RNE
28	Avoid using materials from conflict zones	NCZ

Table (4.5) GSCM Practices Recorded in Case Studies

	Green Purchasing
1	Incoming materials inspection
2	Vendor's environmental management system certification
3	Conduct on-site audit on vendors
4	Use of environmental friendly and recyclable materials / office supplies
5	Coaching and training local suppliers on quality and environmental protection
6	Provide regular feedback to suppliers on product redesign to reduce environmental pollution
7	Avoid using materials from conflict zone
	Green Manufacturing

8	Waste classification
9	Machine's energy efficiency certification
10	Certified 3rd party waste management service provider
11	Retrofit existing machine with energy efficient features
12	In-house waste water and/or air treatment systems
13	Install LEDs in all company premises
14	Annual management report on waste control for performance assessment
15	Recycling of heat generated during production to energy
16	24-hour online monitoring of toxic gas & waste water in factory
17	Re-design of manufacturing/packaging process to improve energy efficiency, waste reduction and pollution prevention
18	Final production testing on pollutants/chemicals
19	Upgrade production line to latest green technology
20	Use of GPS to monitor vehicles of waste collectors
21	Use of renewable energy to power office/factory/vehicle
	Green Distribution
22	No coloring or chemical ink used on packaging materials
23	All in-house vehicles are Euro-4 standard compliant
24	Recycling of packaging materials
25	Cargo consolidation / direct delivery for improved logistics efficiency
26	Green advice printed on packing materials
27	Vehicle engine must be shut down while in company premises
	Reverse Logistics
28	Customers to return defective products for rework/disposal

Table (4.6) GSCM Practices under Different SCM Buckets

Out of all the green practices, some of them are widely implemented in most enterprises while other practices are only mentioned in a handful of cases. After a detailed review of the information provided during the case studies the following bar chart, Figure 4.11 and table 4.7, illustrate all the green SCM measures captured in this research by frequency.

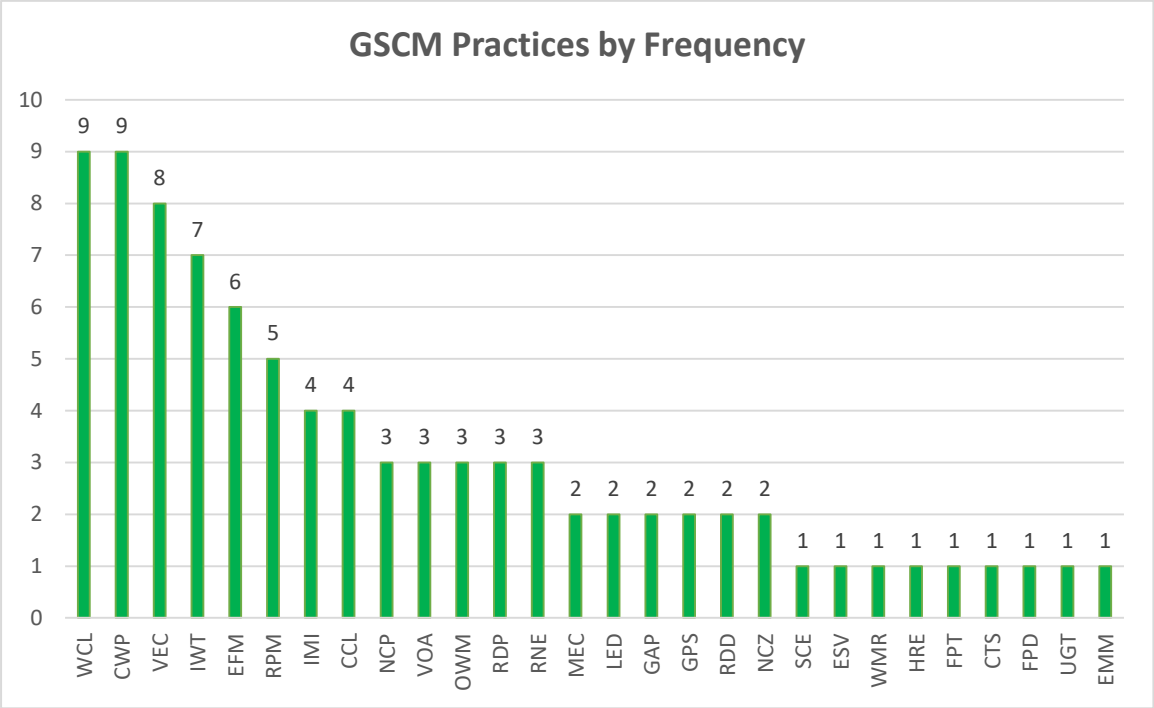

Figure (4.11) GSCM Practices by Frequency

Code ID	BYM	SDA	YDL	YHS	UFC	TFC	THI	UWin	EER	RDH	Count
WCL	X		X	X	X	X	X	X	X	X	9
IMI	X		X	X						X	4
VEC	X	X	X	X	X	X	X	X			8
MEC						X			X		2
CWP	X		X	X	X	X	X	X	X	X	9
EMM						X					1
IWT	X	X	X	X		X			X	X	7
SCE						X					1
NCP					X	X	X				3
RDD						X				X	2
VOA					X		X			X	3
LED							X		X		2
ESV							X				1
RPM		X	X		X		X			X	5
WMR					X						1
HRE					X						1
CCL				X	X			X		X	4

OWM	X			X						X	**3**
RDP							X	X		X	**3**
FPT		X									**1**
EFM	X	X	X	X				X	X		**6**
CTS				X							**1**
GAP		X		X							**2**
FPD									X		**1**
UGT										X	**1**
GPS									X	X	**2**
RNE		X						X	X		**3**
NCZ								X		X	**2**
Count	7	7	8	9	9	9	9	8	9	13	

Table (4.7) GSCM Practices Implemented by SMEs

With the purpose of sharing the finding of GSCM practices that adopted in these SMEs, a detailed discussion on all green practices in SCM is presented as follows:

(1) Waste Classification and Certified Waste Management Vendor

The number one most widely implemented GSCM measure by the SMEs involved in this research is waste classification and the use of certified waste management service providers. Respondents from all companies except one shared about this practice during the face-to-face discussion. In general, waste classification requires workers in the factory to segregate waste produced during production into at least three categories: regular waste, toxic waste and recyclable waste. According to some of the respondents, waste sorting and classification is clearly stated under environmental regulations in their country.

Based on research on the relevant government agency's websites in different economies, Thailand introduced several different laws to regulate industrial waste in 1992. Similarly, the Taiwan Government introduced a Waste Disposal Act in 1988 regulating waste disposal and recycling activities. As for China, an environmental pollution prevention law on solid waste was first passed at the National People's Congress in October 1995 with subsequent amendments in 2004, 2013, 2015 and 2016. According to some respondents from China and Taiwan, the local environmental bureau officials conduct periodic on-site inspections on waste disposal at factories, these inspections could be scheduled or sudden spot-check without any advance notification. Furthermore,

RDH from Taiwan shared that due to the free flow of information on the internet, it is very easy for any residents living near a factory to post any waste disposal violation online, this can have big negative impact on the enterprise in terms of company image as well as regulatory infringement.

According to the discussions with these SMEs, it was also evidenced that the governments in these economies have introduced certification schemes for their waste management service providers. Only qualified and licensed waste management vendors are allowed to collect and dispose of industrial waste according to regulatory requirements. Some countries will require the licensed operators to use trucks equipped with GPS for location tracking, and all their trucks and vehicles have to be inspected by selected licensed vehicle workshops once a year. As shared by the respondents of these SMEs, some of these licensed waste collectors are government-linked corporations due to the large investment in vehicle fleets to cover different types of waste, as well as large geographical coverage of different cities.

(2) Use of Vendors/Suppliers with Environmental Management Certification

The second most commonly deployed green measure under supply chain management among these small businesses is the use of vendors or suppliers with relevant environmental management certification, such as ISO-14001, RoHs, EICC or OEKO-TEX®. Eight of the companies interviewed cited this requirement as one of the key procurement policies in their organization. Unless it is strictly mandated by their customers, some of the respondents shared that it is impossible to have all their materials and services supplied by certified vendors as the cost is also being considered an important factor for small and medium sized enterprises. Some of these certified vendors tend to charge a higher price for their services or materials, and this can be a big barrier for smaller enterprises in implementing this green practice.

Another challenge in deploying this measure is the availability of certified vendors in their city. Based on the information shared by the respondents in China, their factories are located in remote areas of Fujian province, and it is impossible to find ISO-14001 certified logistics service providers serving that area.

(3) Installation of In-house Waste Water / Air Treatment Systems

The next most commonly adopted green practice under SCM is the in-house installation of waste water and/or air treatment systems. According to the discussions with the respondents, such measures implemented could be due to regulatory requirements as mandated under the local environmental law, or the systems were installed voluntarily in order to better control and prevent air pollution or water contamination.

Installing internal water and air purifying systems can be very costly and time consuming. During the factory visit at YDL, a large air purifying system was undergoing construction that blocked out 1/3 of the factory space. The company has spent more than a few million RMB in building this system due to a mandatory requirement by the local environmental bureau after violations were discovered by the authority. For other companies, the installation of water and air treatment systems supports better pollution control for their production activities. One of the respondents from TFC shared that investment of such expensive systems is important to ensure no environmental damage to the community, and it is also critical for the safety and health of their own employees who are working in the factory every day.

(4) Use of environmentally friendly and recyclable materials / office supplies

Six of the small enterprises interviewed have disclosed that they have internal policy in using environmentally friendly and/or recyclable materials in their production operations or in the office. Some good examples are using water soluble glue and cleaning agent instead of chemical products (UWin); using human edible ice rather than industrial ice (YHS); all paper supplies used in the office and factory are made of recyclable materials (EER). As claimed by the management staff of these enterprises, most of these safe-to-use or recyclable materials are usually at least 20-30% more expensive than the usual materials so this can be quite a heavy financial burden on the SMEs.

(5) Recycling of packaging materials

Packaging is an important component in the entire supply chain process. It is used to protect products as well as to facilitate ease of transportation from place

of manufacturing to point of consumption. Packaging can cause a high degree of environmental pollution in the use of different materials. Half of the enterprises interviewed in this project have launched an internal policy to ensure all packaging materials used must be recyclable. Some good examples are use of paper bags instead of plastic packaging materials (UFC), and bigger carton boxes with larger capacity are used to reduce the usage of packaging materials (SDA). For some cases, in order to ensure this procedure is effective, there is a need to develop an effective return process for customers to return the packaging materials for re-use in future orders.

(6) Incoming Materials Inspection

Some of the companies involved in the research carry out incoming materials inspection as part of green initiatives to control environmental pollution. This can be considered an effective preventive measure to detect any harmful substances in the incoming materials, especially for those companies in the food and beverage-related industries. According to YHS's feedback during on-site visit, a reliable incoming materials inspection usually requires the company to invest in a good in-house laboratory with trained laboratory technicians. Basic testing instruments and machines need to be installed to analyze the composition of the incoming materials, such testing can be either destructive or non-destructive. Due to the limited financial capability of SMEs, the in-house laboratory can only conduct relatively simple inspections; any detailed and complex testing can only be done in an external professional laboratory which can be very costly to set up in-house.

(7) Cargo consolidation / direct delivery for improved logistics efficiency

Another important area in the control of environmental pollution is transportation. It is easy to understand that excessive transportation of raw materials or final products would cause severe damage to the environment due to the burning of petroleum with high emission of carbon dioxide and other harmful gases. Four of the small businesses involved in the research shared that they have implemented some forms of control over their logistics operations to ensure minimum environmental impacts. Two measures have been deployed so far: (1) all cargoes to be consolidated for handover to logistics service providers to

improve operational efficiency and (2) instead of sending final products to a warehouse for temporary storage, some companies choose to deliver them directly to customers to avoid unnecessary transportation in order to save costs and reduce carbon emissions.

(8) No colouring or chemical ink used on packaging materials

Another interesting GSCM practice cited by three SMEs during the case study is not to use any colouring or chemical ink on the packaging materials. This is to prevent any environmental contamination due to the colour or chemical substances of the ink. One common practice to support environmental protection during packing of products is to use thermal printing on the packaging materials. Thermal printing is carried out without ink, ribbon or toner, it is considered as a greener printing technology which is more cost effective, since the factory does not need to use any printer consumables such as ink, toner or ribbon.

(9) Conduct on-site audit on vendors and suppliers

Three SMEs have implemented onsite audits at the vendor's production facilities. This is to ensure the selected approved vendors implement environmental control measures as agreed with their customers. Such onsite environmental audits are usually carried out annually together with the quality audit. According to these SMEs, the onsite audit looks for waste management, water and energy consumption, ISO-14001 certification, employee training, etc. The audit report is sent to the vendor for corrective action plans if there is any negative observation recorded during the audit. According to one manager from RDH, such an on-site audit could also be requested by their customers from Japan, the USA or Europe.

(10) 24-hour online monitoring of toxic gas & waste water in factory

Many of the SMEs involved in this research drain waste water or emit toxic gas during production. Besides installing air and water treatment systems, three companies have invested pollution monitoring systems to monitor toxic gas and waste water levels round the clock. According to the GM from BYM in China, a real-time pollution monitoring system can be quite costly but necessary to

inform factory managers of the real-time status of toxic gas and waste water in the production floor. Immediate rectification can be put in place when necessary to prevent environmental contamination. Alternatively, YHS as a seafood producer has invented an innovative and cost-effective way to detect any waste water leakage during production. Live fish are kept in the nearby rivers and production team leaders are required to inspect and monitor these fish regularly to determine if there is any leakage of dirty water from the factory to the rivers.

(11) Re-design of product/process to improve energy efficiency, waste reduction and pollution prevention

This GSCM practice can be considered something important and can really help to reduce environmental damage in the long run. Three enterprises have put in effort to redesign their products in order to have greener manufacturing or packaging that helps to reduce environmental impacts either through ease of recycling or reduction of waste. The following examples were given by the three companies:

a) RDH has redesigned their product packaging to use metal cages instead of plastic materials. This has helped in the re-use of these cages after retrieval from customers.
b) Similarly, UFC has changed their product packaging from paper bags to metal drums, and this has greatly improved the reduction of paper bag usage as well as the re-use of metal drums returned by customers.
c) Instead of using a heating process which will increase carbon emissions and PM2.5 pollution, UWin Nanotech redesigned their production process and adopted a wet process to reduce environmental impacts.

(12) Use of renewable/green energy to power office/factory/vehicle

Two of the SMEs (YDL and BYM) that took part in the research are located in Fuding county of China, where there is a large nuclear power plant that supplies electricity to all factories located in Fuding Industrial Park. Although there are different definitions of nuclear power, it is considered as green energy due to minimum carbon emissions compared to coal or natural gas. EER from Taiwan

has also adopted renewable energy in their new plant. They have invested in solar and wind power systems to ensure environmental sustainability while expanding their operations.

(13) Energy efficiency certification on Machines

Two companies (TFC and EER) adopted this practice of only using energy efficient production machines in their factory. This can be achieved by only buying machines that are certified by th local environmental authority to be energy efficient. This sounds to be a good practice for environmental conservation; however, according to the respondents, such certified machines are likely to be at least 20-30% more expensive compared to the regular ones.

(14) Install LEDs in all company premises

This green practice is not anything new as LED technology has been around for quite some time and is proven to be environmentally friendly because LED bulbs are energy efficient compared to incandescent bulbs and compact fluorescent lights. Two companies (THI and EER) have converted lighting with LED bulbs in all their company premises. Using LED lights is also similar to using other energy efficient machines or equipment, they are likely to be more costly during initial investment; however, the running cost is usually lower due to reduction in electricity consumption.

(15) Green advice printed on packing materials

This GSCM practice is used in food manufacturers (YHS and SDA). As these two companies produce food products packed in plastic bags, a clear message is printed on the packaging to advice consumers not to litter after use. This practice is considered an educational measure to prevent littering so as not to damage the environment.

(16) Use of GPS to monitor vehicles of waste collectors

Two of the Taiwanese SMEs (EER and RDH) that took part in this research have implemented this GSCM measure to prevent illegal waste dumping by the waste collectors. According to the respondents, GPS monitoring is important for environmental sustainability as many of these wastes are toxic and they can

destroy the environment if dumped in a forest or river. A factory manager will review the GPS reports with the waste management vendor on a regular basis to ensure everything is in order.

(17) Avoid using materials from conflict zones

Conflict zones are countries or regions having internal conflict or civil war; examples are Yemen or Sudan in Africa. In order to fulfill the pledge of CSR, UWin and RDH have implemented a green procurement policy of "No procurement of conflict resources (such as precious metals) from conflict zones". Even though this is more relevant to ethical supply chain and responsible sourcing, non-stop civil war is severely damaging the natural environment in Africa. According to the managers of these two companies, this green objective can be achieved by sourcing directly from major wholesalers instead of sub-agents.

(18) Customers to return defective products for rework/disposal

As part of reverse logistics, TFC from Thailand and RDH from Taiwan have worked with their logistics vendors and customers to bring back any defective products or unusable materials for rework or disposal according to local environmental regulations. As reverse logistics can be costly, especially for small businesses, TFC and RDH only provide such a service to their large and regular customers as a value-added service to enhance the customer experience.

There are a few unique GSCM practices that are only implemented by one company. The following section outlines these practices in order to facilitate learning among SMEs on environmental sustainability in their supply chain activities:

(19) Vehicle engines must be shut down while in company premises

TFC in Thailand has implemented a green policy to mandate all drivers of vehicles to switch off the engine while in the company premises. This is to reduce carbon emission as well as unnecessary burning of fossil fuels. This policy applies to all types of vehicles including those of visitors, employees and

logistics vendors. A clear signboard was built near the entry gate to inform all drivers of this requirement.

(20) All in-house vehicles are at least Euro-4 standard compliant

The management team of THI in Thailand has instituted an internal procurement policy to ensure all in-house vehicles meet the minimum requirement of Euro-4 emission standards. Employees' and company vehicles are required to satisfy this requirement before they are allowed to drive into the company premises. According to the manager of THI, so far, the trucks from logistics vendors are excluded because it is difficult to ensure all vendors' vehicles conform to Euro-4 emission standards since some vendors are dispatched by customers.

(21) Annual management report on waste control for performance assessment

In Thailand, some industries are regulated by a local environmental bureau with added supervision and control to prevent any environmental contamination. UFC in Thailand is required to submit a waste control report annually to the Department of Industrial Works (DIW) under local environmental regulations. DIW is the official government agency overseeing factory pollution control in Thailand. According to the manager interviewed, although this is a measure mandated by local government, the annual report is an effective tool to support the company management team in monitoring waste disposal control closely to ensure continuous improvement in waste reduction.

(22) Recycling of heat generated during production to energy

UFC in Thailand also implemented a unique GSCM practice to recycle heat generated during production to energy. With additional investment on the production line, heat generated from the boiling process is converted to energy that can be used in the factory. This is achieved by installing a natural gas powered boiler. Based on feedback from the factory manager, this measure is effective in the reduction of electricity usage in the production plant.

(23) Final production testing of pollutants/chemicals

This is a green practice implemented by SDA from China, a seafood manufacturer. According to the respondent of the company, this is both a quality control measure and a green practice to prevent food contamination. All final products will have to go through this test to detect any harmful chemicals and microorganisms before they can be shipped to retail channels.

(24) Coaching and training local suppliers on quality and environmental protection

As a strategy to cultivate sustainable fish farming in the local community of Ningde County, YHS is leading a community initiative to set up a demo base to educate and train smaller fish farmers in green and clean fish farming techniques. According to the MD of YHS, so far, the company has donated close to a million RMB to this community effort to ensure sustainable fish farming which is beneficial to both YHS and the local economy.

(25) Provide regular feedback to suppliers on product redesign to reduce environmental pollution

A very important step implemented by EER from Taiwan is the closed-loop feedback to its major suppliers of used electrical appliances on how to improve product design so as to facilitate product waste recycling. EER organizes regular face-to-face meetings with their major suppliers to discuss product design that can support environmental sustainability in ease of recycling. This is very effective to ensure new products can be more eco-friendly with less impacts on our environment.

(26) Upgrade production line to latest green technology

This GSCM practice is adopted by RDH from Taiwan. During the early days of their refinery operations, anode slime could not be further refined to extract other metals. Most of the anode slimes were stored in the warehouse. In 2017, RDH upgraded their production line to enable further extraction of other metals from anode slimes. This has ensured maximum economic benefits of the production waste, as well as minimum environmental impacts since these wastes will not be disposed directly after tin extraction. This practice is made

possible because of the tangible financial return which is win-win for the company as well as being eco-friendly.

(27) Retrofit existing machine with energy efficient features

In order to reduce energy consumption during production, TFC from Thailand has successfully retrofitted all existing machines in the factory with energy saving invertors. This is a good initiative for environmental sustainability as well as cost reduction. However, according to the managers from TFC, some older machines may not be economical to retrofit, so it is sometimes better to replace older machines with new systems of higher energy efficiency.

Cross-Market Analysis

Besides listing all the GSCM practices shared by the SMEs, the researcher also looked into all the available information to check if there were any green practices that are only unique in certain markets. In general, some of the green actions are used widely in many organizations regardless of markets or locations. Implementation of a waste classification system and the use of qualified licensed waste management vendors are common for almost all the enterprises interviewed in this study. However, all selected enterprises from China that took part in this research have implemented air and/or water treatment systems in their factories, as well as using recyclable materials in their production. During face-to-face discussion with the management staff, it was found that due to the strong enforcement of environmental controls in China lately, local officials from the Environmental Bureau require all local factories to install some form of waste water and air treatment systems to ensure minimum contamination of the environment due to production activities. Any companies wishing to continue their operations will need to comply with these new requirements or choose to close their factory and relocate to another country. A respondent from BYM informed that after the introduction of stringent pollution control regulations by the Chinese Central Government, many of the highly polluting production plants moved to other countries such as Cambodia, Vietnam, Bangladesh or as far away as Africa.

Another green practice commonly used in all three enterprises in Thailand is no chemical ink used in the packaging materials. A widely used alternative is to use laser printing on the packaging materials which is non-toxic. Only Thai enterprises have implemented this measure and not the others from China or Taiwan. So far there is no good explanation for this observation, however, according to one respondent from UFC, this could be due to the marketing and promotion of such a service (industrial laser printing) to be more aggressive and active in Thailand, and that has resulted in a higher degree of adoption of this practice.

The third observation under cross-market analysis is on the re-design of manufacturing and/or packaging processes to improve energy efficiency, waste reduction and pollution prevention. Two out of three Taiwanese enterprises involved in this study had such measures in supply chain operations. One Thai enterprise also introduced this practice to reduce environmental impacts. This practice is considered as a preventive measure to resolve environmental pollution as opposed to reactive measures such as installing waste water treatment systems or waste classification and disposal.

4.3.3 What are the main barriers/challenges to implementing GSCM for SMEs in selected Asian markets?

The next question asked in this research is to understand more about the major challenges faced by small enterprises in implementing GSCM. In order to ensure the answers can be compared and compiled systematically, five challenges were given to the respondents for consideration – Customer, Employee, Government, Technological Innovation and Cost. The following table (4.8) is a consolidation of inputs from all ten companies (in order of significance) and quotes from the respondents:

UWin Nanotech	
Challenges/Barriers	**Quotes from respondents**
1) <u>Customer</u> – For some customers in the PCB industry, due to the existing hardware configuration in their production plant, it is difficult and costly for them to incorporate new and greener production	*"Many customers can talk a lot in environmental protection… when come to investing more money for greener production,*

	tools for their PCB assembly process. Furthermore, there are customers who are more cost-conscious even though they are fully aware of the importance of going green in their production activities. These customers are less inclined to invest in green production.	*they will start to give many different excuses…"*
2)	Government – Like in many developed economies, the Taiwanese Government has established a dedicated agency on environmental control – the Environmental Protection Agency (EPA). There are some new regulations proposed and passed at the Legislative Yuan (Parliament in Taiwan) such as green procurement policy of the public sector and a ban on free plastic bags at supermarkets and department stores. However, due to the very competitive political landscape in Taiwan, it is difficult to pass environmental laws that have wider economic implications on the commercial industry. In addition, the tangible financial support from government to promote greener production process is not readily available mainly due to insufficient government budget as well as lack of support by legislators. Another main challenge of the EPA is the relatively inexperienced workforce of their auditor team. This is causing ineffective enforcement on many factories polluting the environment without appropriate penalties.	*"Currently Taiwan is already considerably advanced in e-waste recycling with a complete recycling system which includes recycling of large electronic devices, such as televisions, computers, air conditioners, and refrigerators. However, there are still no clear regulations and systems for mobile phone recycling; therefore, Taiwan should first establish a recycling mechanism for waste mobile phones to reduce e-waste pollution while also increasing the effectiveness of urban mining" (UWin-Nano, 2017).*
3)	Cost – Using recyclable or greener materials can be expensive compared to normal materials. As much as UWin Nanotech would like to make use of 100% greener materials in their supply chain processes, this is still not economically viable at the present stage due to slow adaptation of green technology in the industry.	*" Remember, we are still a very small company, we don't have so much money to invest in expensive green technology 100%..."*
4)	Technological Innovation – A few different issues under technology are impacting the	*"Although there are new green technologies invented in recent*

implementation of Green SCM as indicated by respondents from UWin: • Although UWin Nanotech develops patented technology for recycling of PCB wastes that can effectively process electronic wastes in a less polluted way, creating sufficient customer awareness is still a big challenge. Additional funding is needed to promote new green technology to make them easily assessable. • As Taiwan is not a big market (compared to Japan, USA or China), some new technologies in green materials are not available in this market, or are too costly to use based on current market conditions. • Similarly, there is insufficient know-how in some of the latest green technologies available to the industry. Universities in Taiwan should help to create awareness of these new technologies through education and research.	*years, it is still difficult to attract customers to use them due to many different reasons…"*
5) <u>Employee</u> – It is necessary to ensure full support from all employees in the successful implementation of Green SCM in any organization. In order to gain support from the staff, only candidates with a strong mindset of environmental conservation are to be hired. This can be a major challenge for SMEs due to a less competitive remuneration package compared to large corporations. However, for UWin, this is not so much of a concern according to the HR manager.	*"The good thing of being a small enterprise is the spirit of family bonding for everybody to work hard for each other… All our employees are very positive about environmental conservation…"*
EER	
Challenges/Barriers	**Quotes from respondents**
1) <u>Government</u>: According to EER, the Taiwanese government is keen to roll out more regulatory changes to support recycling of electronic waste. The Green Mark Program was launched in 1992 by Taiwan's Environmental Protection Administration as a voluntary and positive eco-labeling	*"To improve our environment, more efforts need to be done for the industry… empty slogans and promises from government will not reverse global warming!"*

	programme. The aim of the Green Mark is to "promote the concept of recycling, pollution reduction, and resource conservation" (EPA, 2019). However, the government has also tightened the import of electronic wastes from overseas, this has resulted in limited sources of used electrical appliances to be recycled, as well as increasing the cost to import such wastes from other countries. Another area that EER would like to request from the government is to provide better financial incentives to SMEs in greening their production processes, as such support is quite limited currently.	
2)	Cost: Although EER is well funded by major home appliance manufactures, any decision made for the enterprise has to be financially driven. Hence, cost has been one key consideration for implementing green SCM. If the proposed green initiative is not cost justified, it will not get implemented unless it is mandated by government regulation.	*"Many of the green machines and equipment that we are keen to invest are quite expensive, it is not always easy to breakeven and financially justified after installation…we are a small company that cannot spend all the money in environmental protection."*
3)	Technological Innovation: Since more and more consumers globally are demanding greener products, this has triggered the need for recycling electronic waste due to increasing regulatory control from local government. However, many of these electronic and electrical appliances are still quite difficult to recycle due to the design and technological limitations. In addition, as commented by the respondents, the degree of recyclability is directly related to the types of components used in the design; greener components and parts produced by the latest technology could be costlier to the appliance manufacturers.	*"Honestly, the progress of technology advance in green recycling is still quite slow…many of the recycling processes still emit large amount of carbon dioxide and other hazardous gases…"*

4) Customer: EER is a B2B (Business-to-Business) service provider, all of their customers are major brand owners and producers of electronic and electrical home appliances and consumer products. Either because of local mandatory environmental regulations or a voluntarily green culture, these customers are very supportive of EER in going green.	*"Unlike other industries, we are lucky to have good customers…"*
5) Employee: As a small enterprise, EER has a stable workforce. Currently, they have a low annual turnover ratio of less than 10%, which is considered good in the recycling industry. Most employees are fully committed and cooperate with the company in the adoption of green SCM.	*"I have worked in quite a few other companies in the past, I would say our employees in this company are truly great and fully bought into our green policy…"*
RDH	
Challenges/Barriers	**Quotes from respondents**
1) Cost: The GM of this company is quite a fast talker and was very candid in the interview. He shared with the researcher that tin refining is a traditional industry, it is facing steep competitive pressure from producers in other developing countries such as Vietnam, China or Thailand. Pursuing green SCM may increase the overall production cost impacting the overall profitability since the company will have to install additional machinery and equipment to control air and water pollution and limit carbon emission levels.	*"I need to pay our employees, I need to pay our suppliers, I need to pay my rent and feed my family. It is impossible for me to spend everything on environmental protection that my company will go bankrupt tomorrow…"*
2) Technology Innovation: There are many new green technologies out there in the market that are effective in environmental pollution control. However, they are usually more expensive compared to the current traditional technology. Some of the newer machines are simply priced out of the reach for most of the SMEs.	*"I have been attending global conferences on green technology last few years, some of the new machines are so costly that only suitable for large global corporations…"*
3) Government: The TW government is keen to roll out more regulatory changes to support green business for all enterprises. However, RDH would	*"The company is in the process to expand its capacity by building new factory. However,*

like to see tangible support (such as funding and training) for SMEs to adopt new green technologies and best practices. Another factor under this barrier is the restriction for recycling companies like RDH to import more electronic wastes from other countries. Currently, it is very difficult to import electronic wastes from overseas due to the added regulatory controls in TW, this has severely restricted the output of RDH since they can only source PCB wastes from local suppliers.	*one of the major challenges we are facing is the shortage of sufficient electronic wastes. Unless government re-evaluating the existing import restriction on electronic wastes from overseas, recycling companies like us will not be able to create higher economic value…"*
4) Customer: Customers of RDH in TW and overseas are generally receptive to greener products, even it implies slightly higher pricing.	*"Our customers are large multi-national companies that are not price sensitive… they are more worried about their brand image being tarnished due to environmental pollution…"*
5) Employee: RDH has a stable workforce with long tenure, as they have a low annual turnover ratio below 3% annually. Most of their employees are very supportive of the company implementing green SCM.	*"Our team in the company is fantastic, most of these employees have been with us for many years…"*
BYM	
Challenges/Barriers	**Quotes from respondents**
1) Cost – During the on-site visit, the factory was undergoing a major overhaul due to the installation of new water and gas treatment systems. BYM has made a large investment to stay compliant with the regulatory changes on pollution control, this has increased the overall running costs drastically over the last two years. Similarly, the change of packing materials to biodegradable grade also contributed to the rise in the cost of operating.	*"You can see for yourself, we have spent a few millions (RMB) in these new treatment systems, these things are very expensive…"*
2) Technological innovation – There are new manufacturing technologies in advanced countries on green leathers which are biodegradable and less harmful to the environment. However, these	*"We are in a small remote city, it is difficult for the international suppliers to visit or support us in this location. There is also*

are not available in China. BYM has sent some of their R&D staff overseas in order to learn about these new technologies.	*no trade show in this region, we need to go to Shanghai or Beijing to meet with these international suppliers…also, I am not sure if we can afford these new green materials?"*
3) <u>Customer</u> – Even though BYM has global clients such as Zara and H&M, there is constant pricing pressure from large clients to reduce price. Larger clients are likely to be more demanding in quality and more price sensitive; this is directly impacting BYM's profit margin.	*"To be honest, sometimes I wonder if it is better to serve smaller customers… these big global customers are so demanding on quality and pricing, with a difference of 2-3% in unit price, they will leave us and buy from other suppliers".*
4) <u>Employee</u> – According to BYM, it is not easy to hire experienced employees to join the leather industry as the production process is perceived as dirty and harmful to humans. About 80% of the employees are recruited from other provinces as it is not easy to attract enough local talent.	*"It is also a challenge for us to recruit qualified staff to work in our factory… as you know, the younger generation today like to work in nice office with good benefits, our industry is too dirty to attract good talents…"*
5) <u>Government</u> – In general, local government in Fuding city is quite supportive of SMEs in the industrial park. However, BYM would like to see more financial support to the enterprises in order to implement more green practices.	*"We do not have any issue with the local government, the only suggestion is for them to support us to get more loans from the banks to keep our business going…"*
SDA	
Challenges/Barriers	**Quotes from respondents**
1) <u>Cost</u> – Although many companies in China talk about environmental conservation these days, it is still difficult to source suitable green materials to be used in the supply chain. Some green materials have to be procured directly from overseas at very high cost and even locally made greener materials can also be expensive compared to ordinary	*"I have been working in this industry for many years, the cost of the raw materials are increasing almost every few months…it is even more costly if we specify greener materials that coming from overseas…"*

materials. Similarly, there are higher investment and annual maintenance costs to be incurred in waste water treatment and cold room storage systems in the factory.	
2) <u>Technological Innovation</u> – This could also be linked to cost. There are many green technologies invented overseas but not yet available in China. This has resulted in higher cost incurred by the local businesses if they have to adopt these green techniques to prevent or reduce environmental pollution.	*"I also want to use the latest high-tech green energy trucks, but I don't think our company can afford today, maybe in the next few years after we go public listing…"*
3) <u>Employee</u> – SDA is a local SME located on the outskirts of Fuzhou city. It is not easy for such a local enterprise to attract high quality talent to join the company. It is also very costly to hire high calibre employees which increases the overall operating costs of the company. Not only is it difficult to recruit high quality candidates, it is also equally challenging to retain these professional people for more than a year.	*"Young people today don't stay in small towns like Ningde, they like to find job in Shanghai, Guangzhou or Beijing… it is really difficult to recruit university graduates to join us".*
4) <u>Customer</u> – This is a common problem encountered by most of the SMEs; despite changing customer's needs due to environmental conservation, it is still difficult to convince customers to pay more for greener products. This is squeezing profits of the enterprises since it is more expensive to produce green products, but SMEs are unable to charge higher prices.	*"If you have to pay 20-30% more to buy our products, will you consider? Most customers we have are very price sensitive, on one hand they ask for greener products, on the other hand; when the price is higher, they will walk away…"*
5) <u>Government</u> – The China Government has been very supportive to local companies in implementing green supply chain. Some cities have introduced financial incentives for SMEs to implement control measures to reduce environmental pollution. The Environmental Control Bureau in each city is also stepping up efforts to educate companies to transform their production processes to a greener	*"The local and central government have been very supportive to the business community in going green; we don't have any problem with them…"*

supply chain. As such, government is not considered a major barrier to implementing Green SCM. When commenting about the government; both managers from SDA were quite reserved and didn't talk much.	
YDL	
Challenges/Barriers	**Quotes from respondents**
1) Employee – Unlike the banking or e-commerce industry, the leather manufacturing industry is a highly polluting trade. It is extremely difficult for SMEs like YDL to recruit good talent to join the company. This problem is even more acute when the factory is located in the isolated third tier city of Fujian.	*"This industrial zone is located in a very remote town in Fujian province…not many young people like to come here. Even for me, if it is not because of limited job opportunity in my hometown (North-eastern region of China), I may not want to come here too…"*
2) Customer – These days, many customers demand greener products; however, they are reluctant to pay higher prices. This is especially tough in the fashion industry like leather production due to extreme competitive pressure from the market. According to the deputy GM, such customer behaviour is causing many leather manufacturers in China to go out of business.	*"Many of these overseas customers are global fashion brands, however, most of them are so stingy, on one hand asking us to be as green as possible, on the other hand; keep asking for discount!"*
3) Cost – This barrier is related to increasing customer demand. Introducing GSCM can increase business cost to SMEs as greener processes, machinery and materials are usually more expensive than the regular alternatives.	*"Many of the waste water treatment systems you saw just now are very expensive, we have to get loan from local bank in order to pay for the installation…"*
4) Technological Innovation – YDL is located in a small town in Fujian province, it is not easy to receive the latest green technology compared to companies based in Shanghai or Beijing. It is also very costly for such technology to be installed in the factory located in a remote area, especially if it is from overseas.	*"I have attended a trade exhibition in Germany last year, some of the leather production machines are really cool and produce less wastes…but they are too costly for factories in China…maybe only suitable in*

	advanced markets like Japan, Europe or USA…"
5) Government – Both central and local governments are very supportive of enterprises pursuing green management. The local environment bureau provides technical and financial support to local firms to ensure they stay compliant in pollution prevention.	*"The environmental officials from the local government come to our factory regularly and provide good trainings and technical support… no complaint at all".*
YHS	
Challenges/Barriers	**Quotes from respondents**
1) Employee – YHS is located on the outskirts of Fuzhou city, which is rather remote and less developed. It is very challenging to recruit high quality talent to join a seafood manufacturer which is less glamorous compared to IT or the financial industry. It is even more difficult to ensure all employees follow company green policies when many of them are from remote villages which may not have adequate awareness and appreciation of environmental sustainability.	*"Just now when we tour the production floor, I believe you have also discovered that, our seafood industry is quite a smelly business…it is difficult to attract younger people to join us in such working environment… many of our workers are middle aged villagers staying near-by; most of them do not have high education qualification, they have no clue about global warming…"*
2) Technological Innovation – Similarly to the challenge of employee hiring; as YHS is located in a small town in Ningde city, it is not easy to obtain latest green technology. It can be very expensive for such technology to be installed in the factory if it is from overseas.	*"I have visited some seafood factories in Taiwan and Japan, there are newer water treatment systems which can reduce water consumption, however, I can't find any local dealer in China yet… maybe these new technologies are still too costly for us…"*
3) Cost – The seafood industry is a traditional industry, it is facing steep competitive pressure from other producers and pursuing green SCM in the direction of sustainable seafood may increase	*"Although our company is doing well these few years, we also would like to do more for our living environment… but it*

overall production cost impacting overall profitability. This can be very challenging for SMEs like YHS to survive in a hyper-competitive business environment.	*is also true that, the seafood market is getting more and more competitive, my chairman has asked me to justify financially for every new green initiative proposed since last month…"*
4) Customer – As YHS's final products are shipped to Australia, Singapore, Taiwan and Hong Kong as well as to Japan and Korea; these customers are supportive to green suppliers since they are embracing sustainable seafood.	*"We have some good customers from overseas… maybe there are more stringent regulations in their home market on food imports, generally they are very supportive to our move into green supply chain".*
5) Government – According to YHS, they do not have any complaint about the local government. The MD disclosed that the local environmental bureau provides good technical support in the form of training and financial assistance to local firms to ensure they stay compliant in environmental pollution prevention.	*"Government in China is very supportive to enterprises pursuing green management and sustainable seafood".*
UFC	
Challenges/Barriers	**Quotes from respondents**
1) Technological Innovation: There are many new green technologies invented in the food industry from Europe, Japan or USA. However, most of them are still unavailable in Thailand. Even if they are brought into local market, it is usually very expensive and so not suitable for SMEs in developing economies like Thailand.	*"Our company sends us to overseas to attend trade exhibitions every year, I have seen many new technology in our industry that can save energy and produce less waste… however, most of them are still quite expensive and I would hope the price can come down soon…"*
2) Employee: As UFC has been in business since 1988, many of the staff are very senior with long tenure. As compared to younger generations with	*"We are a great company, many of the pioneer employees stay with us since 1988 when*

better appreciation of environmental protection, it is sometimes difficult to change the mindset of these senior employees to embrace green policies.	*we first opened…but this also give us some headache when our senior employees are less receptive to green procedures".*
3) Government: Being a signatory nation to the Paris Climate Agreement (1996), the Thai government has talked a lot about environmental conservation in recent years with new regulations passed in the parliament. However, so far there is limited financial support offered to SMEs in the country.	*"I would hope to see some tangible support from the government, such as low interest loans for us to purchase new production equipment or incentives to the industry for the companies to train their employees…"*
4) Cost: There are tangible benefits in green management since waste from production processes such as heat and recycle wastes can have a financial return to UFC after project implementation.	*"In the last few years, we have rollout some green initiatives to help us in cost reduction…if plan carefully and execute wisely, companies can enjoy benefits and yet go green!"*
5) Customer: As most final products are exported to Japan (80%); customers in JP are very serious about green products and corporate social responsibilities. In general, Japanese customers have no issue in paying premiums for greener products.	*"We don't have any issue with our customers when implementing environmental related policies…"*
TFC	
Challenges/Barriers	**Quotes from respondents**
1) Cost – According to the warehouse manager, the unit price for greener materials is usually higher than the regular materials. On average, the price difference can be around 20-30%. Similarly, buying an energy efficient production machine is also costlier than the one which is less energy efficient. Since SMEs are likely to have financial constraints, cost is a major barrier discouraging them from moving towards a greener supply chain.	*"We have evaluated a few new machines that can give us better energy saving, however, they are quite expensive… we need to ensure the best use of funding since it is always limited…"*
2) Customer – There is increasing demand for greener products. This is even more evident for	*"This is especially true for SME customers…difficult for us to*

parts used in buildings such as water valves. Although there are large customers willing to pay premiums for green products, some customers are still reluctant to absorb additional cost due to greener products.	*increase pricing because of greener supply, they are also very price sensitive…"*
3) Technological Innovation – While there are new green technologies developed in different industries, they are not widely available in Thailand. Such new technologies are also very expensive if brought into Thailand for testing, since they are still not widely used locally and lack economies of scale.	*"Some of our colleagues went overseas to participate in trade fairs, there are new green technologies in Germany and Switzerland can help us in reducing production waste… but they are still not available in Thailand yet… hopefully next year we will see them in Thailand".*
4) Government – The Thai government talks a lot about environmental conservation, there are also some new regulations passed in the parliament that help to promote environmental protection. However, there is minimum financial support given to SMEs in Thailand. This could be due to economic difficulties of the Thai government, since it is not a financially rich country like Singapore or Switzerland.	*"We are not a rich country, there are many things that our government would like to do but no money… If possible, I hope they can help SMEs to apply more loans from the local banks".*
5) Employee – Many employees in TFC have long tenure with the company. With a healthy mix of young and mature employees, most of them are receptive to the company's green policies, collectively helping each other to create a greener working environment.	*"I am very proud to work with these staff, they are very open and cooperative with us in implementing additional measures in ensuring we have a clean and green working environment…"*
THI	
Challenges/Barriers	**Quotes from respondents**
1) Cost – In general, special materials or new machines that are greener can be quite costly compared to the regular materials or machines. Any SMEs keen to incorporate green practices in	*"This is the same as buying a Tesla electric car which is usually more expensive than the traditional petrol car unless*

their operations, they will need to assess the tangible benefits through ROI analysis before any investment can be made on green projects.	*it is heavily subsidized by the government…"*
2) Technological Innovation – There are increasing new green technologies invented globally to support environmental conservation. However, there is limited awareness in Thailand, especially to the SMEs. More needs to be done to ensure new technology can be adopted in SMEs such as active promotion and training.	*"I have discussed with some suppliers on new machines that can have lower energy consumption… most of them are either too costly or not applicable to smaller enterprises as they are mainly for mass production…many of the local dealers are not keen to bring into Thailand".*
3) Government – The government in Thailand is supportive of environmental conservation, there are also some new regulations passed in the parliament. However, these regulations are largely punitive; there is limited policy in offering financial support to SMEs in the country.	*"I would hope the government can be more proactive in supporting SMEs in training, funding as well as education…"*
4) Employee – Basically, most of the employees in THI are supportive of the company implementing green measures to improve the environment. There is no major concern in this category.	*"Our staff are quite receptive to new procedures and controls to ensure we stay green in our day to day production activities, we don't have much issues about the employees…"*
5) Customer – Although the products manufactured by THI are supplied to Japanese companies based in Thailand the final customers are actually in Japan, Europe and North America. Customers from developed countries are very supportive of using greener products to reduce carbon emissions and environmental pollution.	*"Some of our customers even provide training and technical support to us in order to have greener production in our factory… These are very good customers that truly concern about our earth".*

Table (4.8) Challenges/Barriers as identified by SMEs

After analyzing the inputs from the respondents, the following table (4.9) is a summary of rankings on challenges in GSCM adoption:

	UWin	EER	RDH	BYM	SDA	YDL	YHS	UFC	TFC	THI	Count
Customers	1	4	4	3	4	2	4	5	2	5	*34*
Employees	5	5	5	4	3	1	1	2	5	4	*35*
Government	2	1	3	5	5	5	5	3	4	3	*36*
Technological Innovation	4	3	2	2	2	4	2	1	3	2	*25*
Cost	3	2	1	1	1	3	3	4	1	1	*20*

Table (4.9) Major Challenges Recorded During Ten Case Studies

Based on this summary, the top challenge with the least score is cost, which means it is the most challenging barrier impacting the implementation of GSCM. 50% of respondents put this factor as the number one obstacle and indicated that the cost of going green in the supply chain activities is preventing more SMEs from adopting greener SCM since these small businesses are not as resourceful and financially well-off compared to the multinational corporations. One general manager told the researcher that it is very common for the owner of a small company to worry about not being able to pay their employees at the end of every month. These entrepreneurs also have to ensure sufficient cash flow to meet monthly payments to suppliers to ensure a continuous supply of materials and services. Many of them agreed that, unless there is a positive return from investing in green measures, it is very difficult for SMEs to incur additional operating costs just to promote a greener supply chain.

The second most challenging barrier to green SCM implementation is technical innovation. Most common feedback under this category mentioned the high cost of adopting these newer technologies or limited awareness due to lack of support in their respective city, since many of these SMEs are located in remote locations. However, during face-to-face discussion, there seemed to be some overlaps between this barrier and the barrier of high cost of going green, since the latest green technologies or machines are likely to be more expensive compared to traditional alternatives. One respondent from SDA mentioned the

instability of the latest green technology that may affect the quality of the end products, so the company had decided not to go green in cold-chain logistics at the moment.

The third most challenging barrier in GSCM adoption was the customer. This barrier was only ranked first by one company but was in second place for two other companies. Some respondents felt that their customers were very demanding for greener products or a greener production process; however, they refused to pay more to encourage SMEs in contributing more towards environmental sustainability. Nevertheless, there were also quite a number of respondents from other enterprises that had positive comments about their customers in the pursuit of green SCM. These customers are likely to be from advanced economies such as Western Europe, Japan, Australia and New Zealand where the consumer acceptance of eco-friendly products is far more established than other countries.

The fourth most challenging barrier to the adoption of green SCM is the employee. Since it is ranked as the second last obstacle, it can be considered as a positive catalyst for companies to implement green practices. Most of the respondents interviewed mentioned that employees in the company were not a major obstacle in embracing GSCM, this could be due to long service tenure of the staff as well as regular engagement with employees to ensure full cooperation in the successful implementation of GSCM. However, two companies in China ranked employee as their biggest challenge in implementing GSCM; this is because of the difficulty in hiring new workers to work in the factory due to the remote location, as well as dirty industry of seafood production and leather manufacturing.

The barrier ranked last by some respondents in this research is government. This result could be distorted because of the responses from the four Chinese SMEs. Due to the unique political system in China, the communist government has absolute power in the country, controlling everything. This has resulted in possible discrepancies occurring in the case study outcome since the respondents from the Chinese enterprises are less likely to make honest disclosure during face-to-face discussion pertaining to their government. If the

responses from these four companies are removed, the barrier of government will likely not be the last obstacle in the implementation of GSCM. The most common complaints about what government should do more to support SMEs to go green is about financial assistance. There are also calls for government to relax import restrictions on electronic wastes, as the selected Taiwanese SMEs in this research are in the e-waste recycling industry that require large volumes of used electronic products for their recycling production.

Cross-Market Analysis

Under the assessment of major challenges in GSCM adoption, there are interesting observations from different markets on the ranking of challenges. Besides what has already been discussed on the consistently low ranking of government by Chinese SMEs, all three Taiwanese companies ranked their employees as the least impacting factor on GSCM adoption. This could be due to the strong green culture and awareness in Taiwanese society where the government has launched waste recycling campaigns since the 1990s. Most of the employees working in these Taiwanese SMEs have long tenure and they are committed to offering 100% cooperation to their company in implementing green practices and procedures.

Another interesting observation under this section is the barrier of the customer among the SMEs based in Thailand. Two of the companies have ranked the customer as the lowest impacting factor when one of them put it second. The main reason for this difference is two of these SMEs are the overseas subsidiaries of Japanese companies, so their products manufactured in Thailand are either sent back to Japan or delivered to other Japanese customers within Asia. The direction to embrace green management in the Thailand factory is being asked by the parent company in Japan due to stronger environmental sustainability awareness in Japanese society. As such, they do not encounter many issues with customers compared to other participating SMEs. The other Thai company involved in this research is the overseas production base of Taiwanese investors. They sell their products to customers in many countries across different continents. It is unavoidable that they are

facing resistance from customers in demanding cheaper prices as well as greener products.

4.3.4 Based on information interpreted from research question 4.3.3, what are the mitigations adopted by SMEs to overcome the identified barriers by integrating GHRM and GSCM?

In order to mitigate some of the challenges faced by SMEs in going green on their supply chain operations, the participating SMEs implemented the following people-related remedies (Tables 4.10 and 4.11):

	Types of Green HRM Practices	**Code**
	Job Analysis	
1	Specific environmental control measures are included in the job analysis	JAEM
	Recruitment & Selection	
2	Relevant environmental qualification requirement for specific positions	EQRP
	Reward	
3	Team rewards when company hits specific green goals/objectives	TRGO
4	Individual rewards to staff when they achieve specific green goals/objectives	IRGO
5	Verbal recognition of employees who demonstrate positive green behaviour	VRGB
6	Organize quiz games during annual year-end dinner to encourage employees to practice green behaviour	QGGP
7	Suggestion scheme for all employees to submit ideas on environmental conservation	SSEC
8	Salary increment for existing staff after obtaining green related certification	SIGC
	Induction	
9	Induction workshop for all new hires to share green policies	INWS
10	Posters on green policies displayed in the factory	POGP
11	Internal training workshops from external consultants or managers	INTR
12	Green policies written in company handbook.	CEHB
	Training	

13	External training workshops by professional consultants, government agencies or academic institutions	EXTR
14	OJT for new hire to attach to senior employees to learn about green practices	OJTG
15	Annual field trip studies to visit other companies with good green management and control/waste recycling plans	AFTB
	Performance Evaluation	
16	Green performance to be assessed during annual performance review	GPRV
17	Salary/Point reduction to employees performing poorly in green objectives	SDGO

Table (4.10) GHRM practices implemented by the SMEs

	Code	BYM	SDA	YDL	YHS	UFC	TFC	THI	UWin	EER	RDH	SUM
1	EQRP				X	X		X	X	X	X	6
2	TRGO		X		X		X					3
3	IRGO	X		X	X				X	X	X	6
4	INWS	X	X	X	X	X	X	X	X	X	X	10
5	POGP	X					X					2
6	INTR		X	X			X	X			X	5
7	EXTR	X	X	X	X	X		X	X	X	X	9
8	JAEM	X	X	X		X			X	X	X	7
9	QGGP					X						1
10	AFTB				X	X						2
11	GPRV	X	X	X	X			X	X			6
12	SSEC							X		X		2
13	SDGO	X				X						2
14	CEHB	X	X		X	X	X					5
15	SIGC				X				X			2
16	OJTG		X						X			2
17	VRGB				X					X		2
	SUM	*8*	*8*	*6*	*10*	*8*	*5*	*6*	*8*	*7*	*6*	

Table (4.11) GHRM practices adopted by individual SMEs

Out of these 17 green HRM practices, some of them are widely implemented in many of the participating SMEs. After a detailed review on the information provided during the case studies the following chart (Figure 4.12) illustrates GHRM practices by frequency:

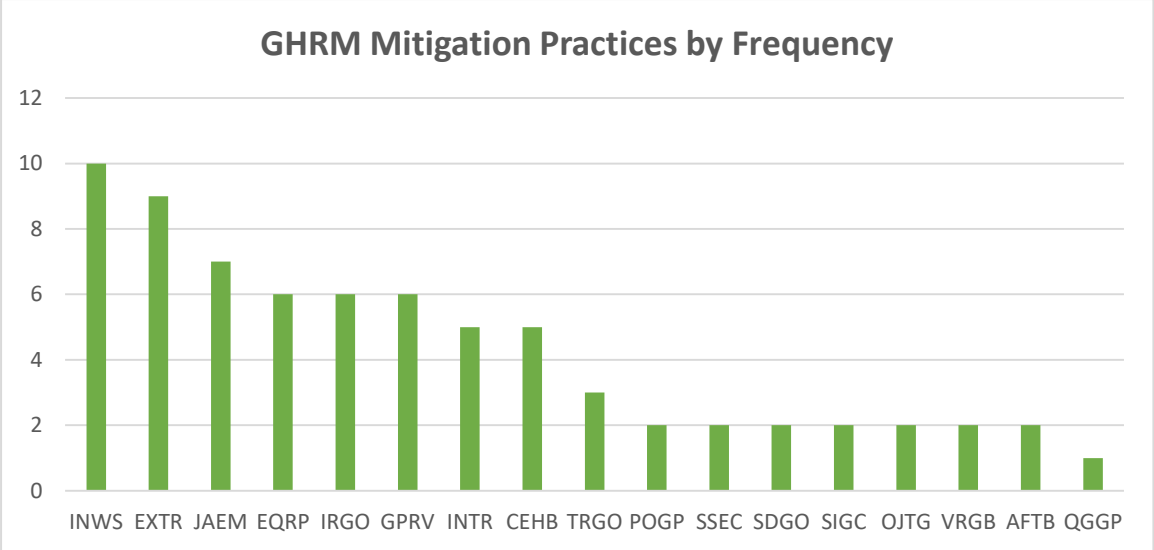

Figure (4.12) GHRM Practices by Frequency

In the following section, all GHRM implemented by the selected SMEs are discussed. Some of them can be directly attributed as mitigation on barriers as identified under research question 4.3.3; however, other GHRM practices are merely adopted as standard human resource policies not related to any identified challenges.

(1) Induction Workshop for New Hires

All ten companies interviewed in this research have implemented induction workshops for new recruits. In fact, this is a basic HRM practice in most companies, as it is necessary for management of the organization to ensure all incoming new hires understand and observe basic policies and procedures for safety and discipline. The companies involved in the research usually conduct the induction workshop in either a 2-hour or half-day session. Company green policies are shared during the induction workshop such as switching off machines or office lighting if not in use (tea break or end of shift), waste classification and disposal, using both sides of the paper for printing and photocopying, switching off the car engine when parking in company premises.

As shared by the respondents from some of the SMEs, this GHRM practice is used to mitigate the difficulty of hiring new employees:

a) YDL: *"Usually we just hire anybody that is interested to work for us. Many of these young people are from village that do not have basic knowledge and experience working in a company, having induction workshop for them is necessary…"*
b) YHS: *"If I have enough money, I will hire experienced staff with better qualification… however, in reality, we should be lucky if there are applicants coming to us. It is required to conduct detailed induction workshop to brief them on all our policies in safety and environmental protection."*
c) SDA: *"We cannot compare ourselves with those big multinational companies that can attract top talents from universities… many of our workers only have basic high school education and without prior working experience. Induction workshop is a good way to teach them how to work in our factory effectively…"*

(2) External Training for Green Management Control

All except one SME involved in this research are sending their employees to attend external training on green management control. These trainings could be free of charge offered by local government on latest regulatory controls, or paid sessions conducted by professional environmental management consultants on latest green management techniques. Some companies also sponsor their staff to pursue higher education in environmental management courses at local universities.

According to some of the companies, this GHRM practice is adopted mainly to overcome the challenges under Government and Technological Innovation. This practice is to support their employees to cope with the ever-changing environmental regulations as well as latest developments in green technologies:

a) BYM: *"China has implemented many new environmental regulations over these few years, I send my employees to attend external training because they need to know these new laws that can help to ensure we can achieve regulatory compliance with no violation…"*
b) EER: *"Although we are a small company, it is necessary for our managers to be trained and keep up with the latest technological and*

regulatory changes in environmental control… Many of them are eager to attend these training workshops to upgrade their professional knowledge."

c) *YDL: "After spending a few millions (RMB) on these new air and water treatment systems, our technicians and managers will need to learn how to use the systems effectively to achieve maximum results. So far, we have sent many technical staff to external training workshops for knowledge and skill upgrade…"*

(3) Specific Environmental Control Measures in Job Analysis

Altogether, seven companies included green control practices in the job analysis process. Specific green requirements are stated in the job duties to ensure workers in these positions observe green practices during operations. Some examples are waste classification and disposal, collecting unused materials for recycling, monitoring noise and air pollution levels in the factory and chemicals used in the machine must be neutralized before disposal.

Based on the respondents from four SMEs, having this GHRM is useful to ensure their workers perform according to the required environmental standards and procedures, which is essential in the implementation of green SCM. This is more relevant to the mitigation of barriers in customer:

a) *BYM: "Before our workers are assigned to production line, they need to read the job instructions to ensure they fully understand what is required to perform their task and to minimize any pollution to the environment. This can be critical when we have customers visiting our factory…"*

b) *SDA: "In order to produce high quality seafood products that are also eco-friendly to the environment, we need all our production workers to know their roles and responsibilities at the beginning of work shift. This is basic to ensure we meet the expectations of our customers!"*

c) *YDL: "We have regular customer visits from different cities and countries… my staff need to know what is required in their job to ensure minimum waste is generated during production… a copy of job description is provided to every one of them…"*

d) *RDH: "We include all important requirements from customers in the job instructions… such as quality and safety standards, waste prevention and pollution control… factory supervisors will also spot-check to see if the employees are following these instructions."*

(4) Environmental Qualification Requirement for Specific Positions

Six SMEs participating in this research have implemented this GHRM practice. In order to ensure qualified candidates to take up specific positions of environmental management, specific technical and professional qualifications are stated in the job descriptions. One example is anyone applying to be an environmental control officer or safety officer will need to have ISO-14001 lead assessor certification. Alternatively, some SMEs also accept candidates who have relevant hands-on environmental management experience in previous employment.

Respondents from these SMEs shared that this GHRM practice is needed because they are an ISO-14001 certified company and a basic requirement to be certified is to have internal qualified ISO auditors to carry out periodic factory assessments on pollution control and prevention. The certification of environmental management systems is required mainly due to customer request, especially overseas customers from Japan, Europe, Australia and New Zealand.

(5) Individual Reward when Staff Achieves Green Goals/Objectives

Another GHRM practice adopted by six SMEs is to reward individual employees when they achieve a pre-set goal. This could be one-time cash or gift reward when the staff member completes relevant environmental management training, when the rejects of a machine are less than a specific threshold or energy consumption of a production line is reduced. According to some of the respondents, such rewards are usually presented to the staff during the year-end company dinner.

In relation to the challenges faced by the SMEs in the green adoption in their supply chain activities, this particular GHRM practice is to mitigate the barrier of employee since it is difficult to hire qualified and experienced employees:

a) *BYM: "As you can see, it is not easy to recruit new staff as well as retain good employees in this remote city… Rewarding good employees when they achieved good performance is absolutely necessary…"*
b) *YDL: "In order to achieve environmental sustainability, we need our employees to have proactive and positive attitude towards green management…if they perform well in waste reduction or cut in energy consumption, we will reward them directly."*
c) *YHS: "To hire good employees in seafood manufacturing industry is tough in this area, we need to do more to retain our existing employees and one way to achieve this goal is to incentivize them regularly when they perform well…"*
d) *RDH: "One of our production workers suggested us to recycle the used gloves for waste reduction. After implementation, this suggestion helped us to save quite a bit of money in buying gloves. We have rewarded him with one additional month of year-end bonus…"*

(6) Green Performance Assessment during Annual Performance Review

The next green practice in human resource management implemented by six enterprises in this research is to include green performance assessment during the annual performance review. Based on the respondents, there is no additional salary increment for those employees who achieve specific green objectives; however, the green performance assessment includes an overall performance review of every employee in the company, together with other dimensions such as quality, productivity, punctuality, safety, etc.

All Chinese SMEs and one Thai company who took part in this research voiced their view about the use of this GHRM practice to overcome the challenge of increasing cost in a greener supply chain:

a) *BYM: "Waste reduction and energy consumption are keys to cost reduction…I need all my staff to focus in these areas if we want to be competitive!"*
b) *SDA: "It is necessary to ensure all our employees fully aware of the green objectives given to them as part of annual performance appraisal. Some of these KPIs have direct implications to our financial return…"*

c) YDL: *"Any violation that causing environmental contamination will result in heavy fine from local authority… We need to ensure environmental related performance KPIs are being measured for all our workers every year."*

d) YHS: *"Good employees can help the company to achieve cost saving every day if they follow the correct work instructions to minimize wastage in raw materials as well as water… we need to measure their performance in waste prevention during annual performance review."*

e) UFC: *"As we are serious about environmental sustainability, our management team is determined to measure green performance for every employee… all of them are given specific performance goals on energy and water consumption to be appraised annually."*

(7) Internal Training Workshops Conducted by Managers or External Consultants

In order to be cost effective, some companies conduct in-house training workshops to teach their employees green management techniques and regulations. Five SMEs interviewed have implemented such a practice to share green knowledge among their staff. These sessions can either be conducted by their own managers or an environmental control officer, or by some external consultants as well as local government officials. This is a more cost-effective arrangement since the workshop could be much larger with more staff attending together, so the cost of trainer could be lower per employee. Another advantage is the timing of the session, the respondents interviewed shared that such information sessions are usually carried out during lunch time or after work, to ensure minimum disruption to business.

According to some SMEs, this GHRM is used to have a more cost-effective arrangement for staff training, in order to mitigate the barriers of government and technological innovation due to changing environmental regulations and technologies:

a) TFC: *"To be on top of the changing regulations, as well as learning new green techniques, we need to provide regular training to our staff. It is*

better to have in-house training workshops during lunch break or after work to minimize any disruption to our production…"

b) THI: *"Our production is operating in 3-shift for 6 days a week… it is difficult to release a big group of staff to attend external training. By having internal trainings, we have experienced managers to share with everyone on the latest government regulations and new operating procedures…"*

c) RDH: *"It is no brainer to have internal training workshops for our employees compared to sending them to external workshop… We have large conference rooms and our engineers and managers are knowledgeable about any new changes in government regulations or production machines…"*

(8) Green Policies Written in the Company Handbook.

Another green HRM practice implemented is having the green policies written in the company handbook. Most companies participating in this research issue a company handbook (or employee handbook) to all their employees. The content usually includes the company mission, basic employment terms and conditions, company benefits and remuneration structure, basic policies and procedures. Five of the SMEs interviewed have included basic green policies in the company handbook to ensure everyone working in the company observes and behaves in accordance with eco-friendly policies. According to the respondents of these companies, this GHRM practice is not related to any challenges of green adoption since this is just a standard HRM practice to provide full company information to all employees.

(9) Team rewards when company hits specific green goals/objectives

A few SMEs taking part in this research implemented team reward incentives when company meets specific green objectives. Examples are electricity or water consumption, waste disposal, reject rate or fine on pollution violation; etc. The reward is usually given to the entire company in the form of an additional bonus at the end of the year. According to a respondent from YHS, it is also possible to reward workers from a particular production line when they achieve predetermined goals.

According to two of the SMEs this GHRM is used to mitigate the barrier of employee recruitment so as to improve overall staff retention in the company:

a) *YHS: "To be frank, our salary and compensation is not as good as compared to big companies in Shanghai or Beijing… we introduced team rewards to attract our employees to stay with us as well as working together to achieve environmental sustainability…"*
b) *SDA: "To make high quality food products for our customers, we need happy employees that understand the importance of hygiene and pollution prevention. Giving out team rewards when they achieve good results collectively is one good way to make them happy and stay with us longer…"*

(10) Posters on green policies displayed in the factory

During on-site factory visits, educational posters on environmental protection were found to be clearly displayed in the company premises of two companies. According to the managers, this is a good communication channel to educate all their employees on the importance of environmental sustainability. Both companies shared that this is only a basic employee communication practice that is not related to any challenges of GSCM adoption.

(11) Suggestion scheme for all employees to submit ideas on environmental conservation

Another interesting GHRM practice introduced by two SMEs is a suggestion scheme open to all employees to participate on environmental conservation. Any suggestion pertaining to improving environmental control can be submitted to the managers, rewards to be given for any practical suggestions that can be implemented in the company. This practice can be used as a mitigation on the challenge of employee retention according to the respondent from EER: *"This is a good GHRM practice for our employees to participate in the building of a greener working environment. This is positive to ensure good employees stay with us longer and minimize the turnover rate."*

(12) Salary/Point deduction to employees who perform poorly in green objectives

Two companies have instituted a salary or point deduction system for their employees if they fail to meet the green objectives. This is especially serious when excessive waste or rejects have been produced during production. According to the managers of the two SMEs, this practice is needed to mitigate the increasing production cost due to bad performance of employees:

a) *BYM: "I think it is common sense to punish any employee if he or she performs badly…"*
b) *UFC: "When the employee is doing well, company will reward him greatly. If he is doing badly, I think it is fair that he should be reprimanded accordingly, especially if the poor performance is creating excessive wastage that causing environmental damage…"*

(13) Salary increment for existing staff after obtaining green related certification

This particular GHRM practice is related to the requirement of environmental management qualification for certain positions in the company. Instead of hiring new staff to fill these important positions, it is also possible for companies to send their staff to take the training and be certified. UWin and YHS have internal policies to provide salary adjustments for those staff that successfully obtained ISO-14001 internal auditor certification. According to the respondents of these two companies, this HR policy is just to ensure equity between new and existing staff with a similar professional qualification.

(14) OJT for new hires to attach to senior employees to learn about green practices

Two SMEs that took part in this research implemented an OJT programme for new hires to understudy senior staff after joining the company. The new hires will learn about the work procedures and green measures from a senior colleague, such as safety precautions, operating procedures, waste classification and disposal, etc. According to the respondents of these two companies, the OJT program is useful and important in new employee recruitment and training because many of their new hires are fresh graduates

or school leavers that do not have prior working experience. Hence, this is a mitigation to overcome the challenge of employee:

a) *UWin: "We have recruited a few fresh graduates from local universities… it is a cost-effective way to speed up the learning curve for these new hires by pairing them with the senior colleagues. They will learn all the necessary operating procedures including how to segregate production wastes into different categories…"*
b) *SDA: "As mentioned before, it is very challenging to recruit new people to join our seafood industry. We have tried to bring in young people from other provinces with minimum educational qualification and no working experience. OJT is very good to ensure they learn as fast as possible on safe and green production…"*

(15) Verbal recognition to employees that demonstrate positive green behaviour

Instead of monetary reward, two companies provide verbal recognition to any employees that exhibit positive green behaviour in the company. Some examples such as switching off the machine during tea break and after work; walking or using a bicycle instead of fossil fuel vehicles; using both sides of the paper for printing/copying, etc. Such positive behaviours to be highly commended during company events such as annual dinners, staff meetings or outdoor gatherings. Based on the feedback from managers of YHS and EER, this GHRM practice is not related to any of the challenges faced in GSCM adoption, it is just a positive reinforcement to motivate employees in pursuing environmental sustainability.

(16) Annual field trips to visit waste recycling plants / companies with good green management

Two companies have organized annual field trips for their front-line employees to visit waste recycling plants or other companies that have implemented effective green management. According to the managers, such educational trips can be beneficial for employees to appreciate the importance of environmental conservation and waste recycling, this is essential for new

employees who are lacking experience in green management. Based on their feedback, this GHRM practice is effective as a mitigation in employee hiring difficulty, as well as customer demand in GSCM adoption:

a) *YHS: "We have many young workers coming from rural villages, this is their first job…when they see how other green companies running their operations effectively and efficiently, this can educate them better than reading from text books…"*
b) *UFC: "Every year, we try to organize a trip for new employees to visit waste recycling company, this is for them to appreciate the value and importance of waste classification and recycling. Our customers expect us to be green and it is everyone's responsibility to contribute towards greener living in our company…"*

(17) Organize quiz games during annual year-end dinner

One SME shared that to enhance the understanding of environmental conservation, simple quiz games are used during the annual year-end dinner event. Employees that answer the quiz correctly are given a small gift as encouragement. According to a manager from UFC, the quiz game is just a small activity for the company to educate employees on the knowledge of green management, it is not actually related to any mitigation of challenges in green adoption.

Summary

In summary, out of 17 GHRM practices 11 were being introduced as a form of mitigation on some of the identified challenges/barriers on GSCM adoption (Table 4.12):

Challenges	Relevant GHRM Mitigation Practices
Customers	a) Specific Environmental Control Measures in Job Analysis b) Environmental Qualification Requirement for Specific Positions

	c) Annual field trips to visit waste recycling plants / companies with good green management
Employees	a) Induction Workshop for New Hires. b) Individual Reward when Staff Achieves Green Goals/Objectives. c) Team rewards when company hits specific green goals/objectives. d) OJT for new hire to attach to senior employees to learn about green practices. e) Annual field trips to visit waste recycling plants / companies with good green management.
Government	a) External Training for Green Management Control b) Internal Training Workshops Conducted by Managers or External Consultants
Technological Innovation	a) External Training for Green Management Control b) Internal Training Workshops Conducted by Managers or External Consultants
Cost	a) Green Performance Assessment during Annual Performance Review b) Salary/Point deduction to employees who perform poorly in green objectives

Table (4.12) Mitigation of challenges by relevant GHRM practices

Cross-Market Analysis

After analyzing the data, there are similarities and differences between different markets on the implementation of green HRM practices. All three Taiwanese SMEs participating in this research have consistently rolled out the following green HRM practices to improve GSCM:

- Relevant environmental qualification requirement of the specific positions
- Individual reward when staff achieves specific green goals/objectives
- Induction workshop for all new hires to share on green policies

- External training workshops on green knowledge and regulations
- Specific environmental control measures included in the job analysis

All four Chinese SMEs involved in this research have launched the following green HRM practices to mitigate any challenges in the GSCM implementation:

- Induction workshop for all new hires to share on green policies
- External training workshops on green knowledge and regulations
- Green performance assessment during annual performance review

However, only one GHRM measure is commonly adopted by all three companies based in Thailand: to conduct induction workshops for all new hires to share on green policies. Based on the data collected from focus group discussions, the average number of GHRM practices adopted by SMEs in three different economies are as follows:

- China: 8
- Taiwan: 7
- Thailand: 6.3

From the statistics, it seems that SMEs in Taiwan and China are more receptive to adopting people related to green measures to support implementation of GSCM in order to go green in their operations.

4.3.5 What are the benefits and challenges of integrating GHRM and GSCM?

In this research, the selected SMEs were also asked to share benefits and challenges encountered in launching GHRM practices, as well as the benefits received after integrating GHRM and GSCM together. The following table (4.13) outlines the inputs given by the respondents:

Company	**Challenges in GHRM Implementation**	**Benefits in Integrating GHRM with GSCM**
UWin	• *"GHRM is still new in TW, many people don't really familiar"*	• *"Improve adoption rate of green practices in the company"*

	• *"GHRM is difficult to quantify, need to have more tangible KPIs"* • *"Due to resource constraint in SMEs, difficult to hire suitable candidates"*	• *"Enhance brand and corporate image"* • *"Help to achieve better results in green performance"*
EER	• *"Foreigners working in our company may not fully appreciate the importance of green management"* • *"High turnover rate for SMEs especially during economic boom time"*	• *"Help to achieve final objectives on environmental control and minimize pollution"*
RDH	• *"Some employees view the additional GHRM procedures as additional chores and unwilling to cooperate"*	• *"As many machines in our company are still manually operated, GHRM has helped to equip our employees with necessary knowledge and skillset to support Green SCM"* • *"Most workers are positive to cooperate with the management to ensure better working condition and environmental awareness"*
BYM	• *"Difficulty in recruiting high quality talents"* • *"Increasing wages causing sharp rise in labour cost"*	• *"Help to reduce environment pollution during production"* • *To support meeting final goals on environmental control and pollution prevention"*
SDA	• *"Difficulty in recruiting high quality talent"*	• *"To ensure all employees are aligned with the unified direction towards green and safe working environment so as to produce greener and*

		safer products for the customers"
YDL	• *"Difficulty in recruiting workers"*	• *"Help our company to achieve the objective of minimizing pollution and protecting our environment"*
YHS	• *"Older staff require more time and regular communication/training to ensure they comply with green procedures"*	• *"GHRM and GSCM are inseparable in order to achieve positive green results"*
UFC	• *"Senior employees may not fully appreciate the importance of environmental conservation as compared to the younger employees. More training and communication is needed"*	• *"As employees are the most important assets of our company, they make things happen. Hence, it is necessary to incorporate Green HRM together with Green SCM to achieve real green improvement in our company"*
TFC	• *"Employees from rural areas are likely weak in complying with company green policies. More training and communication is needed"*	• *"GHRM and GSCM are complementary to each other to gain trust from employees, customers and community"* • *"All supply chain activities are performed by human, injecting green practices in HRM will help to reduce risks in environment pollution"* • *"All employees feel good and proud about working in a green and healthy environment"*
THI		• *"Help to achieve goals in environmental conservation"*

		• *"Create clean and healthy working environment for everyone working in our factory as well as for the surrounding community"* • *"Able to achieve tangible cost saving such as waste recycling"* • *"All employees feel good and proud about working in a green and healthy environment. This has help to boost the morale of our workforce as well as attracting better talents"*

Table (4.13) Challenges & benefits in integrating GHRM and GSCM

Based on the comments from respondents, there are different answers to this research question. In summary, the two most common challenges in implementing GHRM in this research are as follows:

(1) Difficulty hiring suitable talent to join the company – Five companies have cited hiring as the main barrier in GHRM implementation. This is mainly attributed by the limited financial resources of SMEs in paying higher salaries, remote working locations and undesirable working environments in their industries. This situation can be worse during economic booms when SMEs have to compete with resource rich MNCs on hiring. This challenge has a direct impact on selecting qualified candidates with relevant green management experience as these SMEs will just be happy to accept any job applicants coming for a job interview.

(2) Employees may not fully appreciate the concept of environmental sustainability – Five companies indicated that some of their employees were unable to adapt to green policies and practices as introduced in the company. Two companies cited their older staff were reluctant to

cooperate in green adoption during the initial stage. Other companies had similar problems with foreign workers or workers coming from rural areas outside of city. According to these SMEs, regular training and communication is needed to ensure these employees are on-board with the overall company environmental strategy.

Other feedback on the challenges implementing GHRM by other companies is related to the lack of awareness in green human resource management as well as unclear about and shortage of quantifiable performance measurements in this domain. As cited by the MD from UWin, the concept of GHRM is still relatively new in Taiwan and more education and training are required to create sufficient awareness and acceptance for everyone. Another feedback shared by RDH from Taiwan is about the perception of GHRM practices to be additional chores that are not welcomed by some employees. According to the deputy GM of RDH, a few employees are reluctant to attend training over the weekend or after work on green management.

During the case study interviews, all respondents from the SMEs fully agreed with the benefits of GHRM with reference to the implementation of GSCM. The following are the major observations from respondents' inputs:

a) The most common answer is the ability to support their company to achieve goals and objectives in environmental sustainability as shared by six companies (Uwin, EER, BYM, YDL, THI and YHS). Out of these six companies, all except one (YHS) are in highly pollution trades (metal machining, leather production and electronic waste recycling). It is also interesting to note that, the senior management of five SMEs were involved in the case study, the only exception is THI.
b) Three companies also cited that implementing GHRM practices to support GSCM has helped to instill pride and satisfaction among the employees since their working environment is clean and green, which is good for their health and the community.
c) Based on the feedback from two companies, as the production processes in the factory are mostly manually operated, it is clear that, in order to ensure all green procedures are strictly followed, people-related

policies are necessary to ensure all employees are committed and working towards a common goal in environmental sustainability.

d) Other benefits as cited by one SME re cost reduction and enhancement in company/brand image, these benefits were mentioned in conjunction with other benefits as outlined earlier.

4.4 Conclusion

In this chapter, detailed interpretation and analysis of data obtained from the case studies was carried out to answer the research questions. From the analysis, there are valuable observations on the most commonly adopted GSCM and GHRM practices implemented by the SMEs in different economies, as well as main challenges and motivations in embracing environmental sustainability in their operations after thorough thematic analysis. One particularly interesting observation from the data is; there is existence of local collaborative supply chain network in Taiwan when different companies work together for better green management, which is very encouraging and something that other economies can benchmark and learn from Taiwan. The following are the evidences of collaborative supply chain network as demonstrated by the three selected SMEs in Taiwan:

a) **EER** – there is an established on-going communication process for EER to feedback to major home appliances manufacturers to improve on product design so as to achieve higher degree of e-waste recycling.

b) **UWin** – After first level of gold extraction from PCB recycling in UWin plant, all e-wastes to be processed further by other e-waste recycling service providers in Taiwan. This is to improve the overall percentage of e-waste recycling and minimize negative environmental impacts.

c) **RDH** – This SME works with other electronics manufacturers and e-waste recycling service providers to collect wastes for Tin extraction. There is a close loop process between e-waste recycling service providers and electronics manufacturers in Taiwan to ensure all e-wastes are being recycled as much as possible for maximum environmental protection.

In the final chapter, a recap of the research findings, together with theoretical and management implications will be discussed to recommend ideas for future research in the domain of green management in supply chain operations.

All ten case studies will be presented with a basic introduction on each company's background, together with a systematic review and detailed analysis on the data collected from the case studies in accordance with the research questions.

Chapter 5
Discussion & Conclusion

5.1 Introduction

Global warming and climate change are fast becoming the most important agendas for all countries around the globe. Many companies (big or small) have started to focus more on environmental sustainability by greening their business activities for different reasons such as increased customer green awareness, corporate social responsibility or regulatory control. In this research, a comprehensive review of the available literature was carried out to identify previous and existing research on GSCM and GHRM that has led to the development of a conceptual research framework based on both institutional and stakeholder theory with the incorporation of four core supply chain management activities and six common human resource management practices. After conducting ten different case studies in three Asian economies (Thailand, China and Taiwan) by using the proposed conceptual framework, valuable information was obtained that enabled the researcher to conduct in-depth analysis on the behaviour of small businesses in green adoption and environmental management.

In this final chapter, an in-depth discussion is presented to explore the applicability of the proposed research framework with suggested enhancements, as well as theoretical contributions from the research findings. A list of managerial recommendations is also presented to the managers/owners of SMEs and governments on how to improve the adoption rate in green SCM. Lastly, this chapter outlines the limitations of this project together with possible suggestions for future research in the domains of GSCM and GHRM.

5.2 Summary of Research Findings

In this section, detailed interpretation and analysis of data obtained from the case studies are carried out to answer the research questions. From the

analysis, there are valuable observations on the most commonly adopted GSCM and GHRM practices implemented by the SMEs in different economies; as well as major challenges and motivations in embracing environmental sustainability in their operations. The following is a quick summary of findings in accordance with the research questions:

Q1). What are the main motivations/drivers for SMEs to implement green management practices in selected Asian markets?

Nine motivations or drivers were identified by the respondents of the selected SMEs which took part in this research. The following summary presents the motivations in order of frequency cited by the respondents:

a) Customer Demand
b) Company image
c) Global Trend
d) Regulatory pressure
e) Company policy
f) Contribution to society
g) Cost reduction
h) Corporate culture
i) Increase green awareness

An interesting observation from the case studies is some respondents don't even consider what they have implemented in GHRM as unique. One respondent shared that: "company will always need to be flexible to react to changing market conditions". Since environmental sustainability is new and increasingly prominent these days, it is necessary for SMEs to make changes in their HR practices to ensure the company can go green successfully.

Q2). What are the most common GSCM practices used in SMEs from selected Asian markets?

According to the findings from the study, the top eight most common GSCM practices used in the selected SMEs are:

a) Waste classification - general/toxic/recycle

b) Use of government certified third party waste management vendor
c) Use of vendors/suppliers with environmental management certification
d) Installation of in-house waste water/air treatment systems
e) Use of environmentally friendly and recyclable materials/office supplies
f) Recycling of packaging materials
g) Conduct incoming materials inspection
h) Cargo consolidation/direct delivery for improved logistics efficiency

Based on the inputs from the SMEs, there is no specific green practice introduced that is specific only relevant to small businesses and not in large MNCs. However, one observation worth mentioning here is the types of green SCM practices used by these ten SMEs in various markets. It is clear that; these enterprises prefer to adopt low cost and easy to implement green initiatives as we see from these top eight most commonly used green practices. All but one can be planned and executed in short period of time with minimum capital investment. The only exception is the installation of air and water treatment systems when it is mandated by local environmental bureau.

Q3). What are the main barriers/challenges to implementing GSCM for SMEs in selected Asian markets?

The three biggest challenges shared by the selected SMEs in this research are (a) Cost, (b) Technological Innovation and (c) Customer.

Q4). Based on information received from Q3, what are the mitigations adopted by SMEs to overcome the identified barriers by integrating GHRM and GSCM?

The people related mitigations used by the selected SMEs to overcome respective challenges are as follows (Table 5.1):

Challenges	Relevant GHRM Mitigation Practices
Customers	d) Specific Environmental Control Measures in Job Analysis e) Environmental Qualification Requirement for Specific Positions

	f) Annual field trips to visit waste recycling plants / companies with good green management
Employees	f) Induction Workshop for New Hires. g) Individual Reward when Staff Achieve Green Goals/Objectives. h) Team rewards when company hits specific green goals/objectives. i) OJT for new hires to attach to senior employees to learn about green practices. j) Annual field trips to visit waste recycling plants / companies with good green management.
Government	c) External Training for Green Management Control d) Internal Training Workshops Conducted by Managers or External Consultants
Technological Innovation	c) External Training for Green Management Control d) Internal Training Workshops Conducted by Managers or External Consultants
Cost	c) Green Performance Assessment during Annual Performance Review d) Salary/Point deduction to employees who perform poorly in green objectives

Table (5.1) Mitigations used by SMEs to overcome respective challenges

The above GHRM practices are grouped under Training, Job Analysis, Reward, Induction, Recruitment & Selection and Performance Evaluation.

Q5). What are the benefits and challenges of integrating GHRM and GSCM?

The two most commonly mentioned challenges in the integration of GHRM and GSCM are: (i) difficulty hiring suitable talent and (ii) employees may not fully appreciate the concept of environmental sustainability.

On the benefits of integrating GHRM and GSCM to achieve environmental sustainability, the following inputs were shared by respondents during case studies:

a) The most common benefit as cited is the ability to support their company to achieve goals and objectives in environmental sustainability.
b) Implementing GHRM practices can also support GSCM to instill pride and satisfaction among the employees since their working environment is clean and green, which is good for their health and the local community.
c) As the production processes in the factory are mostly manually operated, it is obvious that, in order to ensure green procedures to be strictly conformed with, people related policies are necessary to ensure all employees are committed and working towards a common goal in environmental sustainability.
d) Other benefits as cited are cost reduction and enhancement of the company/brand image, these benefits were mentioned in conjunction with other benefits as outlined earlier.

5.3 Enhancement of Research Framework

The proposed conceptual framework developed in Chapter 2 is used to guide the detailed study of the integration of GHRM and GSCM for SMEs. A lot of learnings have been shared in this research and according to the research findings, a few possible areas of enhancement and fine-tuning on the proposed conceptual research framework could be suggested:

1) Clear definition on barriers – In the case studies, it was evidenced that some of the respondents got confused between cost, availability and effectiveness of new green technology. Some respondents cited Technological Innovation as one key impediment to green adoption in GSCM because of the high cost of using greener machines or materials.

However, this overlaps with the Cost barrier which is a separate factor in the proposed model. The definition of Technological Innovation as a possible barrier in GSCM adoption should be clearly defined as the availability of new technology to SMEs as well as the overall effectiveness of these new green techniques or materials on pollution control or environmental protection.

2) Drivers for Green Adoption – In the ten case studies, a question was asked to solicit inputs on the key drivers pushing SMEs to adopt green management in their organization. This information is useful to identify the key push factors that have direct influence on business owners to adopt a new management practice that may or may not bring in tangible benefits to their organization. Policy makers such as government agencies can evaluate these push factors and design appropriate measures to encourage more enterprises to go green, the enhanced conceptual framework to be modified to include these drivers for better illustration of the connections and provide new direction for future research.

3) Incorporating Performance Measurement Metrics – During the pilot case study, the researcher discussed with the respondents of UWin measuring the benefits of integration between GHRM and GSCM during the focus group discussion. Conceptually, this is a good suggestion with the aim of assessing the overall performance of the company after they have adopted green management in their HRM and SCM activities. However, based on the feedback from UWin management, it is very difficult for SMEs to measure and monitor non-financial related performance KPIs. Most SMEs have their basic financial KPIs in place, such as annual profit, annual turnover as well as monthly expenses. However, it is very costly and sometimes challenging to measure other non-financial performance metrics such as carbon emissions, pollutant emissions to water/land, total waste disposal or percentage of green energy consumption. These environmental KPIs require a comprehensive reporting structure and resource support in order to be accurate and relevant to the company. SMEs are usually resource constrained and such reporting can only be done with financial

incentives from local government in the form of consultancy support. Another possible issue in linking the integration of GHRM and GSCM and company performance is it is always challenging to validate the direct linkage since there are many different factors in the real world that can impact company performance. Nevertheless, in the spirit of discovering new insights in green adoption and business management, a series of performance KPIs is included in the enhanced model for future research consideration. (e.g., turnover percentage, P&L, government fine on environmental pollution, green energy consumption, market survey, etc.).

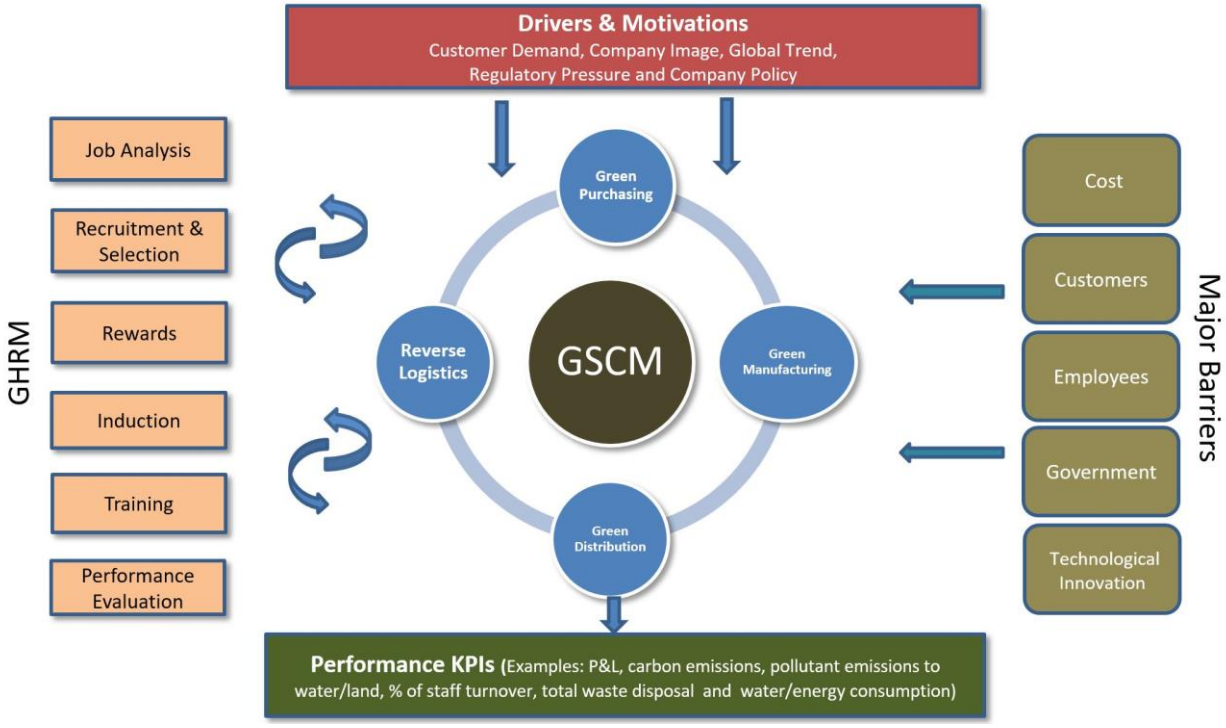

Figure (5.1) Enhanced Research Framework for Future Study

In the above enhanced research framework (Fig. 5.1), additional inputs and outputs have been incorporated with drivers and motivations serving as push factors influencing small businesses to adopt GSCM under the headwind of different barriers. As SMEs are using people related green practices to mitigate the negative impacts of barriers, it is useful to measure the performance of the enterprises under different categories: environmental, financial and people.

5.4 Managerial Contributions and Recommendations

After talking to the business owners and managers of the ten SMEs in this study, it is clear that, Asia being the most vibrant region on earth in terms of economic growth, there is no shortage of opportunities in growing the business aggressively. However, there are also plenty of challenges that can derail the business due to the dynamic operating environment with lots of uncertainties.

As outlined in Chapter 4, the SMEs involved in the case studies have implemented many effective green practices in GSCM and GHRM. SMEs in other cities or countries can certainly learn from these companies in reducing pollution and attaining environmental sustainability. In addition, recommendations obtained from the respondents provide useful and practical lessons to be learned by the business owners and managers of the SMEs regardless of the locations (Fig. 5.2):

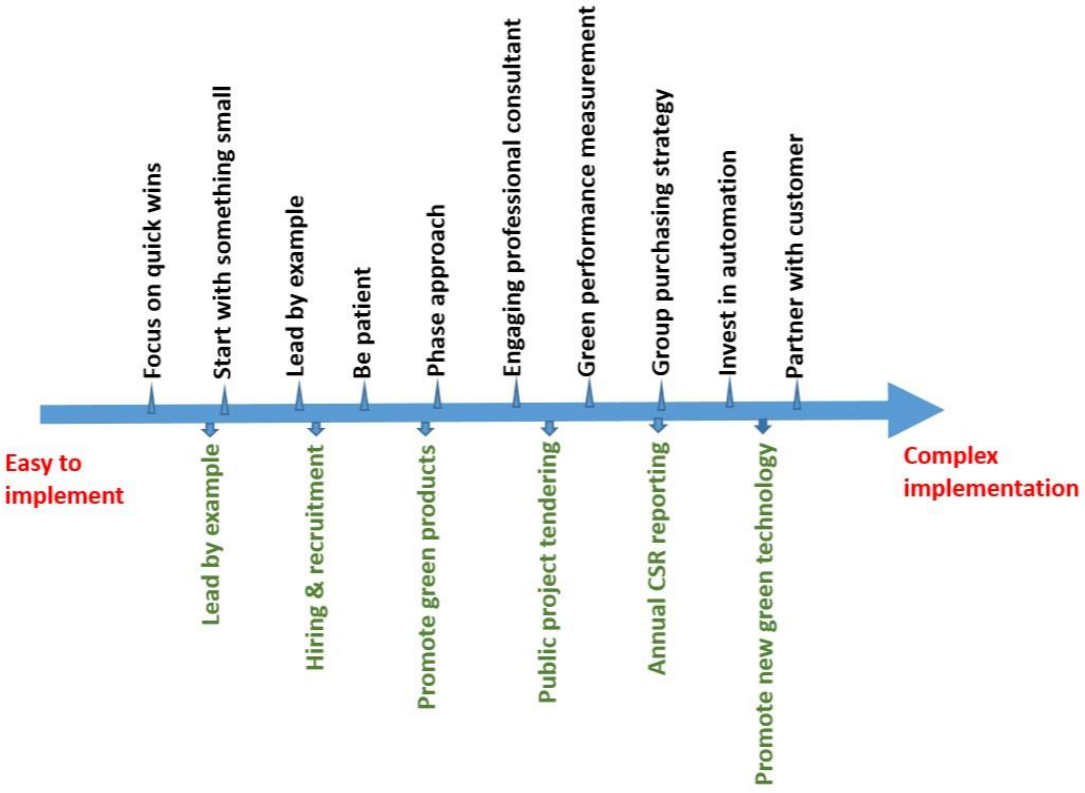

Figure (5.2) Managerial recommendations for business owners and policy makers on green adoption for SMEs

a) Focus on quick wins – During on-site visits and discussions, it was evident that some GHRM practices could be rolled out easily with minimum effort so as to facilitate the implementation of GSCM: support employees to attend internal and external green trainings, conduct induction workshop for new hires, put up posters in the office and factory to spread messages on environmental sustainability and provide tangible and intangible recognitions to employees with positive green behaviour. Companies should first aim to focus on quick wins that are easy to implement and reap green benefits instead of going after complicated and expensive solutions.

b) Start with something small – Similarly, based on feedback from the respondents, it is easy to start GSCM with simple measures instead of trying to do everything at once. Some GSCM practices can be implemented in bite size without much effort: production waste classification, using vendors and suppliers with ISO-14001 certification, using LED lighting and recycling papers in office, logistics process redesign and shutting down vehicle engines when in the facility.

c) Lead by example – Some respondents also shared critical success factors in implementing GSCM and GHRM in their company. One of the important factors is “Leading by Example”. All management staff in the company must exhibit appropriate green behaviour, encouraging other employees to embrace and accept green practices as promoted within the organization. Positive personal conduct such as switching off lighting during lunch or tea breaks, walking or cycling to work instead of driving, using electric vehicles or recycling personal waste can help to cultivate awareness of environmental sustainability in the workplace.

d) Be patient – Some respondents shared that they have foreign workers or workers from remote villages working in their factory. These workers usually lack appropriate understanding and appreciation on environmental sustainability. A few managers have shared that there is no magic formula in solving this challenge; it will take time to bring these

employees on-board to embrace green behaviour and become fully in compliance with company policies and procedures to reduce environmental pollution. Consistent, regular communication and coaching are keys to educating these workers on the importance of saving the earth by reducing pollution.

e) Phase approach – One respondent also suggested that it is necessary to implement green management practices in phases to ensure success. Going green in the entire supply chain flow is not a small undertaking. If a company tries to implement too many changes at once, this will surely disrupt the entire organization and may cause undesirable consequences with resistance from different stakeholders such as employees or suppliers. Hence, any implementation of large-scale projects should be done in phases to guarantee success and acceptance from all stakeholders.

f) Engaging professional consultants – Another useful advice from a few respondents is to engage external consultants to support the execution of GSCM and GHRM if there is sufficient funding, this is to ensure highest possible success rate in the overall project implementation. In many countries, it is possible to apply for financial assistance from local governments to employ professional consultants in greening business operations.

g) Green performance measurement – For those SMEs that have already implemented some form of green initiatives in GSCM and GHRM, it is possible to plan ahead on green performance measurement. Some basic KPIs to be monitored are total energy and water consumption, fine or penalty issued by the local environmental bureau, carbon emissions and production waste disposal. Having consistent, timely and scientific measurements of environmental performance can accelerate greening of supply chain operations for the company.

h) Group purchasing strategy – one common complaint about using greener raw materials that can be recycled is about the higher price. In general, it is usually more expensive to buy such materials. One respondent has suggested to adopt a group purchasing strategy to increase bargaining power when dealing with suppliers. This strategy is feasible in China when many of the SMEs in the same industry are located together in special economic zones. The management committee of the zone or the industry association can help to pool all SMEs together and procure raw materials or services in bulk to reduce cost.

i) Invest in automation – It is also important for business owners or managers to consider using automation to mitigate the impact of hiring difficulties. Although the initial investment is usually high, in the mid to long-run, the benefits obtained from automation such as cost saving and better quality will likely be more than sufficient to justify the initial investment. Another possible way to implement automation is to rent from the equipment supplier.

j) Partner with customer – As shared by most of the respondents, it can be very costly for SMEs to use greener materials or the latest technology which is more energy efficient in the production process. One respondent commented that, they have large customers from overseas that are keen to provide all necessary support to SME vendors in order to reduce environmental pollution. Some possible collaborations could be (i) the customer to provide a large multi-year contract to help an SME in investing new production line, (ii) the customer to buy directly from the green material supplier and send to the SME supplier for manufacturing and (iii) the customer to provide a new production machine with better energy efficiency as part of the order agreement.

Besides sharing recommendations to business owners and managers on how to improve the adoption rate of GSCM, it is equally important for policy makers and public agencies to have a full understanding of these most commonly

implemented green practices and introduce appropriate government policies to encourage adoption of green management. Governments in these three economies signed up to the Paris Agreement on greenhouse gas emission reduction in 2016, so it is logical for them to provide tangible assistance to businesses and residents in meeting the reduction goals committed to under the Paris Agreement.

One common theme emerging from this study is the lack of financial resources for SMEs in Asia, which is also similar in other parts of the globe. According to a research paper published by the Asian Development Bank Institute (Yoshino & Taghizadeh-Hesary, 2018): “SMEs face major challenges in accessing cheap finance, mainly because of the asymmetric information problem between suppliers and demanders of funds and the high transaction costs”. Many business owners or managers interviewed during the case studies have repeatedly urged local governments to support them in securing additional funding in automation investment as well as hiring of top talent.

As provided by the respondents in this research, the following are the managerial recommendations for the policy makers in public agencies to consider on how to support more SMEs to go green:

1. Lead by example – Public sector organizations or related state enterprises should take the lead in implementing Green HRM and Green SCM. This will help to create broader awareness of environmental sustainability, as well as serve as a strong catalyst in green adoption since these public sector organizations conduct regular business transactions with local SMEs.

2. Hiring and recruitment – To overcome hiring difficulties government should encourage more young people to join green companies by providing training incentives or subsidizing their salaries. Alternatively, local universities could implement mandatory internships for university students to be attached to SMEs that are certified with environmental management systems (such as ISO-14001).

3. Promote green products – Government to establish regulations to mandate the use of greener products and services in the country. This can be achieved through public sector procurement processes, as well as levying carbon or environment pollution taxes on companies producing non-green products or services. Some examples are the use of greener emission control standards for vehicles (eg; Euro-5) as well as more energy efficient home appliances. The active promotion of using greener products will certainly help to accelerate the rate of green adoption for manufacturers and brand owners, and spill over to many SMEs as suppliers and vendors.

4. Public project tendering – Governments around the world should recognize the green efforts put in by smaller businesses as these financially strained companies have to sacrifice much more than the large multinational corporations in order to be eco-friendly in their processes and products/services. Possible incentives and special support should be rendered to these smaller businesses during tendering of public projects.

5. Annual CSR Reporting – In order to encourage more enterprises to embrace green management, MD from UWin recommended that local government provide financial incentives to all SMEs on Corporate Social Responsibility (CSR) annual reporting. This should include capacity building to ensure SMEs are fully equipped with the basic structure and resources needed to report annually. For a start, SMEs may only need to focus on environmental sustainability reporting such as carbon emissions, energy and water usage and percentage of waste disposal.

6. Promotion of new green technology – Some of the latest green technologies can be rather costly and difficult to acquire in some markets. Government should take the lead in providing both financial and technical support on the adoption of newer green technologies by SMEs. One common example quoted in this research is the installation of air

and water treatment systems, which usually cost millions of dollars per installation.

5.5 Theoretical Contribution in Green Management

Apart from managerial recommendations to business owners and policy makers, there are also conceptual theoretical contributions in this doctorate research, especially in the domain of SME green management. The following are three areas of theoretical contributions:

Integration of GHRM and GSCM for SMEs in Asia

This qualitative research, although limited in scope, has positive theoretical contributions to the domain of green management; in particular on the adoption of environmental sustainability in SMEs. This research analyzed the integration of GHRM in GSCM for Asian SMEs in the manufacturing industry which is rare in academic research. During the literature review, most of the journal articles found on green management were unrelated to this research. A handful of the articles were theoretical discussions on GHRM such as literature reviews and possible future agendas (Yong et al., 2018; Pham et al., 2019), or the application of GHRM in the service sector such as financial and hospitality industries (Elrehail et al., 2019; Souza Moraes et al., 2019; Iqbal et al., 2018). There was also a study on the attractiveness of GHRM on hiring prospective employees in India (Chaudhary, 2018), which was also unrelated to this research.

The comprehensive review of the available literature found some relevant research related to SMEs in Europe (Italy) and South America (Brazil). There was also green management research on SMEs in Middle East countries such as Iran and Palestine. Although there are similar studies in Asia such as India, Pakistan, Malaysia and Philippines, these studies are merely on the impact assessment of green management (either GHRM or GSCM). It is evident that there is nothing so far in academic research pertaining to the integration of GHRM and GSCM for SMEs in Asia. Hence, this doctorate research provides a niche insight filling a gap in the integration of GHRM and GSCM for small

businesses in Taiwan, Thailand and China, which has never been done so far based on all available research literature.

This research has showcased integration of GHRM practices in GSCM implementation for SMEs based in Asia. These smaller businesses are using different GHRM practices to mitigate challenges encountered during rollout of GSCM, this finding is clearly illustrated under research question Q(3). According to findings from the case studies in this project, all six buckets of GHRM practices (Job Analysis, Reward, Induction, Training, Performance Evaluation, Recruitment and Selection) are being used as mitigation for the successful implementation of GSCM in the ten SMEs. As stated by the respondents, these GHRM practices do exert some form of mitigating influences on the adoption of GSCM. This finding is complementary to the research results from previous studies related to integration of GHRM and GSCM (Teixeira et al., 2015; Nejati et al., 2017; Zaid et al., 2018; Longoni et al., 2018). This theoretical implication is useful for researchers and scholars to explore continuously different GHRM practices that can help to enhance adoption rates as well as the smooth implementation of green SCM by a company, so as to achieve the ultimate objective of environmental sustainability.

These added insights are important to the contribution of new knowledge in green management for Asian SMEs, mainly because of the sheer size of the GDP contribution by the Asian region. According to 2017 GDP data from the World Bank (Worldometer, 2020), Asia has the largest GDP at 35.79% of total world GDP (Table 5.3):

Region	GDP (nominal, 2017)	GDP growth	Share of World GDP
Africa	$2,253,387,990,527	3.07%	2.78%
Asia	$28,964,074,012,908	4.75%	35.79%
Europe	$20,266,185,923,246	2.36%	25.04%
Latin America and the Caribbean	$5,391,967,806,492	1.78%	6.66%
Northern America	$21,132,514,175,449	2.30%	26.11%
Oceania	$1,565,397,861,708	2.08%	1.93%

Table (5.2) Breakdown of GDP for All Regions

Furthermore, according to a study by Dixon and Kwakwa (2016), Asia accounted for 33% of all global carbon emissions in 2014, more than the European Union and the United States combined. In order to contribute to the improvement of environmental sustainability, SMEs, being the key pillars of local economies, it is necessary for academics and researchers to focus more on small businesses in Asia on the topic of green management and emission control. This project was carried out precisely to meet this critical objective.

Drivers and Challenges in GSCM Adoption

Another important contribution of this research is the theoretical implication of drivers and challenges in the adoption of GSCM for SMEs in Asia. There are many similar studies in this area around the globe as outlined in Chapter 2, the literature review. In this research, there are five top drivers to go green in supply chains: (a) customer, (b) company image, (c) global trend, (d) regulatory pressure and (e) company policy. Based on the available research literature listed in the earlier chapter, customer demand and regulatory pressure are the most common cited drivers for companies to push for GSCM, which are also validated in this research as shared by most of the SMEs in the three economies. However, two interesting drivers identified in this study – company image and global trend – are unique compared to other research. This implies that Asian SMEs seem to be paying more attention to company image as well as monitoring global trends while balancing the priorities between business growth and environmental sustainability.

In addition, there are three top challenges to the implementation of GSCM: (a) Cost, (b) Technological innovation and (c) Customer. According to research from other scholars (Drohomeretski et al., 2014; Mwirigi, 2016; Kormych et al., 2019; Handayani, et al., 2019), additional cost in greening SCM is the most challenging barrier to the smooth implementation of GSCM, which is also endorsed by this research by SMEs in Asia. These theoretical implications will be important to future researchers in developing different frameworks in order to assess the mitigating factors on the challenges, as well as the positive impacts of the drivers to motivate companies to go green in supply chains.

Conceptual Contribution of Proposed Research Framework

As discussed in this dissertation several times, there has been limited research conducted on the integration of GHRM and GSCM based on the extensive literature review. This research proposes a high-level research framework to assess the impacts of GHRM on the adoption of GSCM for SMEs in Asia, which can be considered as the first such attempt in the domain of green management for GSCM and GHRM. There is significant theoretical contribution towards green management research, especially on SMEs that are usually resource constrained and constantly struggling for survival. Future research can make modifications to this proposed research framework to assess different factors and attributes to enhance the adoption rate of green management for small businesses.

5.6 Research Limitations

In this section, a few research limitations have to be outlined and acknowledged. Unlike quantitative research with a positivist approach, as a qualitative research project, the following limitations are embedded in the study:

(1) Representation – due to the use of case study methodology, the findings from this study cannot be generalized to larger populations. Multiple-case design has been used to mitigate this problem.

(2) Focus on specific industry – this research only focused on manufacturing firms with production facilities. As the primary source of environmental pollution (eg; waste water and toxic gas) usually occurs during production, some of the findings may not be relevant to other SMEs without manufacturing activities such as companies in the service industry (e.g., F&B, financial or education).

(3) SMEs in China – The four Chinese SMEs selected in this study are all based in Fujian province of southeast region of China. As China is a large country with over 1.4 billion people, research findings from these Chinese SMEs may be very different from SMEs in other cities or provinces in China such as Shanghai, Guangdong, Sichuan or Shandong. Similarly, due to the unique political situation in China, the

managers and business owners interviewed in the case study were reluctant to comment too much on the local government. This impacts the validity of feedback on major challenges in green adoption for SMEs.

(4) SMEs in Thailand – All respondents participating in the case study research from Thailand's SMEs are middle level managers. This is different from the other markets where most respondents were either business owners or senior management. Since the business owners or senior management executives of these Thai SMEs were either Japanese or Taiwanese, they didn't participate in the focus group discussions. This has had some impact on some of the inputs as shared during the on-site visits.

(5) Possible bias in focus group discussion – There were two cases when the senior leaders of the company participated in the focus group discussion together with the employees: EER and RDH from Taiwan. It is possible that the other respondents in the room maybe reluctant to share his or her true feedback in front of the owner or GM. This is especially obvious in Asian culture when employees rarely voice out different opinions in front of their managers.

In order to improve the quality of the research, more SMEs could be invited to take part in the case studies. However, it is very costly to conduct on-site face-to-face discussions and observations if more companies are involved. In this research, the time to complete ten case studies was about one year with frequent travel and factory visits having a direct impact on the overall research timeline. Some of the research limitations as shared in this section could be mitigated in future research as suggested in the next section.

5.7 Recommendations for Future Research

The proposed research framework used in this project can be further enhanced to cater for future research directions. The following are some possible research suggestions:

(a) The focus in this study was on SMEs in the manufacturing industry with production facilities. It would be possible to conduct similar

research on retail supply chain management or green adoption in the service industry.

(b) All ten SMEs taking part in this research are located in Asia. Similar studies could be conducted on SMEs based in other regions so as to determine whether there is any difference in research findings on green management adoption drivers and challenges. Possible countries could be from emerging markets such as Africa, South America or Eastern Europe.

(c) It would also be possible to conduct similar research on multinational companies (MNCs) on the focus of integration of GHRM and GSCM. As these larger corporations are likely to be financially better off and more resourceful, different research findings could be expected from the study.

(d) Instead of using qualitative research (case study) as in this project, future research could also apply quantitative research methods to explore additional insights. For example, using quantitative methods to assess which of the GHRM and GSCM practices outlined in this research have the biggest impacts on the organizations?

(e) On the findings obtained from the case studies, future research could focus on selective green practices in GHRM and/or GSCM to explore deeper relationships. For example, how does the selection of new hires with prior experience in environmental management help to improve the execution of GSCM?

(f) Similar research could also be carried out by zooming in on a particular green supply chain activity to study the mitigating effect of green HRM. For example, green manufacturing is usually the most complex but common factory activity in any company moving towards environmental control. In-depth research could be carried out to study what are the key GHRM practices contributing to the success of green manufacturing.

(g) Another possible research agenda in this direction is to look at additional attributes and measure their impacts on GSCM adoption.

Some possible factors to consider are leadership of the organization, CSR HRM, innovation and SCM technologies such as blockchain, AI or RFID.

5.8 Final Remarks

Based on the findings in this research, it is quite clear that green decisions are made locally for these SMEs based in Asian markets and hence green supply chain is mainly optimized locally, not across the entire supply chain. Beside two SMEs from Thailand that align their green management practices with their parent company in Japan, most other SMEs mainly focusing on their local challenges and requirements when making all decisions on green adoption. In addition, SMEs in Taiwan exhibit strong local collaborative green supply chain network by working closely among each other on electronic waste recycling for better environmental protection. Furthermore, there is room for improvement in the adoption of GSCM by implementing collaborative-based green supply chain. One interesting study from Esade Business School in Barcelona and the Universidad Carlos III in Madrid (Tachizawa, et al., 2015) shared on the finding about the importance of collaboration through the joint efforts in GSCM does have a direct impact on environmental performance of the enterprises. This study strongly recommended “companies to engage in joint projects and initiatives to ensure the highest environmental performance”, which is similar to the special export processing zone setup in China to pool all manufacturers under similar industry together with collaborative green management initiatives to reduce environmental pollution.

This doctorate research on the successful adoption of GSCM with support from integrating GHRM practices for SMEs is an important topic that will create real value towards the effort of environmental conservation. Results and findings from this study will contribute to the advancement of green management research for small businesses globally.

This research differs from other studies in the on-site face-to-face case study research with each of the ten selected SMEs. Due to cost constraints, similar academic research on green management used telephone surveys or questionnaire surveys via email or post. Such methods are likely to be more

cost effective and time efficient; however, some important information could be missing as there is no way we can tell whether the responses received via email, post or tele-conversation are accurate or relevant to the research questions. In this project, the researcher visited all ten companies and had face-to-face focus group discussions with all the respondents, together with factory tours to see the operations in action, directly contributing to richer data collection and increased confidence levels in the research results.

This final chapter of this dissertation concluded the entire research with self-reflection on research limitations and challenges encountered throughout the period of doctorate research and proposed enhancements to the conceptual research framework. It also outlined the managerial and theoretical contributions on the domain of environmental sustainability for SMEs in the areas of GSCM and GHRM. Some interesting recommendations are also shared in this chapter for future research in the domain of green management that could be pursued by researchers globally.

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APPENDIX 1.0

INTEGRATION OF GREEN HUMAN RESOURCE MANAGEMENT & GREEN SUPPLY CHAIN MANAGEMENT IN SMALL & MEDIUM ENTERPRISES

I have received information regarding this research and had an opportunity to ask questions. I believe I understand the purpose, extent and possible risks of my involvement in this project and I voluntarily consent to take part.

Name of Company: **Year Obtained ISO14001: _____**

(1) What is your position in the company? (Please tick ✓)

CEO		COO	
Plant Manager		Production Manager	
SCM Manager		Logistics Manager	
HR Manager		Other (pls specify)	

(2) How long have you been working in this company?

(3) How long have you been involved in Green Supply Chain Management and/or Green Human Resource Management? (Months or years)

GSCM		GHRM	

(4) What are the green SCM practices implemented in your company?

Green Procurement	
Green Manufacturing	
Green Distribution	

Reverse Logistics	

(5) What are the key drivers for your company to implement Green SCM?

(6) Based on your experience, what are the major barriers in implementing Green Supply Chain Management practices in your company? (1 to 6: 1 = biggest barrier, 6 = smallest barrier)

Factors	Order of Significance	Detailed Descriptions
Customer		
Employee		
Government		
Technological Innovation		
Cost		

Other		

(7) What practices under Green HRM were implemented in your company? How these implemented GHRM practices helped to mitigate the challenges as stated under Q(6)?

Areas of HRM	Details
Job Analysis	
Recruitment & Selection	
Rewards	
Induction	
Training	
Performance Evaluation	

(8) What are the main challenges in implementing green HRM in your company?

(9) Based on your experience in this company, what are the main benefits of implementing Green HRM and Green SCM together?

(10) What recommendation(s) you would like to share with other companies in the implementation of GHRM and GSCM?

(11) Any other input or comment pertaining to Green SCM and/or Green HRM?

APPENDIX 2.0

INTEGRATION OF GREEN HUMAN RESOURCE MANAGEMENT & GREEN SUPPLY CHAIN MANAGEMENT IN SMALL & MEDIUM ENTERPRISES

I have received information regarding this research and had an opportunity to ask questions. I believe I understand the purpose, extent and possible risks of my involvement in this project and I voluntarily consent to take part.

問卷調查

(1) What is your position in the company? 您在公司的職位是什麼？ (Please tick ✓)

CEO 首席執行官		COO 首席運營官	
Plant Manager 工廠經理		Production Manager 生產經理	
SCM Manager 供應鏈管理主管		Logistics Manager 物流經理	
HR Manager 人力資源經理		Other (pls specify) 其他 (請明確說明)	

(2) How long have you been working in this company? 您在這家公司工作多久了？

(3) How long have you been involved in Green Supply Chain Management and/or Green Human Resource Management? 您參與綠色供應鏈管理和/或綠色人力資源管理多長時間？

GSCM 綠色供應鏈管理		GHRM 綠色人力資源管理	

(4) What are the green SCM practices implemented in your company? 以下四大類綠色供應鏈管理流程, 請寫出您公司所實施的綠色管理方法和措施。

Green Procurement **綠色採購**	
Green Manufacturing	

綠色生產	
Green Distribution **綠色物流**	
Reverse Logistics **逆向物流**	

(5) What are the key drivers for your company to implement Green SCM? 貴公司實施綠色供應鏈管理的關鍵驅動因素是什麼？

(6) 根據您的經驗，您公司推行綠色供應鏈管理實踐的主要障礙是什麼？

(1 = 最大的障礙, 6 = 最小的障礙)

Factors	**重要順序** **(1 to 6)**	**Detailed Descriptions 詳細說明**
Customer **顧客**		
Employee **員工**		
Government **政府**		

Technology **科技**		
Cost **成本**		
Other **其他**		

(7) What practices under Green HRM were implemented in your company? How these implemented GHRM practices helped to mitigate the challenges as stated under Q(6)? 請問貴公司實施了哪些綠色人力資源管理中的管理方法，以便去緩和 Q(6)所敘述的障礙？

Areas of HRM	**Detailed Descriptions 詳細說明**
Job Analysis （工作分析）	
Recruitment & Selection （招聘與選拔）	
Rewards （獎勵和認可）	
Induction （入職培訓）	

Training **（在崗培訓）**	
Performance Evaluation **（績效評估）**	

(8) What are the main challenges in implementing green HRM in your company? 在貴公司實施綠色人力資源管理遇到的主要障礙是什麼？

(9) Based on your experience in this company, what are the main benefits of implementing Green HRM and Green SCM together? 根據您在公司的經驗，將綠色人力資源管理和綠色供應鏈管理一起同步實施的主要好處是什麼？

(10) What recommendation(s) you would like to share with other companies in the implementation of GHRM and GSCM? ）關於成功實施綠色人力資源管理和綠色供應鏈管理，您希望與其他公司分享哪些建議和提示？

(11) Any other input pertaining to Green SCM and/or Green HRM? 最後，您還有沒有任何對實施綠色人力資源管理和綠色供應鏈管理的其他意見？

衷心感謝您對學術研究和環境保護的支持與貢獻！

APPENDIX 3.0 - Case Study Descriptions

Company: UWin Nanotech

Introduction

UWin Nanotech is based in New Taipei City in northern part of Taiwan. Uwin Nanotech a high-tech recycling manufacturing company with total annual revenue of USD 3 million. This company was founded in 2009 in designing and producing environmental metal strippers for electronics Printed Circuit Board ((PCB) industry. Since inception, the company has been active in quality and environmental improvement. In May 2014, Uwin Nanotech successfully certified with ISO 9000 (quality management system) and ISO14001 (environmental management system).

Uwin Nanotech was recommended to take part in this case study in Oct 2017 by the Environmental Bureau of Taiwan due to its' active involvement in green SCM. Four executives were involved in the focus group discussion to understand the implementation of integrated Green SCM and Green HRM in UWin Nanotech, with average tenure ranging from 6 months to 8 years:

- General Manager/CEO/Founder – 8 years
- Human Resource Manager – 7 years
- Logistics Manager – 6 years
- Production Manager – 6 months

Organizational Structure

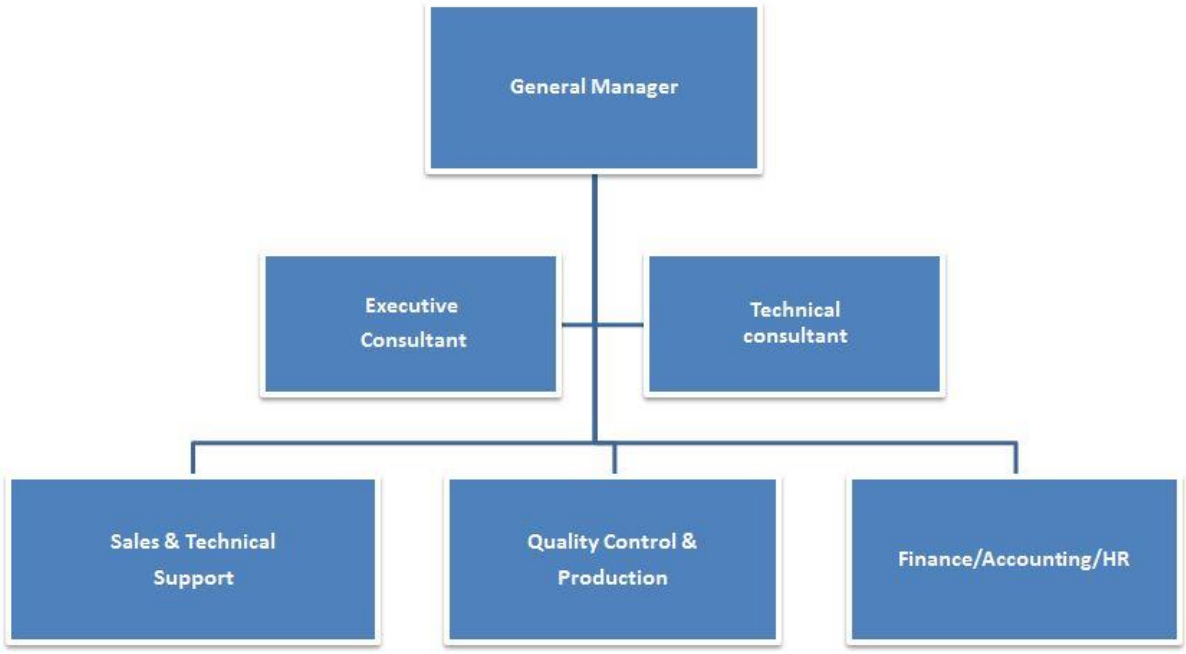

Figure (1) Organizational Structure of UWin Nanotech

UWin Nanotech is a small enterprise with 16 staff in total. The company is run by the General Manager (GM), who is also the founder of the company. He is being assisted by two consultants with strong technical expertise and know-how in the green technology for PCB waste recycling. There are three major departments under the GM:

- Sales & Technical Support- This group of employees are fully responsible in bringing in customers and sales, as well as providing technical support to the clients during after sale support.
- Quality Control & Production – This department is fully in-charged of manufacturing final products. It also handles shipping as well as quality control.
- Finance, Accounting & HR – This is the admin department providing back-office support for the day to day administrative activities. Purchasing function is also under this department.

The most common method of processing electronic wastes generated from the PCB production is open burning. However, this is generating hazardous gases

as well as emitting large volume of carbon dioxide, causing severe air pollution. UWin Nanotech has invented a new recycling technique using hydrometallurgy process to recycle electronic wastes from the PCB industry, this new technique has been patented in many countries. With this new procedure, UWin Nanotech supplies different recycling tools and machines to waste recycling service providers as well as providing recycling services for electronics wastes.

Green SCM Implementation

As UWin Nanotech started as a company supplying green products and services, it is important for them to lead by example in implementing Green SCM. The greening of their supply chain starts at the product design stage when all designers in the company are reminded to ensure only components and parts that add value to the final functionalities of the tool or machine are to be used, this is to ensure minimum wastage so as to save cost and reduce carbon emission footprint.

Based on the face to face interview, the following are the key green practices implemented under each category of Green SCM:

(a) Green Procurement

- As much as possible, the purchasing department only procure materials that conform to RoHs (Restriction of Hazardous Substances) standard. Although such components and materials are likely to be more expensive, UWin Nanotech has achieved around 80% of all materials and components used in the production of end products.

- No procure of conflict resources (such as precious metals) from conflict zone. Even though this is more relevant to ethical supply chain and responsible sourcing, however, non-stop civil war is severely damaging our environment in Africa. This can be achieved by sourcing directly from the major wholesalers instead of sub-agents.

- Another important purchasing policy implemented in UWin Nanotech is to restrict any use of materials containing toxic substances. For materials of high consumption, it is mandatory to request certification

from suppliers in order to certify these materials to be free from toxic content.

(b) Green Manufacturing

- This is related to the elimination of the use of materials with toxic substances during the manufacturing and assembly process. Consumptive materials such as adhesive glue or soldering flux must be certified to ensure no toxic substances before they can be used in the factory.

- All production wastes are sorted under different categories and handed over to certified waste processing suppliers. Regular check from production manager to ensure this is being conformed strictly.

- UWin Nanotech has implemented an internal policy for their manufacturing department to adopt production process with minimum waste and low carbon emission. Some examples are:

    i. Instead of using heating process which will increase carbon emission and PM2.5 pollution, UWin Nanotech uses wet process to reduce environmental impacts.
    ii. All coolants used in the manufacturing process to be recycled for at least three times before replacement.

- Recycle materials or parts if feasible. This is another important green practice used to ensure the production process is environmental friendly. Packaging and in-process materials are recycled in the production process.

(c) Green Distribution

- Instead of bringing the products to warehouse for storage, direct point to point delivery from factory to customers is used whenever possible, this is to reduce transportation and storage so as to minimize carbon emission footprint.

- Since most materials used in final products are green certified and environmental friendly, this has eliminated the need for special handling during transportation either sea, land or air.
- Employees and contractors are encouraged to use green fuel for their vehicle.
- As much as possible, the company carefully selects and appoints only green certified 3rd party logistics service providers in the distribution and delivery of their materials and final products.

(d) Reverse Logistics

- Some of the products produced by UWin are recyclable. The company is currently designing a reverse logistics process to recycle these used products.

Key Drivers on GSCM Adoption

An important question asked during the case study observation is, what are the top three key drivers for UWin Nanotech to implement Green SCM? In summary of responses from the management team, the three key drivers are:

a) Company policy in environmental conservation - This is clearly stated in their vision statement under company website:

"Care: Love and care lead to a better world. UWin applies this concept by preserving the environment, focusing on traditional value, respecting humanity and taking the responsibilities of being an international company, as well as a global citizen" (UWin-Nano, 2018)

b) Customer demands – GM of UWin shared that:

"You cannot imagine how serious is the commitment (on environmental protection) of these major global brands; many of their customers only buy their products if they are being perceived as green…In a way, we are helping them to improve their brand image by recycling many electronic parts used in their products"

c) Global trend – The HR manager interviewed during on-site visit mentioned that:

"Whether we like it or not, global warming and environmental damage are something real and threatening all living creatures on earth today… it is good to see many governments around the world to put in efforts to slowdown warming, reduce pollution…we are business enterprise that have to contribute our share too"

Major Barriers in GSCM Adoption

The following are the key challenges encountered in order of significance:

6) Customer – For some customers in PCB industry, due to the existing hardware configuration in their production plant, it is difficult and costly for them to incorporate new and greener production tools for their PCB assembly process. Furthermore, there are customers which are more cost-conscious even they are fully aware of the importance to go green in their production activities. These customers are less inclined to invest in green production. One respondent shared that: "many customers can talk a lot in environmental protection…when come to investing more money for greener production, they will start to give many different excuses…"

7) Government – Like in many developed economies, Taiwanese Government has established a dedicated agency on environmental control – Environmental Protection Agency (EPA). There are some new regulations proposed and passed at the Legislative Yuan (Parliament in Taiwan) such as green procurement policy of public sector and the ban on free plastic bags at supermarkets and departmental stores. However, due to very competitive political landscape in Taiwan, it is difficult to pass environmental laws that have wider economic implications on the commercial industry. Similarly, the tangible financial support from government to promote greener production process is not readily available mainly due to insufficient government budget as well as lack of support by the legislators. Another main challenge of EPA is the relatively inexperienced workforce of their auditor team, this is causing ineffective enforcement on many factories

polluting the environment without appropriate penalties. The following is the press interview of the GM on what the government of Taiwan can do more on electronics waste recycling:

"Currently Taiwan is already considerably advanced in e-waste recycling with a complete recycling system which includes recycling of large electronic devices, such as televisions, computers, air conditioners, and refrigerators. However, there are still no clear regulations and systems for mobile phone recycling; therefore, Taiwan should first establish a recycling mechanism for waste mobile phones to reduce e-waste pollution while also increasing the effectiveness of urban mining" (UWin-Nano, 2017).

8) Cost – Using recyclable or greener materials can be expensive as compared to normal materials. As much as UWin Nanotech would like to make use of 100% greener materials in their products, this is still economically unviable at present stage due to slow adaptation of green technology in the industry. The logistics manager has put it quite bluntly that: *"Remember, we are still a very small company, we don't have so much money to invest in expensive green technology 100%..."*

9) Technological Innovation – The management team has raised the following issues on the technological innovation for green adoption:

- Although UWin Nanotech develops patented technology in recycling of PCB wastes that can effectively process electronic wastes in lesser polluted way, creating sufficient customer awareness is still a big challenge. Additional funding is needed to promote new green technology in order to make them easily assessable.

- As Taiwan is not a big market (as compared to Japan, USA or China), some new technologies in green materials are not available in this market, or it is too costly to use based on current market condition.

- Similarly, there is insufficient know-how in some of these latest green technologies available to the industry. Universities in Taiwan should help to create awareness of these new technologies through education and research.

One respondent has shared that: *"Although there are new green technologies invented in recent years, it is still difficult to attract customers to use them due to many different reasons…"*

10) Employee – It is necessary to ensure full support from all employees in the successful implementation of Green SCM in any organization. In order to gain the support from the staff, only candidates with strong mindset of environmental conservation to be hired. This can be a major challenge for SMEs due to less competitive remuneration package as compared to large corporations. However, for UWin, this is not so much of a concern as according to the HR manager: "*The good thing of being a small enterprise is the spirit of family bonding for everybody to work hard for each other… all our employees are very positive about environmental conservation…"*

Green HRM Implementation

In order to enable successful implementation of Green SCM, the executive management team of UWin Nanotech made a decision to incorporate green practices into their human resource management. The following are the green practices implemented so far:

Areas of HRM	Detailed Descriptions
Job Analysis	- All jobs are designed to ensure minimum waste produced. - Clearly outline green requirements in the job descriptions (eg; SOPs)
Recruitment & Selection	- Pre-requisites for the qualified candidates include: ▪ past experience working in ISO-14001 companies

	▪ relevant experience in developing green products/services ▪ relevant experience/knowledge in green recycling process
Reward	- Monetary rewards to be given to R&D engineers in inventing new green products/services. - Rewards/recognitions given to any employee successfully achieving relevant personal green certification.
Induction	- All new hires must attend induction training on green awareness, basic roles and responsibilities on CSR, this is to instill corporate green culture to all new employees.
Training	- On-the-job (OJT) training with senior staff. The MD said: *"We have recruited a few fresh graduates from local universities… it is a cost effective way to speed up the learning curve for these new hires by pairing them with the senior colleagues. They will learn all the necessary operating procedures including how to segregate production wastes into different categories…"* - Employees with good performance to be sent for external training conducted by Environment Protection Agency on green materials, green process control and green management.
Performance Evaluation	- All staff are assessed according to performance KPIs related to environmental protection, such as; no. of green products invented, no. of green materials sourced, no. of production processes converted to green processes.

According to the MD, implementing some of these people related green measures is to mediate the impacts of the challenges in customer and

government. For examples; the induction workshop and trainings are important steps to ensure all employees fully aware of government regulations. The inclusion of green qualifications for new hires as well as in the job descriptions is the direct response to the increasing demand from customers that calling for greener production and products. Lastly, the annual performance evaluation that includes environmental KPIs for the employees is critical to ensure all staff performing according to targets set by the company management to achieve better results in pollution control and environmental sustainability.

During the interview, the following challenges were shared in the implementation of Green HRM in the company:

a) *As Green HRM is a relatively new management concept, especially in Taiwan, more time is needed to gain acceptance in the organization especially in smaller enterprises when resource is limited.*
b) *As in many other management practices that involving humans, Green HRM can be difficult to measure or quantify. If tangible measurement is needed, the availability of quantitative KPIs can be limited.*
c) *In order to ensure all employees fully aware of green corporate culture, as well as to embrace it completely, strong sense of self-discipline and determination from the staff is absolutely necessary.*
d) *Similarly, successful implementation of green initiatives in the company will require employees with like-minded individuals that are also strong supporters in environmental conservation. However, it is not easy to attract such talents into smaller enterprises when the overall compensations and benefits are not attractive or competitive.*

HR manager has shared with the researcher that: *"Honestly, not many people in Taiwan know about green HRM. To us, it is the same human resource management practices but focusing more on green education…"*

Despite facing several barriers in launching Green HRM in UWin Nanotech initially, the management team acknowledged that; Green HRM does bring some benefits when integrating with Green SCM:

- *With proper execution of Green HRM, it can improve adoption of green culture of the organization.*
- *On the intangible side of business management, Green HRM helps to enhance brand and corporate image.*
- *Coupled with tangible actions, Green HRM can help the company to achieve better results in green performance.*

The company GM was right to point out that: *"Until the days when every job can be replaced by robots, most companies in the world will still need strong HR management to ensure any strategic management direction is being supported and executed successfully".*

Observation

UWin Nanotech is a typical example of many small and medium-sized enterprises that exist in Taiwan today. These smaller enterprises are eager to contribute to the effort of environmental conservation in their day-to-day business activities. However, due to the limited resources either financially or in capability, it is always a big challenge for them to do more in the implementation of green practices.

Even though UWin Nanotech is an ISO-14001 certified enterprise; during the fieldwork research with the management team, it is still evident that the lack of sufficient resources is impacting the progress of further implementation of Green HRM and Green SCM in the company. One major obstacle encountered during the case study research is to collect information on company performance data. It is easy for most companies to provide financial performance data since this is a basic information to manage the company, however, there is limited data on other performance indicators in SMEs that are not financial related.

Another major barrier in implementing Green SCM is the weak bargaining power with the suppliers. UWin Nanotech has an internal company policy to only use suppliers with green enterprise certification, however, this is not always possible as these companies are likely to be major suppliers in a specific industry. These major players command price premium on their services or

products as dominant suppliers. As such, UWin Nanotech may be forced to use other unqualified suppliers due to pricing pressure.

Company: EER

Introduction

EER is a recycling service provider on used electric household appliances; such as washing machine, television, refrigerator or electric fan. The company was founded in 1998 with HQ office located in Taipei city, as well as two factories in Taoyuan County. The main investors of this company are the major household electric products manufacturers from Japan and Taiwan, with the main objective to recycle used electric household items in order to prevent any environmental pollution due to disposal of used appliances.

EER is certified under ISO-14001 environmental management system since 2004. In addition, the company also obtained the certification of Electronic Industry Citizenship Coalition (EICC) & ISO 50001:2011 under Energy management systems. The two recycling plants in Taoyuan County have a total headcount of 125 in Jan 2018 and they are now listed on the stock exchange of Taiwan since March 2018. About 40% of the company's income is from government subsidies and the other 60% is from the sales of electronic parts after recycling.

EER was introduced by a local contact in Taiwan to take part in this research project. Three management staff were interviewed during on-site visit in early 2018; they are:

a) General Manager – 20 years working experience in EER
b) Section Head of Human Resource Department – 4 years working experience in EER
c) Process & Regulatory Manager – 8 years working experience in EER

Organizational Structure

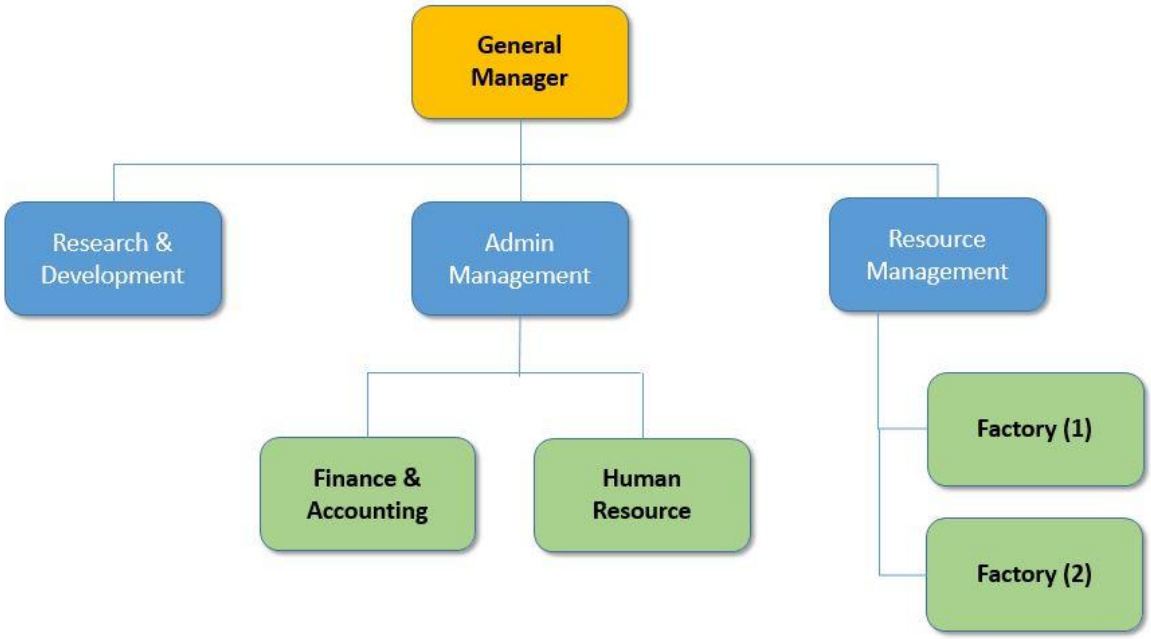

Figure (2) Organizational Structure of EER

As mentioned previously, EER was founded by a group of electrical home appliances makers from Taiwan and Japan. The company is led by a general manager reporting into the board of directors consists of the major shareholders. The two factories located in Taoyuan County have recycling operations together with logistics and warehouse functions. This company has a relatively flat and simple organizational structure, there are three departmental managers in-charge of R&D, Administration and Resource (Production) with section managers supporting in different sub-sections such as plant management, human resource, finance and accounting.

Green Supply Chain Management (GSCM)

The first section of the focus group discussion is about the implementation of green SCM in EER. As a recycling vendor of used electronics products, the company has launched GSCM for a few years. The following are the major green practices rolled out in the company:

Green Procurement

(1) All paper used in the office, as well as business name card printing as well as toilet papers, must be recyclable material.

(2) All machines as well as electrical appliances used in the company must be energy efficient as certified by local authority. The office equipment used in the company such as color copiers, printers, computers and mini-fridges are all certified to be energy efficient.

Green Manufacturing

(1) All production wastes are being sorted based on General, Recycle and Toxic wastes, to be processed differently. During the recycling process at the factory, toxic wastes such as coolant in the old appliances must be separated and removed from regular waste. These toxic wastes must be treated internally before handing over to qualified waste collector that is certified by local government.

(2) Large investment on air pollution control and waste water processing systems are installed in the factory to ensure minimum environmental impacts for air conditioners recycling due to greenhouse gases in the home appliances. There are officers from local environmental bureau visiting the recycling plants regularly to ensure the operation is running within the approved environmental control parameters.

(3) As there is new factory setup in early 2018, additional environmental control measures are to be implemented – waste water recycling, LED lighting used to light-up the entire factory and energy generation via renewable sources such as solar and wind energy.

(4) A very important step implemented by EER is the close-loop feedback to its major shareholders (home appliances manufacturers) on how to improve product design so as to facilitate product waste recycling. This is very useful to ensure new products to be more environmental friendly with less pollution.

Green Distribution

(1) So far there is no particular green practice under this category, as cost is still the most important factor in choosing logistics vendors.

(2) All qualified logistics vendors must have GPS capability to ensure no toxic waste is being dumped inappropriately.

Key Drivers in Adoption of GSCM

The general manager is a pioneer employee and has been with the company since first day when it was established. He was hired as a process engineer to setup recycling operations in Taiwan after receiving overseas training in Japan. He acknowledged with the researcher that, it is always challenging to implement green management practices in a small enterprise like EER due to limited resources and talents. However, the following three major drivers help supporting EER in the successful adoption of GSCM:

(a) Government policies – As discussed in the earlier section, EER was established by a group of electrical home appliances manufacturers due to Taiwan government's regulatory intervention. There are a lot of toxic wastes from the used home appliances that can contaminate environment severely if not treated appropriately. With the mandate given by the government as well as from the major shareholders, EER is determined to implement as many environmental control measures as possible. This is one major motivation influencing the adoption of GSCM in EER. The GM has shared that: "*our company was established to support waste recycling by the government, naturally we have to lead by example to implement green supply chain management…"*

(b) Company image – As a major player in providing professional recycling service of used electronic consumer products, it is vital for EER to project a green company image. Adopting effective green SCM is helping EER to demonstrate strong commitment in environmental conservation to its customers, employees and to general public. Under this subject of company image, the GM was very candid to say that: *"We are in the process to apply IPO in the local stock market, having a positive company image is absolutely important for us…"*

(c) Cost consideration – Through the use of energy efficient equipment and machines, EER is able to achieve some levels of cost saving in the day to day operations. Similarly, the use of LED lighting and renewable energy may have higher setup cost during initial stage, the company is able to enjoy lower energy bill every month. The process manager shared that: *"With careful planning, we are able to achieve good cost reduction in our monthly energy expenses, the saving is good for small company like us…"*

Major Barriers in Implementing GSCM

Implementing these green measures were not without challenges. All three respondents have shared various difficulties during focus group discussion. The following are the major obstacles encountered in the implementation of GSCM in order of significance:

1. Government: Taiwanese government is keen to rollout more regulatory changes to support recycling of electronic waste. The Green Mark Program was launched in 1992 by Taiwan's Environmental Protection Administration as a voluntary and positive eco-labeling program. The aim of the Green Mark is to "promote the concept of recycling, pollution reduction, and resource conservation" (EPA, 2019). However, the government has also tightened the import of electronic wastes from overseas, this has resulted in limited sources of used electrical appliances to be recycled, as well as increasing the cost to import such wastes from other countries. Another area that EER would like to request from the government is to provide better financial incentives to SMEs in greening their production processes, as such support is quite limited currently. The GM of this company has this message to Taiwanese government: *"To improve our environment, more efforts need to be done for the industry… empty slogans and promises will not reverse global warming!"*

2. Cost: Although this company is well funded by major home appliance manufactures, any decision made for the enterprise has to be financially

driven. Hence, cost has been one key consideration for implementing green SCM. If the proposed green initiative is not cost justified, it will not get implemented unless it is mandated by government's regulation. The GM shared that: *"Many of the latest green machines and equipment that we are keen to invest are quite expensive, it is not always easy to breakeven and financially justified after installation…we are a small company that cannot spend all the money in environmental protection."*

3. Technological Innovation: Since more and more consumers globally demanding for greener products, this has triggered the need for recycling of electronic waste due to increasing regulatory control from local governments. However, many of these electronic and electrical appliances are still quite difficult to recycle due to the design and technological limitations. In addition, as commented by the respondents, the degree of recyclability is directly related to the types of components used in the design; greener components and parts produced by latest technology could be costlier to the appliances manufactures. According to the process and regulatory manager: *"Honestly, the progress of technology advance in green recycling is still quite slow…many of the recycling processes still emit large amount of carbon dioxide and other hazardous gases…"*

4. Customer: EER is a B2B (Business-to-Business) service providers, all of their customers are major brand owners and producers of electronic and electrical home appliances and consumer products. Either because of local mandatory environmental regulations or voluntarily green culture, these customers are very supportive to EER in going green. The GM acknowledged that: *"Unlike other industries, we are lucky to have good customers…"*

5. Employee: As a small enterprise, EER has a stable workforce. Currently, they have a low annual turnover ratio with less than 10%, which is considered very good in the recycling industry. Most employees are fully committed and cooperate with the company in the adoption of green

SCM. The section head of HR told the researcher that: *"I have worked in quite a few other companies in the past, I would say our employees in this company are truly great and fully bought into our green policy…"*

Green Human Resource Management (GHRM)

In this case study research, the respondents were asked if EER implemented any people related green measures to ensure smooth implementation of green SCM. The following are the relevant human resource practices launched in EER:

Job Analysis

- No specific job requirement for most positions in the company. However, standard green practices are clearly stated in all job descriptions & SOPs:
  - Waste classification and separation during production (toxic vs. general)
  - Minimizing waste during production
  - Electricity saving during and after work
- As EER hires many foreign workers in their factories, these basic SOPs are especially important for them since they do not have such environmental awareness in their home country.

Recruitment & Selection

- In general, relevant work experience is more important than having relevant environmental certification. However, practical experience in ISO14001 or other similar EMS to be considered positively during job interview since this is a company dealing in electronic waste recycling.
- EMS experience is especially importance for positions related to annual ISO audit and work safety.

Reward

- For those employees with qualified EMS certification, they will be given additional allowance if they involve in EMS audits of the factories.

- Verbal recognition to be given to employees with clear demonstration of green behavior, this is done during staff meeting or annual company events.

Induction

- All new hires will have to attend 2-hour induction workshop on first day of work, to learn about company policies, environment control procedures and general admin requirements.

Training

- Some employees with good performance are selected to upgrade their professional knowledge in green management by attending external professional training courses. Since EER is paying for their tuition, they are required to be bonded with the company after training.
- When there is any new regulatory change in environmental conservation, some professional and managerial staff are sent to attend external training workshops conducted by local environment bureau or external consultants.
- Senior managerial staff are also invited to attend green management conferences in order to learn more about latest green technology and environmental control practices.
- According to the GM: *"Although we are a small company, it is necessary for our managers to be trained and keep up with the latest technological and regulatory changes in environmental control… Many of them are eager to attend these training workshops to upgrade their professional knowledge."*

Performance Evaluation

- EER has implemented suggestion scheme to encourage all staff to provide useful and implementable suggestions to improve operations and reduce negative environmental impacts. This contribution will be taken into consideration during annual performance evaluation. Based on the GM: *"This is a good GHRM practice for our employees to participate in the building of a greener working environment. This is positive to ensure good employees to stay with us longer and minimizing turnover rate."*

During the discussion on GHRM, the GM shared that; some of these green practices are launched to mitigate the effect of cost barrier in going green for their company. Clear green policies are included in job description and shared during induction workshop to ensure energy saving, material recycling and waste reduction. Performance appraisal and recognition on individual employees also take into consideration on any cost saving related suggestions raised by the employees.

Implementing the above green people measures to support green SCM did come with some challenges:

1. *There are quite a number of foreign workers working in the company (mainly from Thailand and Indonesia), it is necessary to communicate with them frequently to ensure they fully embrace green practices.*
2. *When the economy is good, turnover rate of the employee can be as high as 15% or above per year; this has created some challenges for the company, especially during 2014/2015. The situation is better in recent years with manageable staff turnover rate at 10% and below annually.*

When asked about what benefits can be realized from integrating both GHRM and GSCM together; the respondents all agreed that: *"as most of the activities in the factories are still being operated by human operators, by integrating both GHRM and GSCM together can help to achieve final objectives on environmental control and minimize pollution".* The GM has summarized the importance of GHRM in supporting GSCM as: *"We are a small enterprise that cannot afford to install expensive robots to replace human workers…the only way to ensure success in our daily supply chain operations is to ensure everybody in the company learns and practices green procedures…"*

Observation

EER is a small but organized enterprise with strong focus in environmental conservation. It is obvious that its green corporate culture is being influenced by their Japanese shareholders. The researcher observed during on-site visit that, their office and production floor are well managed with strong emphasis in basic house-keeping.

As the company is now listed at the local stock exchange (March 2018), EER will be subject to stricter regulatory supervision as a public company. It is likely that EER will implement more green measures in GSCM and GHRM to ensure minimum environmental damage.

Company: RDH

Introduction

RDH is a tin metal smelting and recycling company based in Taoyuan city of Taiwan. It was founded in 1995 with only 4 employees (including the founder). After 23 years, the company has grown into a medium sized enterprise that has 130 staff today. RDH is a licensed recycling service provider specializing in recycling PCB (Printed Circuit Board) and extracting tin materials for reuse. The extracted tin is molded into tin bars with purity up to 99.95%. They are now being sold in both local and international markets. The company has successfully obtained the ISO-14001 certification in 2010, as well as ISO-50001 certification on efficient energy management. RDH is also a current member of the Electronic Industry Citizenship Coalition (EICC) from Responsible Business Alliance, this membership can only be achieved after thorough audit by qualified assessors to evaluate the company in social, economic and environmental conditions of its global electronic supply chain through the use of a standardized code of conduct.

This case study was made possible through the introduction from the founder of UWin Nanotech in Dec 2017. The General Manager and the manager of Safety & Environment Control have agreed to take part in the focus group discussion during on-site visit. The GM has been with the company for about 15 years and the safety manager is in his 11th year of service in RDH.

Updated on June 2020: The GM has passed away end of 2019 due to heart failure, for the record; I express my earnest commiseration to his family and RDH on the demise of the GM. My deepest condolences.

Organizational Structure

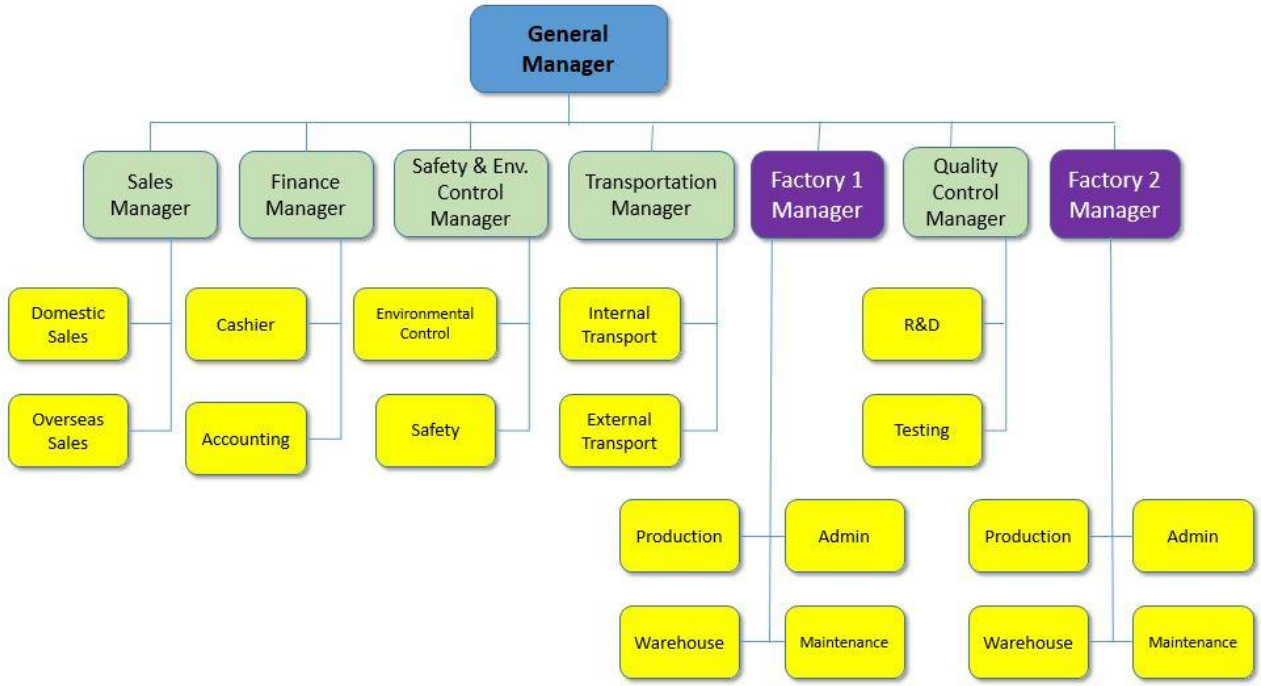

Figure (3) Organizational Structure of RDH

RDH is being managed by a general manager (GM) who is the son of the founder. He is supported by several managers under different departments as shown in figure (3). During the onsite visit in Dec 2017, RDH has two factories in operation and the 3rd plant was under construction. According to latest update, they have plan to expand their business with a 4th factory in the next 12 months.

Green Supply Chain Management (GSCM)

At the start of case study research, the two management staff of RDH were asked about the green management practices adopted in the company under different areas of GSCM. The following are the inputs given during interview:

Green Procurement

1. As RDH is certified under EICC as well as committed to be CONFLICT FREE SMELTER as required by major customers, RDH will not purchase any raw materials from conflict zone (eg; some African countries that having civil war now).

2. RDH also setup an in-house laboratory to ensure in-coming materials purchased are meeting quality and free from toxic pollutants. This is being carried out under the department of Quality Control.
3. Onsite audit also required for new vendors before signing contract.

Green Manufacturing

1. During the early days of operations, anode slime cannot be further refined to extract other metals. Most of the anode slimes were stored in the warehouse. Recently, the company has upgraded their production line to enable further extraction of most metals in anode slimes. This has ensured maximum economic benefits of the production waste, also to ensure minimum environmental impacts since these wastes will not be disposed directly after tin extraction.
2. Toxic waste is separated from regular waste and handover to qualified waste collector that is operated by local government in Taoyuan city.
3. Large investment on air pollution control and waste water processing systems in both of the production plants to ensure minimum negative impacts on the environment. All powder particles generated during recycling process are collected through specially designed in-house collector system, this is to prevent air pollution during production.
4. In-house laboratory under Safety and Environmental Control department to check the quality of air and waste water produced during production once every six months, to ensure the factory is meeting regulatory standards.

Green Distribution

1. RDH uses 3rd party logistics vendors for all their transportation needs. All trucks that carry waste materials are equipped with GPS to ensure the waste materials are not to be disposed illegally.
2. RDH uses metal packing materials instead of plastics as they can be recycled.
3. The company also work closely with logistics vendors to ensure maximum logistics efficiency in each delivery, this is to achieve cost reduction as well as to minimize carbon emission due to redundant trips.

Reverse Logistics

1. RDH works closely with their major customers to ensure tin waste/scrap can be collected and sent back for further refining.

Key Drivers in Implementing GSCM

Compared with many other SMEs, RDH has implemented many green SCM practices that help to minimize carbon emission as well as air pollution and environmental contamination. Both the GM and safety managers shared the following major drivers motivating the company to go green:

a) As requested by customers - Many of their customers are large raw material traders that work directly with major international brands in consumer electronic products (such as mobile phone and laptop computer), they are very sensitive in using materials that may cause environmental pollution. The GM disclosed that: *"Some of our customers are big global brands, to be honest, they are very demanding and sometimes arrogant…Green image is very critical to their brand!"*

b) Corporate culture - The believe and determination of the founder to ensure RDH to be a good corporate citizen in contributing to corporate social responsibilities. Since inception of the company, the founder has established a strong corporate culture in RDH to cultivate green awareness among all employees. This is clearly stated under their company mission statement:

"Environmental – Zero Waste and Sustainability as our main aim and concern;

Innovation – Improving recycling technology continuously; and

Satisfaction – Proper handling, leaving you with no worries."

Major Barriers in GCSM Adoption

RDH encountered a lot of barriers while trying to green their supply chain operations. The following are the major barriers in adopting GSCM in the company as disclosed by the two respondents in order of significance:

1) **Cost**: Tin refinery is a traditional industry, it is facing steep competitive pressure from other producers in other developing countries such as Vietnam, China or Thailand. Pursuing green SCM may increase overall production cost impacting overall profitability since the company will have to install additional machinery and equipment to control air and water pollution, as well as limiting carbon emission level. The GM of this company is quite a fast talker and can be very candid in the interview. He shared with the researcher that: *"I need to pay our employees, I need to pay our suppliers, I need to pay my rent and feed my family, it is impossible for me to spend everything on environmental protection that my company will go bankrupt tomorrow…"*
2) **Technology Innovation**: There are many new green technologies out there in the market which are effective in environmental pollution control. However, they are usually more expensive compared to the current traditional technology. Some of the newer machines simply priced out of the reach for most of the SMEs. The safety manager shared that: *"I have been attending some global conferences on green technology last few years, some of the new machines are so costly that only suitable for large global corporations…"*
3) **Government**: TW government is keen to rollout more regulatory changes to support green business for all enterprises. However, RDH would like to see tangible support (such as funding and training) for SMEs to adopt new green technologies and best practices. Another factor under this barrier is the restriction for recycling companies like RDH to import more electronic wastes from other countries. Currently, it is very difficult to import electronic wastes from overseas due to the added regulatory controls in TW, this has restricted the output of RDH since they can only source PCB wastes from local supplies. This view has been aired during a press interview in Wealth Magazine (Taiwan) on April, 2017: *"The company is in the process to expand its capacity by*

building new factory. However, one of the major challenges we are facing is the shortage of sufficient electronic wastes. Unless government re-evaluating the existing import restriction on electronic wastes from overseas, recycling companies like us will not be able to create higher economic value…"

4) **Customer**: Customers of RDH in TW and overseas are generally receptive to greener products, even it implies slightly higher pricing. This was being shared by the GM: *"Our customers are large multi-national companies that not so price sensitive… they are more worried about their brand image being tarnished due to environmental pollution…"*
5) **Employee**: RDH has a stable workforce with long tenure, as they have a low annual turnover ratio below 3% annually. Most of their employees are very supportive to the company in the implementation of green SCM. This has been echoed by the safety manager that: *"Our team in the company is fantastic, most of these employees have been with us for many years…"*

Green Human Resource Management (GHRM)

In this research, an important angle to explore is the integration of GHRM and GSCM to improve the effectiveness of greening supply chain operations. In RDH, the management team has also implemented a few people related green initiatives to support GSCM, the following practices as outlined by both managers:

- **Job Analysis**: In order to ensure all employees fully understand the important of green management, standard green practices are clearly stated in their job description (JD):
    - Waste classification and separation during production (toxic vs. general)
    - Minimizing waste during production, check carefully before disposing recyclable wastes.
    - Energy saving during and after work, switch off electricity if not in use.

In order to ensure all operators understand their respective roles and responsibilities in green management; the GM shared that: *"We include all important requirements from customers in the job instructions… such as quality and safety standards, waste prevention and pollution control… factory supervisors will also spot-check to see if the employees are following these instructions."*

- **Recruitment & Selection**: Working experience in ISO-14001 or other Environmental Management Systems will be considered positively during job interview. This is especially importance for positions related to ISO annual audit and environmental control.

- **Reward**: Any employees demonstrate positive green behavior to be recognized and rewarded. The GM has shared one good example about one factory worker suggested to recycle used gloves and he was given award during year-end company dinner.
  In order to overcome difficulty in hiring and retaining qualified employees, the GM shared that: *"One of our production workers suggested us to recycle the used gloves for waste reduction. After implementation, this suggestion helped us to save quite a bit of money in buying gloves. We have rewarded him with one additional month of year-end bonus…"*

- **Induction**: All new hires will have to attend half day induction workshop on first day of employment, this is to learn about company policy, environment control procedures and general admin requirements.

- **Training**: All employees to attend regular in-house training classes so as to be briefed on safety and environmental related requirements. The GM stated that*: "It is no brainer to have internal training workshops for our employees compared to sending them to external workshop… We have large conference rooms and our engineers and managers are knowledgeable about any new changes in government regulations or production machines…"*

However, in some situations, some professional and managerial staff do attend external training conducted by local environment bureau or external consultants.

More of the GHRM initiatives are implemented in order to mediate the effect of high cost in going green for RDH. All cost saving related policies in environmental management are clearly outlined in the company policies and procedures; they are also briefed to all employees when they join the company on first day. Reward and recognition are given to employees that have workable solutions in saving cost and minimizing pollution of environment.

During the discussion, the general manager also talked about the initial challenge during the onsite visit: *"Some of the employees viewed the launch of green management practices as extra burden above and beyond their regular daily works at the beginning".* Such attitude has impacted the smooth implementation of these green practices. However, after regular communication and coaching, this situation has improved drastically after a few months. According to the GM*: "When we first introduced these new green practices, I remember I have some senior workers coming to my office and asked me why we have to make changes? Communication, communication and communication is still the most important in introducing any new policies in the company…"*

Both respondents agreed that, the integration of Green HRM into Green SCM is helping the company to implement green practices quickly and smoothly. They have reiterated that, the smelting and recycling process is semi-automated, many of the steps are still being done manually by the production workers. Green practices introduced under GHRM are helping the company to equip the employees with necessary knowledge and skillset to support Green SCM. The safety manager has this to say to the researcher: *"We really can see the difference… after implementing new people related policies and procedures, most of our workers are positive to cooperate with the management to ensure better working condition and environmental awareness."*

Observation

Through the face to face discussion and on-site visit in this case study, RDH is a typical SME in Taiwan that is interested to contribute more in environmental conservation but being constraint by limited available resources.

The implementation of green HRM and green SCM together helps to ensure smooth implementation of green management in the factory, this is especially important when recruiting new workers: "*"As many machines in our company are still manually operated, GHRM has helped to equip our employees with necessary knowledge and skillset to support Green SCM".* On adopting more green practices in the company, the general manager openly shared that, there is a limit to what RDH can do in this aspect due to increasing cost in going green. As directly commented by the GM: *"With the increasing regulatory control in reducing pollution, our company has already invested a lot of money in installing new systems to trap and recycle dust particles and chemical wastes… this is a really heavy financial burden for smaller firms like us…"*

Company: BYM

Introduction

BYM is a leather manufacturer based in Fuding city of Fujian Province, China. It was founded in 2006 with registered capital investment of 41 million RMB. BYM's main products are synthetic leather, microfiber leather and filling acrylic resin. Their manufacturing plant is located in Long-An industrial development park, which is a specially designed economic development zone for manufacturing companies.

In order to ensure the company is in compliance with basic environmental conservation best practices, BYM applied and successfully obtained ISO-14001 environmental management system certification in 2015.

Organizational Structure

The following is the basic organization structure of BYM:

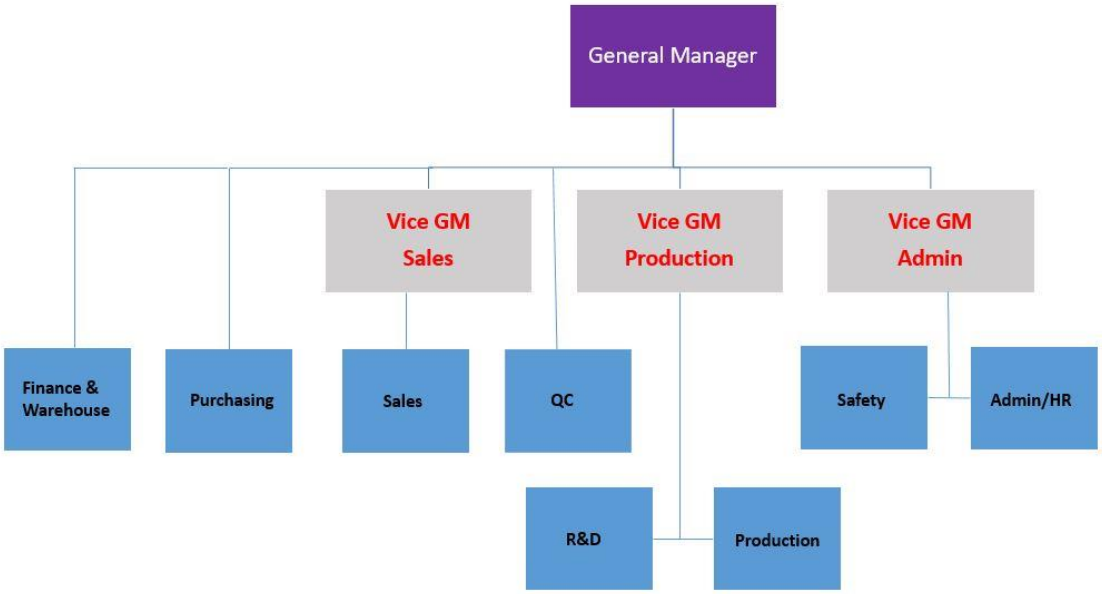

Figure (4) Organizational Structure of BYM

The overall business of BYM is being managed by a general manager, together with three vice GMs assisting him in running variable functions: Sales, Production and Admin. He has direct responsibility for other functions such as finance & warehouse, purchasing and quality control. The total workforce of this company is about 200.

This case study was conducted in Nov 2017 with one-day onsite observation at BYM factory and face-to-face interview with the general manager.

Green SCM Implementation

The general manager has been with BYM coming to seven years. He had worked in the same industry for almost twenty years with a wealth of professional experience in managing leather plants. He is answerable to the board of directors in the running of the day-to-day operations to ensure the company meeting all preset objectives as determined by the board.

As leather manufacturing industry is considered to be highly toxic and harmful to the environment, BYM has co-founded a Green Alliance for Leather

Manufacturers in Fujian province, with the clear objective to create green awareness, sharing of ideas and expertise to reduce environmental pollution for the entire industry.

During the interview, the GM has shared the following green SCM practices already implemented in the factory:

(a) Green Procurement

- As required by customers, all final products supplied must be RoHs (Restriction of Hazardous Substances) compliant. As such, purchasing department only procure materials that confirm with RoHs standard.

- For some materials that with no available qualified RoHs suppliers, purchasing department will collaborate with QC and external laboratories (such as SGS) to conduct tests on the materials, to ensure they are free from hazardous substances.

(b) Green Manufacturing

- All production wastes are sorted under two different categories (toxic and non-toxic) and handed over to certified waste processing suppliers.

- Toxic gases generated during production are centrally collected and treated by scrubber system before they can be released.

- Local government in Fuding city has helped to build a centralized waste water treatment plant at the industrial park. Waste water from all factories are pumped directly into this treatment plant to remove contaminants and discharge safely into river.

- BYM has installed computer-aided online monitoring system to monitor the generation of toxic gases and waste water. The system is in operation 24-hour and 7-day non-stop.

(c) Green Distribution

- The one important green initiative implemented so far under this bucket is the use of biodegradable packing materials for shipping. This includes carton boxes, wooden pallets, packing tapes and stretch film wrappers.

(d) Reverse Logistics

- So far there is no requirement on reverse logistics for this industry.

Key Drivers in GSCM Adoption

The GM emphasized a few times during interview that, it is imperative for all leather manufacturing companies to embark on Green SCM before it is too late. He is very clear on the challenges facing this industry: *"We are in a dirty trade…many cities refuse to let us continue our production, if we don't change, we would either be punished by government heavily or out of business…furthermore, all our customers also demand for greener materials, what to do?"*

In summary, the key drivers pushing BYM to go green are as follows:

i. Being labelled as highly polluting industry, leather manufacturers need to transform themselves before go out of business completely.
ii. More and more new regulations on environmental protection have been introduced in China over the last few year, leather manufacturers will need to stay compliant or facing strong enforcement by local government.
iii. BYM supplies final products to big fashion brands such as Zara, H&M and Topshop. Many of these European clients have asked for greener products due to the increase environmental awareness of their retail customers.

Major Barriers in GSCM Implementation

As compared to many other SMEs, BYM is very committed in implementing Green SCM in their day-to-day operations. However, they have encountered several barriers over the last few years:

1. **Cost** – During on-site visit, the factory was undergoing major overhaul due to the installation of new water and gas treatment systems. BYM has spent large investment in order to stay compliant with the regulatory changes on pollution control, this has increased the overall running costs drastically over the last two years. Similarly, the change of packing materials to biodegradable grade also contributed in the rise of cost of operating. The GM said during factory visit: *"You can see for yourself, we have spent a few millions (RMB) in these new treatment systems, these things are very expensive…"*
2. **Technological innovation** – There are new manufacturing technologies in advance countries on green leathers which are biodegradable and less harmful to the environment. However, it is not available in China. BYM has sent some of their R&D staff overseas in order to learn these new technologies. According to the GM: *"We are in a small remote city, it is difficult for the international suppliers to visit or support us in this location. There is also no trade show in this region, we need to go to Shanghai or Beijing to meet with these international suppliers…also, I am not sure if we can afford these new green materials?"*
3. **Customer** – Even though BYM has global clients such as Zara and H&M, however, there is constant pricing pressure from large clients to reduce price. Larger clients are likely to be more demanding in quality and price sensitive; this is directly impacting BYM's profit margin. The GM also told us that: *"To be honest, sometimes I wonder if it is better to serve smaller customers… these big global customers are so demanding on quality and pricing, with a difference of 2-3% in unit price, they will leave us and buy from other suppliers".*
4. **Employee** – According to BYM, it is not easy to hire experienced employees to join the leather industry, as the production process is being perceived as dirty and harmful to humans. About 80% of the employees are recruited from other provinces as it is not easy to attract enough local talents. GM of the company was quite honest to inform that: *"It is also a challenge for us to recruit qualified staff to work in our*

factory… as you know, the younger generation today like to work in nice office and good benefits, our industry is too dirty to attract good talents…"

5. **Government** – In general, local government in Fuding city is quite supportive to SMEs in the industrial park. However, BYM would like to see more financial support to the enterprises in order to implement more green practices. During the interview, the GM didn't say much about the government: *"We do not have any issue with the local government, the only suggestion is for them to support us to get more loans from the banks to keep our business going…"*

Green HRM Implementation

BYM is quite a structured and well run SME in leather industry. They have implemented a few green practices in HRM to support the smooth execution of Green SCM:

(a) Job Analysis

- All jobs on production floor are designed with control elements of green practices. Production operators are required to operate machines which are controlled by computer to ensure no pollution to environment due to waste water and toxic gases generated during production process. Two main in-process indicators used in the job analysis are energy consumption and % of waste recycling.
- The GM shared during onsite visit that: *"Before our workers are assigned to production line, they need to read the job instructions to ensure they fully understand what is required to perform their task and to minimize any pollution to the environment. This can be critical when we have customers visiting our factory…"*

(b) Recruitment & Selection

- BYM is developing their own biodegradable leather due to customer demand. Currently, the most important talents that required by this company is under R&D department. The key requirements for the R&D positions are relevant working experiences and education

qualifications. Candidates with green training and certification will be viewed favorably but not an essential prerequisite.

(c) Reward

- Rewards to be given at different levels when goals are met for % of waste recycling (96%) and energy consumption. Negative reinforcement to be applied for employees that perform badly in the key performance indicators, such as deducting monthly allowance. The GM was very direct that: *"I think it is common sense to punish any employee if he or she performs badly…"*

- Tangible rewards given to high performance employees as a form of encourage in order to improve staff retention rate. The GM said: *"As you can see, it is not easy to recruit new staff as well as retain good employees in this remote city… Rewarding good employees when they achieved good performance is absolutely necessary…"*

(d) Induction

- All new employees are required to attend one-day induction training when on-board. Employee handbook with detailed company policies on waste elimination, energy saving and contamination prevention is given to the new hires during induction.

(e) Training

- Prominent posters are displayed on the production floor to remind all employees on basic environmental protection measures.
- BYM also sends employees to external trainings on new environmental legislations and requirements conducted by local environment bureau or universities. According to the GM, this is useful to overcome the challenge in new environmental regulations: *"China has implemented many new environmental regulations over these few years, I send my employees to attend external training because they need to know these new laws that can help to ensure we can achieve regulatory compliance with no violation…"*

(f) Performance Evaluation

- All production employees are being evaluated under individual productivity, % of reject rate, energy consumption, % of waste recycling.
- GM has also shared during discussion: *"Waste reduction and energy consumption are keys to cost reduction…I need all my staff to focus in these areas if we want to be competitive!"*

According to the GM, many of these people related green practices are introduced in order to save cost for the company; this is especially critical since they have invested quite a lot of funds to upgrade the air and water treatment systems in the factory. The company is very focused in energy saving and waste recycling; all employees are briefed regularly on these green company policies and their performance is also being measured based on relevant KPIs annually.

During the interview, the GM also shared about the main challenges encountered in implementing green HRM to support Green SCM:

- *Due to the type of industry as well as the remote location of the factory, it is getting more and more difficult to recruit high quality talents to join his company.*
- *Because of the fast growing economy of China, labour cost is rising every day. This has material impact to the bottom-line of most companies.*

However, in order to mitigate these challenges, he also supplemented that, the company is currently planning to use more automation technology to overcome labour shortage issue. A good example is to install semi-automatic production machines that can reduce the need of manual workers by at least 30-40%:

"I have already discussed with our board of directors, likely that we will invest a few millions (RMB) on semi-auto machines in the next 2 years… hopefully this will help to reduce the need to recruit more workers when we ramp up the production…"

Despite facing numerous challenges in introducing green management strategies, the GM is still very positive about going green for his company. His view about benefits of integrating GHRM and GSCM together is as follows:

- As a highly labour intensive traditional industry, leather industry can cause high pollution to the environment if not managed carefully. Such industry is subject to heavy and stringent governmental regulations on day to day operations.
- By integrating both GHRM and GSCM together, BYM is able to achieve final goals on environmental control and pollution prevention.

In summary, the GM has this to say about the integration of GHRM into GSCM for his company: *"I would think there are definitely benefits to incorporate green human resource management when implementing supply chain operations…example; all our employees learn how to recycle wastes and dispose toxic wastes according to company policies, which is very important in reducing environment pollution during production"*

Observation

In general, BYM is a traditional leather manufacturing company that under tremendous pressure to upgrade into a greener leather supplier. With more and more new regulations on environmental control, GM of BYM has the following sharing for other SMEs in the adoption of green management strategies:

- Since leather industry is amongst the top ten most polluting industries globally, it is necessary for BYM to transform and implement GSCM and GHRM before they are asked to shut down.
- Situation in China is especially more challenging as local government is implementing tougher measure to prevent environmental pollution from dirty industries.
- Moving to other low cost countries (such as Vietnam or Cambodia) is not a long time sustainable solution; as sooner or later these other countries will implement similar regulatory measures to curb environmental pollution.

The local environmental bureau in Fujian province is very strict on the pollution control for leather industry. All registered leather manufacturers located in this province will have to undergo annual environmental audit. All audit reports can be searched under the homepage of environmental bureau. Based on the latest report found on BYM, the company has passed the annual audit in the month of May, 2018 without any negative finding.

Company: SDA

Introduction

SDA is a local SME based in Fujian province, which is located in the South-East coastal area of China. It was founded in 2007 with capital investment of 28 million RMB. SDA is a seafood manufacturer, with main products ranging from fish, sea cucumber, abalone, prawn and scallop. Not only producing frozen seafood products for exporting to foreign markets such as USA, Canada, Japan, South Korea and Australia, they also produce dried food products mainly catered for domestic consumers in China. The manufacturing facility is located at outskirt of Fuzhou with more than 30,000 square meter, using latest food production equipment and techniques to ensure high product quality.

SDA has permanent workforce of 230 employees with about 15% of them are university graduates, mostly working in management and back office support functions. Besides passing the annual inspection by the local Environmental Bureau, this company also successfully obtained the certification of ISO-14001 in 2014 for their manufacturing facility. In order to study this enterprise, a one-day observation carried out at their manufacturing facility during Nov 2017, together with face to face interviews with two of their senior management staff:

- Vice General Manager (production) – 10 years' experience in the company
- Logistics Manager – 5 years' experience in the company.

Other secondary data were also collected and used in this case study research, they are:

- Company website

- Company brochures
- Internal documents – SOPs, org chart
- Online news archives

Organization Structure

SDA is managed directly by the founder; he is also the General Manager of the enterprise. As an experienced entrepreneur for many years, the founder is quite popular and well respected in the local business community. In SDA, he is being supported by four Vice General Managers in-charge for different portfolios as outlined under the following organization chart (Figure 5). The HQ office and the production facility are all under one roof which is located in Ningde city of Fujian province.

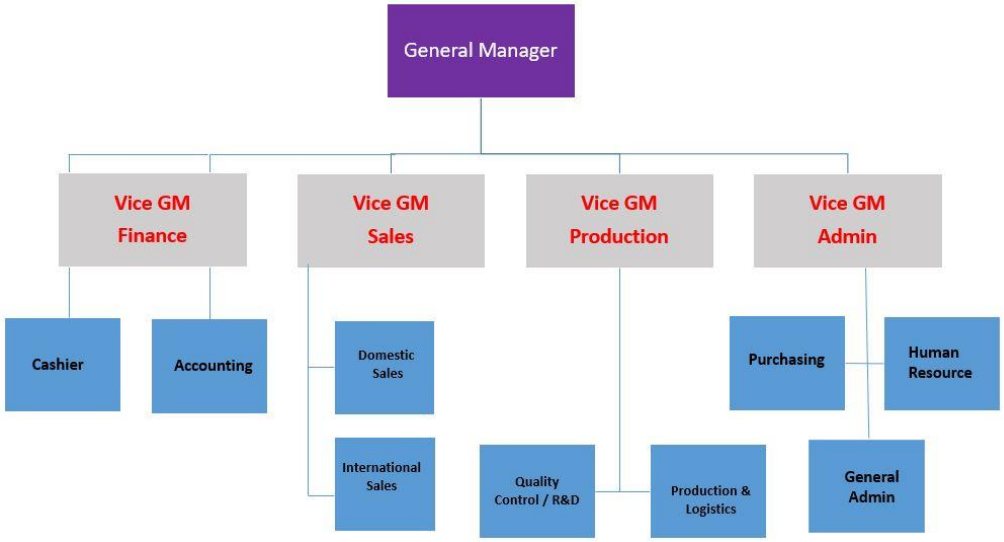

Figure (5) Organizational Chart of SDA

Green SCM Implementation

In order to minimize negative impacts to the environment, SDA has implemented green supply chain since 2012. A series of green practices were launched to ensure minimum carbon emission and pollution to the environment during the entire seafood supply chain operations:

(a) Green Procurement

- If there is no big difference in prices, raw materials to be procured from suppliers with green certification. Alternatively, packaging materials used must be biodegradable so as to prevent pollution to environment.

(b) Green Manufacturing

- The three main criteria used in the manufacturing process are; reduction of energy used, waste reduction and contamination prevention.
- As SDA is in food business, food contamination prevention is one major consideration in the manufacturing operations. Testing of final products is mandatory to detect any harmful chemicals and microorganisms before they can be shipped to retail channels.
- Waste water generated during production process is collected and channeled into centralized waste water treatment system in the factory. It is treated via several stages before discharging into river.

(c) Green Distribution

- All plastic packaging materials are biodegradable and clear marking on the plastic bags to serve as gentle reminder to consumers not to litter.
- Bigger carton boxes to be recycled after use, with qualified waste collection vendor handling recycling of the factory.
- SDA has installed a dedicated cold-room storage facility that used latest green technology from Germany, to ensure lower energy consumption.

One important discussion during the interview with the logistics manager is on the possibility to use vehicles powered by renewable energy (or hybrid energy) during transportation. Presently, there is no such requirement from SDA to their trucking vendors. The main reason is because, due to the type of frozen foods produced, all the products have to be transported under cold-chain logistics. Refrigerated trucking is used to ensure freshness of the products at all time. According to the logistics manager: *"Using green energy powered vehicle may affect the stability of cold temperature during transportation, we cannot afford to deliver spoilt seafood to our customers just to go green, right?"*

(d) Reverse Logistics

- Currently, there is no reverse logistics requirement in food industry.

Key Drivers in GSCM Implementation

During face to face interviews, senior management of SDA shared on the three key drivers that triggered the need to implement Green SCM in their manufacturing facility:

i. As international export is core revenue source of SDA, it is necessary to implement GSCM so as to align with overseas clients' expectation. The Vice GM told the researcher that: *"Green image is getting more and more important for overseas markets such as Europe and Japan, these are our focused markets now…"*

ii. Under current global development, in the long run, Green SCM is the way to go for all enterprises in China or everywhere around the globe to improve competitiveness. It is vital for SDA to start the green journey before it is too late. The logistics manager shared that: *"The global trend now is environmental protection; it is better for us to embrace green practices earlier than later".*

iii. Like most people in China, increase in environmental awareness for the employees is also another main driver for SDA to embark on Green SCM. It is already difficult to attract talents to work in SMEs and any enterprise with contaminated supply chain damaging the environment will not be able to attract and retain staff. The Vice GM disclosed that: *"The younger people these days are very sensitive to working environment…if they see the factory is dirty and the production process is polluting environment, they will not report to work tomorrow…"*

Major Barriers in GSCM Adoption

Implementing Green SCM is not without barriers over the last few years. The following are the main obstacles encountered by SDA management team in order of importance:

(1) **Cost** – Although many companies in China talk about environmental conservation these days, it is still difficult to source suitable green materials to be used in the supply chain. Some green materials are to

be procured directly from overseas at very high cost even locally made greener materials can also be expensive comparing to ordinary materials. Similarly, higher investment and annual maintenance costs to be incurred in waste water treatment and cold-room storage systems in the factory. The Vice GM started complaining about ever increasing cost of doing business in China: *"I have been working in this industry for many years, the cost of the raw materials are increasing almost every few months…it is even more costly if we specify greener materials that coming from other countries".*

(2) **Technological Innovation** – This could also be linked to cost. There are many green technologies invented overseas but not yet available in China. This has resulted in higher cost incurred by the local businesses if they have to adopt these green techniques to prevent or reduce environmental pollution. This was quoted by the logistics manager that*: "I also want to use the latest high-tech green energy trucks, but I don't think our company can afford today, maybe in the next few years when we go public listing…".*

(3) **Employees** – SDA is a local SME located at the outskirt of Fuzhou city. It is not easy for such a local enterprise to attract high quality talents to join the company. It is also very costly to hire high caliber employees that increase overall operating costs of the company. Not only it is difficult to recruit high quality candidates, it is also equally challenging to retain these professional people for more than a year. The Vice GM shared this during interview: *"Young people today don't stay in small towns like Ningde, they like to find job in Shanghai, Guangzhou or Beijing…it is really difficult to recruit university graduates to join us".*

(4) **Customers** – This is a common problem encountered by most of the SMEs; despite changing customer's need due to environmental conservation, it is still difficult to convince customers to pay more for greener products. This is squeezing profits of the enterprises since it is more expensive to produce green products but unable to charge higher prices. The logistics manager asked the researcher that: *"If you have to*

pay 20-30% more to buy our products, will you consider? Most customers we have are very price sensitive, on one hand they ask for greener products, on the other hand; when the price is higher, they will walk away…"

(5) **Government** – China Government has been very supportive to local companies in implementing green supply chain. Some cities have introduced financial incentives for SMEs to apply in order to implement control measures to reduce environmental pollution. Environmental Control Bureau in each city is also stepping up efforts to educate companies to transform their production processes to greener supply chain. As such, government is not being considered as a major barrier in implementing Green SCM. When talking about the government; both managers were quite reserved and didn't talk much: *"The local and central government have been very supportive to the business community in going green; we don't have any problem with them…"*

Green HRM Implementation

During on-site observation and interviews, it is clear that implementing Green SCM cannot be isolated from effective human resource management. This is especially important for labour intensive manufacturing industry. SDA has implemented some green practices under HRM in order to support the greening of their supply chain activities:

(a) Job Analysis

- Apart from the roles and responsibilities of each position, some KPIs are built in the job scope for each production line; examples are waste %, contamination % as well as overall energy consumption.
- Based on the manager; this is useful to ensure all staff truly understand what to do in the production on environmental conservation which is expected by most of the customers: *"In order to produce high quality seafood products that are also eco-friendly to the environment, we need all our production workers to know their roles and responsibilities at the*

beginning of work shift. This is basic to ensure we meet the expectations of our customers!"

(b) Recruitment & Selection

- As discussed in earlier section, it is not easy for SDA to recruit high quality candidates due to many different reasons. Previous relevant working experience in environmental pollution control maybe considered favorably, however, this is not a mandatory selection criterion.

(c) Rewards

- Each production line is being assessed on % of waste produced. Monetary reward to be given to all team members of any production line that meeting annual goal.
- The manager was candid in the sharing that: *"To make high quality food products for our customers, we need happy employees that understand the importance of hygiene and pollution prevention. Giving out team rewards when they achieve good results collectively is one good way to make them happy and stay with us longer…"*

(d) Induction

- All new employees to be given an employee handbook on the first day, detailed company policies on waste elimination, energy saving and contamination prevention are clearly stated in the handbook.
- Based on the sharing from the manager; this practice is adopted to mitigate the difficulty in bringing in new employees: *"We cannot compare ourselves with those big multinational companies that can attract top talents from universities… many of our workers only have basic high school education and without prior working experience. Induction workshop is a good way to teach them how to work in our factory effectively…"*

(e) Training

- SDA implements OJT for new hires. According to the manager: *"As mentioned before, it is very challenging to recruit new people to join our*

seafood industry. We have tried to bring in young people from other provinces with minimum educational qualification and no working experience. OJT is very good to ensure they learn as fast as possible on safe and green production…"

- Besides on-job training, SDA also invite environmental management experts from local university to conduct in-house training to their employees. SDA also send some management staff to attend workshops conducted by local Environmental Control Bureau.

(f) Performance Evaluation

- Beside standard performance KPIs such as punctuality, work quality and efficiency; each employee is also being measured on waste generation. This is important for both cost reduction and minimizing environmental pollution.
- One respondent shared during interview: *"It is necessary to ensure all our employees fully aware of the green objectives given to them as part of annual performance appraisal. Some of these KPIs have direct implications to our financial return…"*

SDA focuses in using GHRM practices to mediate some of the negative effects from the challenges of employees and high cost in going green. As mentioned by the respondents: *"it is extremely difficult to hire qualified talents to join the company due to the remote location of the factory as well as unattractive salary and compensation in the traditional seafood industry".* Hence, the company hires almost anyone that meet minimum requirements and have to conduct induction workshop as well as regular training sessions to ensure these new employees understand environmental regulations, company policies and procedures. Similarly, SDA put in great emphasis in waste reduction for performance measurement. This is critical to ensure cost saving and support in environmental sustainability.

It is noticeable to know that, the single most critical challenge facing any SME in business expansion and growth is the lack of talents. SMEs are usually run by family members or friends since they do not usually offer better salary and

compensation package as compared to bigger enterprises. In order to overcome this major shortcoming, SDA currently establishes partnership with universities in Xiamen and Fuzhou to provide internship opportunities to the university students. It is still too early to assess if this scheme is successful as there is still no student joining as permanent staff after internship.

Both the interviewees also acknowledged the importance of integrating both the Green SCM and Green HRM for their company. One clear benefit is *"to ensure all employees are aligned with the unified direction towards green and safe working environment so as to produce greener and safer products for the customers".* Ultimately, this is crucial for company's sustainability and economic competitiveness. The Vice GM shared that: *"Most of the works in our factory are carried out by manual workers… having these environmental green human resource measures enable us to implement effective green supply chain operations much more smoothly and quicker".*

At the end of the onsite observation and interviews, the vice general manager of SDA has suggested the following recommendations to enhance the integration of Green SCM and Green HRM:

(1) Lead by example: all management staff in the company must exhibit green behavior so as to encourage all other employees to embrace and accept green practices as promoted by the company. The logistics manager joked during the interview that: *"I have started cycling to office everyday instead of driving, this is good to demonstrate the management's commitment in environmental conservation, hope more managers can follow my change…"*

(2) To mitigate the challenge of lack of talents, it is important for the company to conduct feasibility study on automating production processes. Although automation investment could be costly in the short-term, it can help enterprises to overcome manpower shortage effectively.

(3) Many of the latest green production technologies can be very costly for SMEs to adopt, government may need to provide more financial incentives (such as low interest rate loans) to promote the use of green

technologies for effective environmental protection. Vice GM of SDA said: "*We are a small company; it is necessary for government to support us to apply more loans from local banks…these big banks usually lend money to the big boys but not to small fish like us…"*

Observation

Being a food production company, it is a right direction for SDA to take considerable efforts in the greening of their supply chain activities so as to ensure all products manufactured are safe and free from harmful substances. Having more than 50% of their products selling into overseas markets, this has helped SDA to focus more on the implementation of green management practices in their day to day supply chain operations.

Although SDA management team acknowledged the importance of integrating Green HRM with Green SCM to reduce environment pollution, there are more could be done in the company to introduce more green HRM practices; such as encouraging employees to use bicycle or green energy powered vehicle, providing tangible rewards to employees that inventing green production methods or sending more employees to attend external trainings on green management.

Company: YDL

Introduction

YDL is a leather material manufacturer located in the special leather export processing zone of Fuding city. It was founded in April 2006 with a paid-up capital of 6.8 million RMB. The main products of YDL are synthetic leather and microfiber resin. It is a small enterprise with about 195 employees in 2017. YDL is an ISO-14001 certified company since 2011, they have introduced both Green Human Resource and Supply Chain Management in their day to day operations to minimize negative impacts to the environment. However, based on a report (2017) from the local environmental bureau of Fujian province, YDL was listed as one of the potential enterprises with higher risk in environmental pollution.

Through the help of local contact, two management staff agreed to be involved in this case study research. One of them is the deputy general manager with 12 years of working experience at YDL; another one is the factory manager with 4 years of service in YDL. Both managers were interviewed face to face during an on-site factory visit in Nov 2017. In addition, other secondary data such as company homepage, product brochures, internal company documents were also used in this case study.

Organizational Structure

The organizational structure of YDL is relatively simple. The company is headed by a general manager with full support from deputy GM. There are two departmental managers under them: factory manager and safety & admin manager. The largest department is Production which has about 75% of the total workforce. They are being supported by the admin groups that have the sales, procurement, finance and HR functions. Warehouse operation is part of finance group in order to ensure better control on raw materials and finished goods.

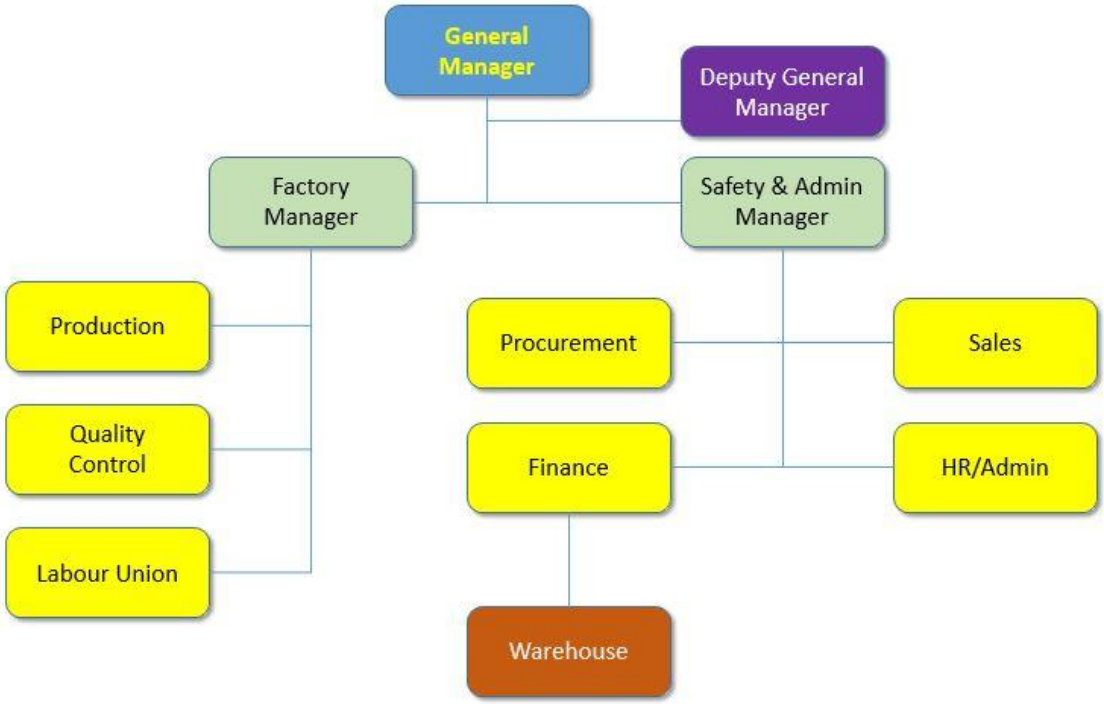

Figure (6) – Organizational Structure of YDL

Green Supply Chain Management

Leather manufacturing industry is considered as a “dirty” industry that can have severe environmental impacts if not managed professionally. There are lots of organic and inorganic solid wastes produced during production processes that are harmful to living creatures. In addition, the unbearable smell generated from waste material associated with leather processing activities can greatly affect the surrounding environment. Many governments have to introduce very strict regulations to ensure these leather processing factories to maintain adequate environmental control in order to mitigate any damage to the environment.

YDL has introduced a series of green measures under its supply chain activities so as to minimize any pollution. The following are the different practices as shared by the two managers during interview:

Green Procurement

(1) Procurement group works with R&D and Sales teams to source materials such as color powder, fabric, packaging boxes and bags based on specific quality and environmental friendly specifications.

(2) YDL also setup an in-house laboratory to ensure in-coming materials purchased are meeting quality and free from toxic pollutants.

(3) Depending on requests from customers, 3rd party quality certification may also be needed for certain materials. Examples; UNI 11427 Ecopelle or STANDARD 100 by OEKO-TEX®.

Green Manufacturing

(1) Due to the foul smell generated during leather treatment process, YDL installed waste gas treatment system to ensure no air pollution during operations.

(2) All production workers are instructed to minimize waste generated during production, all waste leather must be collected and recycled for other purposes.

(3) Toxic waste is separated from regular waste and handover to qualified waste collector that is directly run by local Fuding government.

Green Distribution

(1) For logistics distribution, it is usually pre-arranged by overseas customers. Customers appoint their own freight forwarding vendors to carry the goods from China to final destination. As such, YDL has minimum control over the choice of logistics service provider.

(2) One positive initiative adopted by YDL is the use of biodegradable and recyclable packing materials whenever possible.

Reverse Logistics

(1) So far, YDL has not implemented any related green measure in this area.

Key Drivers in the Adoption of GSCM

As a small enterprise, it is costly to implement some of these green measures. The two participants in this case study research shared with us on the two major drivers why YDL has decided to green their supply chain for environmental conservation:

(1) Increasingly stricter regulations on environmental control

After a few decades of rapid economic growth in China, there are clear evidences of ecological damages in major Chinese cities. Central government recognizes the importance of improving the living environment for everyone, hence, a series of new laws were introduced in 2014 to improve the country's environmental situation.

Over the last few years, many of the leather manufactures have shifted their operations from Guangdong province to Fujian province due to stricter enforcement of environment control in Guangdong. The special leather industry park established in Fuding city is specially designed for the leather industry to house these companies together to enable efficient and effective environmental supervision and control. Companies operating in this park will

have to implement a set of environmental control measures under local regulations. This is the primary driver why YDL adopts green SCM to ensure they are in compliance with environmental regulations. According to the deputy GM: *"In our country, if there is any policy that needs to enforce strictly, the local government will take very firm actions to ensure every company conforms to the regulations…having a cleaner and greener living environment is one of the top objectives of our leaders, we have to work closely with our government to achieve this goal…"*

(2) <u>As requested by customers</u>

Most of YDL's customers are from overseas, many of them are from Europe, North America, Australia and Japan. Local environmental policies in these developed countries are usually more stringent than in China and the customers will demand for greener products before they can be imported into the home market. The factory manager shared with the researcher that: *"We regularly receive overseas customers to visit our factory. They like to conduct on-site environmental audit before deciding giving us the orders…if we do not implement green supply chain, maybe you will not see this factory today as we will not be able to survive without these big overseas customers…"*

Major Barriers in GSCM Adoption

The two managers were given a list of potential barriers in the adoption of GSCM by small and medium sized enterprises. The following are the major barriers in the order of significance as provided during face to face interview:

> (1) <u>Employee</u> – Unlike banking or e-commerce industry, leather manufacturing industry is a highly polluting trade. It is extremely difficult for SMEs like YDL to recruit good talents to join the company. This problem is even more acute when the factory is located in an isolated 3rd tier city of Fujian. The factory manager was quite open to disclose that: *"This industrial zone is located in a very remote town in Fujian province…not many young people like to come here. Even for me, if it is not because of limited job opportunity in my hometown (North-eastern region of China), I may not want to come here too…"*

(2) Customer – These days, many customers demand for greener products. However, they are reluctant to pay higher price. This is especially tough in fashion industry like leather production due to extreme competitive pressure from market. According to the deputy GM, such customer behavior is causing many leather manufacturers in China to go out of business. The deputy GM complained to the researcher that: *"Many of these overseas customers are global fashion brands, however, most of them are so stingy, on one hand asking us to be as green as possible, on the other hand; keep asking for discount!"*

(3) Cost – This barrier is related to the increasing customer demands. Introducing GSCM can increase business cost to the SMEs as greener processes, machinery and materials are usually more expensive than the regular alternatives. Factory manager informed the researcher that: *"Many of the waste water treatment systems you saw just now are very expensive, we have to get loan from local bank in order to pay for the installation…"*

(4) Technological Innovation - YDL is located in a small town of Fujian province, it is not easy to receive latest green technology as compared to companies based in Shanghai or Beijing. It is also very costly for such technology to be installed in the factory located in remote area especially if they are from overseas. The deputy GM recalled: *"I have attended a trade exhibition in Germany last year, some of the leather production machines are really cool and produce less wastes…but they are too costly for factories in China…maybe only suitable in advanced markets like Japan, Europe or USA…"*

(5) Government – Both central and local governments are very supportive to enterprises pursuing green management. Local environment bureau provides technical and financial support to local firms to ensure they stay compliant in pollution prevention. The factory manager has good comment about the local government: *"The environmental officials from the local government come to our factory*

regularly and provide good trainings and technical support…no complaint at all".

Green HRM Implementation

The second part of the case study interview is about the implementation of people related green practices to improve the execution of green SCM. Through the discussion, both participants shared the following green human resource practices:

Areas of HRM	Green Practices

Job Analysis	• YDL clearly outlines job requirements in the JD (job descriptions) for different positions in the factory. Examples; there are different waste handling requirements for production workers; such as:
	  ○ Waste classification and separation during production (toxic vs. general).
	  ○ Minimizing waste during production
	  ○ Collect all leather wastes at end of work shift and to be recycled later.
	• One manager shared that*: "We have regular customer visits from different cities and countries… my staff need to know what is required in their job to ensure minimum waste is generated during production… a copy of job description is provided to every one of them…"*

Recruitment & Selection	• Experience in ISO14001 or other similar EMS to be considered positively during job interview. However, YDL is not giving higher salary or additional compensation due to such qualification. • Both managers interviewed also shared that, it is already very challenging to hire ordinary workers coming into this industry. Hence, it is impossible to set

	a higher selection criteria or requirement on green qualification at the moment.
Rewards	• Any employee achieving pre-set performance goals to be rewarded case incentive up-to 350 RMB per month. The pre-determined goals include quantity, quality and recycling related performance measures. • As a form of motivation to encourage good employees to stay with the company. The manager shared that: *"In order to achieve environmental sustainability, we need our employees to have proactive and positive attitude towards green management…if they perform well in waste reduction or cut in energy consumption, we will reward them directly."*
Induction	• All new hires will have to attend 6-8 sessions of induction workshops to learn about company policy, environment control procedures and general admin requirements. These workshops will need to be taken within the first 3 months after on-board. • This is to mitigate the difficulty of staff hiring. According to the respondent: "*"Usually we just hire anybody that is interested to work for us. Many of these young people are from village that do not have basic knowledge and experience working in a company, having induction workshop for them is necessary…"*
Training	• All employees to attend pre-work meeting once a week. They are briefed on safety and environmental related requirements during meeting.

	• Some professional and managerial staff are sent to attend external training conducted by local environment bureau or external consultants. • The manager has shared that, sending staff to external training is important to ensure all key users know how to use these new machines: *"After spending a few millions (RMB) on these new air and water treatment systems, our technicians and managers will need to learn how to use the systems effectively to achieve maximum results. So far, we have sent many technical staff to external training workshops for knowledge and skill upgrade…"*
Performance Evaluation	• KPIs such as waste % reduction, % of consumables are used in annual performance evaluation. The KPIs can be applied individually or based on team level. • The manager shared that: *"Any violation that causing environmental contamination will result in heavy fine from local authority… We need to ensure environmental related performance KPIs are being measured for all our workers every year."*

YDL managers shared that, the introduction of GHRM practices is to mediate some of the challenges the company faces; especially on the staff hiring and demanding customers. As claimed by the managers, in order to ensure all newly recruited employees understand the company polices in green management, YDL has implemented a series of induction workshops which is very thorough and extensive to be completed within three months after on-boarding. The company also use weekly pre-work briefing to update everyone on any new regulatory changes on environmental laws and safety requirements. These measures are essential and necessary as YDL is difficult to hire anyone

with good green management qualification. In addition, these measures are helping the company to ensure the operations can be run in accordance to customer's requirements of environmental sustainability.

When we discussed about the implementation of green HRM in YDL, both participants kept repeating about *"the difficulty in recruiting workers in this factory".* One major factor is the remote location of the leather industry park in Fuding. The county of Fuding is a 3rd tier city located at Fujian's border with Zhejiang province. Its total population is only about 290,000. The main economic pillars of this county are tourism and farming, this has resulted that not many local young people willing to work in the factory. Most of the workers in this leather industry park are in fact hired from the western part of China, such as Sichuan and Chongqing. During onsite visit, there were still new employees reporting to work by batches that caused slight interruption in the discussion.

On the benefit of using human resource management practices to support the successful execution of green supply chain management, the deputy GM has put it bluntly that: "*Leather manufacturing is still a labour intensive industry, nothing can be done without having support from the employees*". To the management team, it is obvious that: *"integrating GHRM with GSCM will help the company to achieve the objective of minimizing pollution and protecting our environment".*

During interviews with the participants, the following additional issues were also discussed:

(a) <u>The use of green energy in the factory</u>: There is a large nuclear power plant in Fuding County. It is a private-public partnership project with about USD 7 billion investment. This power plant has started operation in 2012 and supplies electricity to all cities of Fujian. Although there are two different opposing views on nuclear power, it is considered as green energy in this project due to lower carbon emission.

(b) <u>Investment on New Treatment System</u>: Deputy GM has shared on the big investment that the company put in during 2016-2017. As the

local environmental bureau issued an ultimatum for leather processing enterprises to install new waste gas treatment system, YDL has spent up to 5 million RMB in the installation of new treatment system to ensure no hazardous gas emission during operations.

Observation

It is clear that all green efforts put in by YDL are triggered by the regulatory pressure from local environmental bureau, with some degree related to customers' demand. The factory manager has shared his view on implementing green management strategies during the tour of production line:

(i) Any SME should consider the cost of implementing green strategies in advance and factor into the overall cost of doing business. This is critical to ensure the company will not go out of business because of going green. He has commented that: *"No company will be that stupid to go green all the way but go bankrupt tomorrow, right? There must be a limit to what we as a small enterprise can contribute to environmental protection, as compared to the multinational companies…"*

(ii) In general, the local government is supportive to the local SMEs in going green. As long as the enterprises are in good standing with full compliance in annual corporate tax payment, SMEs can apply for financial assistance in the implementation of GSCM.

Company: YHS

Introduction

YHS is a seafood manufacturer based in Ningde city of Fujian Province in China. It was established in March, 2001 with a paid-up capital of 30 million RMB. YHS is a small enterprise with about 200 employees, 20% of the workforce are management staff. During the early days of start-up, YHS worked closely with Fujian Agriculture and Forestry University to develop a full range of seafood products based on yellow croaker fish, which is a species of marine fish commonly found in the ocean of south east region of China. Besides selling to different cities within China, most of these seafood products are exported to

Japan, South Korea, Australia, South East Asia, Taiwan and Hong Kong. Currently, the company has established research partnership with the local universities to setup cold-chain logistics services, this is a project being supported by Provincial Government in Fujian with research funding. YHS has been certified under ISO-14001 environmental management system since 2010.

Organizational Structure

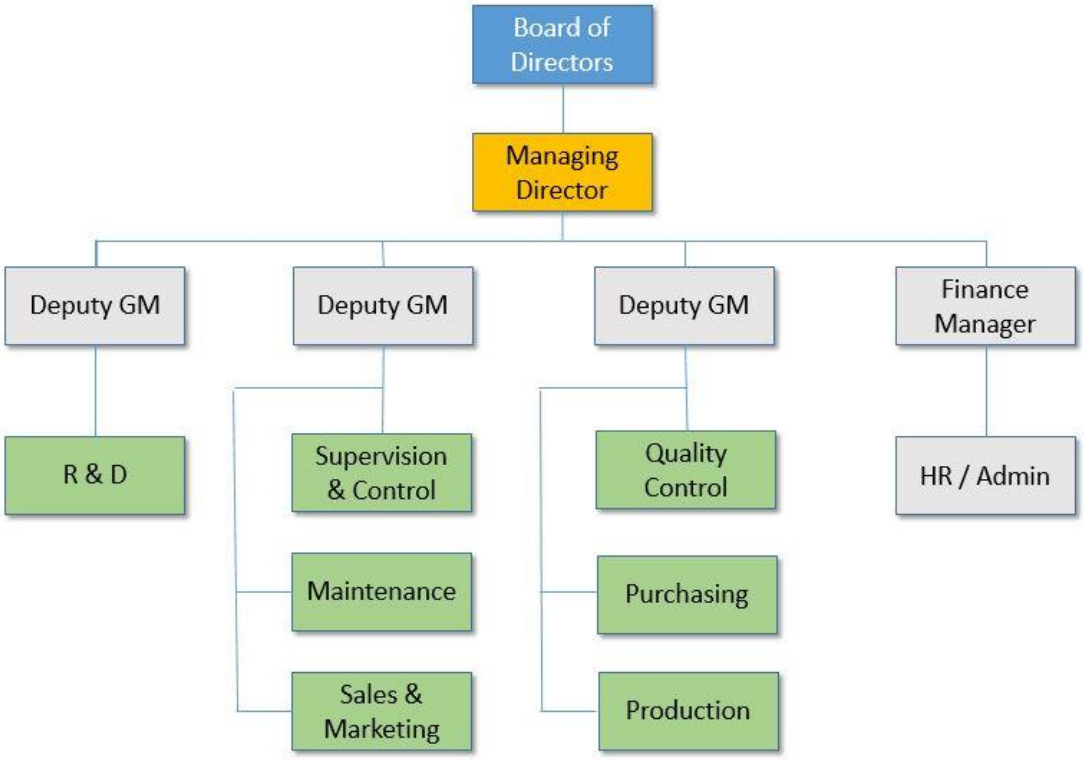

Figure (7) Organizational Structure of YHS

YHS is managed by a managing director that has been with the company for four years. He is reporting into a board of directors consists of major shareholders of the company. The MD is assisted by three deputy general managers and one finance manager, looking after different functions of the company. Human resource and general administrative management are under the charge of finance manager.

In this case study research, the MD has spent about five hours with the researcher during Nov 2017 to go through the interview questionnaires and

touring the production line and warehouse of the company. Secondary data source is also used after the on-site study, such as company website, product brochures, official data from local government and public media reports.

Green Supply Chain Management (GSCM)

The first part of this case study research is to find out what are the major green SCM initiatives implemented in YHS. The following is the information provided by the MD:

Green Procurement

(1) Since YHS is a food producer, it is critical to ensure all raw materials purchased to be in conformance to local governmental quality and safety requirements. All materials purchased for production must be from qualified CIQ (China Inspection & Quarantine Bureau) suppliers.

(2) To ensure the quality of raw materials used in the production line, YHS has setup an in-house laboratory to carry out sampling checks on raw materials. Only materials meeting quality and free from toxic pollutants can be used in the production process.

(3) As a strategy to cultivate sustainable fishing farming in local community, YHS also leading a community initiative to setup a demo base to educate and train smaller fish farms in green and clean fish farming technique.

(4) Since about 70% of the products produced by YHS are for overseas export, 3rd party quality certification also needed on their products as requested by overseas customers (such as ISO-22000, GFSI).

Green Manufacturing

(1) As YHS is a seafood production house, a lot of products will need to be frozen or covered with ice. Although it is more costly, however, all ices used in the production line are edible and not industrial ices.

(2) Waste water treatment and recycling system is installed in the factory to ensure no pollution to the river after discharge.

(3) YHS factory is located next to river. Since there are live fish in the river, any dead fish discovered during daily inspection will trigger immediate stop of production.

(4) There are wastes produced during production process. Toxic waste is separated from regular waste and handover to qualified waste collector that is run by local government.

Green Distribution

(1) Most of their logistics needs are outsourced to external logistics service providers. The company has stipulated a minimum 5 containers per delivery in order to reduce carbon emission.

(2) All plastic bags used in the product packaging come with printing of "please dispose plastic bags into trash bin", this is to remind the consumers not to litter the packing bags after use.

Reverse Logistics

So far, there is no specific green measure under reverse logistics.

Key Drivers for GSCM Adoption

It is useful to understand why as a small enterprise with limited resources, YHS is interested and committed to adopt GSCM. The MD openly shared the following reasons during face to face discussion:

(a) As required by more and more customers to go green, it makes good economic sense for YHS to be green and clean especially in food industry. He has commented that: *"These days, most customers are quite direct in requesting us to be green before they give us any order…you will be surprised, not only the overseas customers, even our domestic clients also demand greener products too!"*

(b) Overall company branding and image enhancement - this company was awarded as one of the most famous brands in China since 2012 mainly because of its commitment in corporate social sustainability, as well as excellent product quality. The MD was proud to share that: *"As*

one of the most famous brands in China, we need to be as green as possible…also to be a good corporate citizen in corporate social sustainability…"

(c) YHS is determined to be a socially responsible enterprise in order to return something back to the community. Few years ago, they had setup a 200K RMB annual charity fund to support local fish farming industry on sustainable fish farming. The MD of YHS was quite excited to share this program which was started by him: *"With this funding, we are able to setup a seafood laboratory not far from this factory… every week, we have professors and graduate students from nearby universities coming to teach the local fish farmers how to increase their production using greener methods, this initiative is really well received and popular!"*

Major Barriers/Challenges in GSCM Adoption

One important question asked to the MD is about what challenges the company had encountered while trying to rollout these green SCM practices. The following are the major challenges faced by YHS in order of significance:

(1) Employee - YHS is located at the outskirt area of Fuzhou city, which is rather remote and less developed. It is very challenging to recruit high quality talents to join seafood production company which is less glamour as compared to IT or financial industry. It is even more difficult to ensure all employees following company green policies when many of them are from remote villages which may not have adequate awareness and appreciation on environmental sustainability. MD of the company has shared that*: "Just now when we tour the production floor, I believe you have also discovered that, our seafood industry is quite a smelly business…it is difficult to attract younger people to join us in such working environment…many of our workers are middle aged villagers staying near-by; most of them do not have high education qualification, they have no clue about global warming…"*

(2) Technological Innovation - Similarly to the challenge of employee hiring; as YHS is located in a small town in Ningde city, it is not easy to

obtain latest green technology. It can be very expensive for such technology to be installed in the factory if they are from overseas. According to the MD: *"I have visited some seafood factories in Taiwan and Japan, there are newer water treatment systems which can reduce the water consumption, however, I can't find any local dealer in China yet… maybe these new technologies are still too costly for us…"*

(3) Cost - Seafood industry is a traditional industry, it is facing steep competitive pressure from other producers and pursuing green SCM in the direction of sustainable seafood may increase overall production cost impacting overall profitability. This can be very challenging for SMEs like YHS to survive in a hyper-competitive business environment. The MD of YHS was honest to point out that: *"Although our company is doing well these few years, we also would like to do more for our living environment…but it is also true that, the seafood market is getting more and more competitive, my chairman has asked me to justify financially for every new green initiative proposed since last month…"*

(4) Customer - As YHS's final products are shipped to Australia, Singapore, Taiwan, Hong Kong as well as to Japan and Korea; these customers are supportive to green suppliers since they are embracing sustainable seafood. This was shared by the MD on customer: *"We have some good customers from overseas… maybe there are more stringent regulations in their home market on food imports, generally they are very supportive to our move into green supply chain"*

(5) Government – According to the MD: *"Government in China is very supportive to enterprises pursuing green management and sustainable seafood*". He also shared that, the local environmental bureau provides good technical support in the forms of training and financial assistance to local firms to ensure they stay compliant in environmental pollution prevention.

Green Human Resource Management

As shared by the MD, the biggest challenge of YHS in adopting GSCM is people related, it is vital for the company to implement green HRM to mitigate the problems. The following are the key measures launched so far:

Job Analysis

There is no specific requirement for each job position. However, YHS establishes a green management policy applied to all positions in the company; such as:

a) All machines and lightings to be off during breaks and off hours
b) Waste classification and separation during production
c) Minimizing waste during production

Recruitment & Selection

Recruitment and selection for certain jobs in YHS are based on qualifications and experiences of environmental management; for example, managers and engineers supporting waste water treatment system will need to possess relevant professional qualification.

Experience in ISO14001 or other similar EMS to be considered positively with higher starting salary. This is needed for employees' in-charge of internal ISO audit in the company.

Reward

Any employee with professional environmental management certification will receive salary increment. Either verbal recognition or monetary reward to be given to employee with good green performance, such as positive behavior in electricity or water saving during production.

Based on the MD: *"To hire good employees in seafood manufacturing industry is tough in this area, we need to do more to retain our existing employees and one way to achieve this goal is to incentivize them regularly when they perform well…"* He also shared about the team rewards for the workers on the production floor: *"To be frank, our salary and compensation is not as good as compared to big companies in Shanghai or Beijing… we introduced team*

rewards to attract our employees to stay with us as well as working together to achieve environmental sustainability…"

Induction

All new staff to be briefed on first week during face to face induction workshop. This is usually conducted by external consultant on company policies, such as green related procedures and work ethics. Based on the MD, this measure is to mitigate the challenges in hiring new employees: *"If I have enough money, I will hire experienced staff with better qualification… however, in reality, we should be lucky if there are applicants coming to us. It is required to conduct detailed induction workshop to brief them on all our policies in safety and environmental protection."*

Training

Each year, to ensure all employees fully embrace in environmental sustainability to meet customers' expectation, YHS organizes field trips for employees to visit companies that perform well in environmental conservation, this is useful for everyone to learn best practices on green management. The MD has shared that: *"We have many young workers coming from rural villages, this is their first job…when they see how other green companies running their operations effectively and efficiently, this can educate them better than reading from text books…"*

Some professional and managerial staff are sent to attend external training conducted by local universities or government agencies pertaining to latest green technology or regulatory changes.

Performance Evaluation

There are two key KPIs used in green management that are used to assess the environmental performance of the staff; electricity consumption and % of waste recycling. Although not all positions can be individually appraised based on these KPIs, group results are used to determine if individual performance is difficult to measure.

The MD said to the researcher*: "Good employees can help the company to achieve cost saving every day if they follow the correct work instructions to minimize wastage in raw materials as well as water… we need to measure their performance in waste prevention during annual performance review."*

Some of these GHRM measures are launched to overcome the challenge of hiring difficulty. Like most other SMEs in China, it is not easy for YHS to hire new recruits with good relevant qualification and experience. Hence, intensive induction workshop and trainings are provided to all new staff in order to equip them with adequate knowledge in environmental management and pollution control. Monetary rewards are also used to incentivize employees in achieving green targets especially in energy saving. This is equally important for staff retention and further enforcing the concept of eco-friendly supply chain in the company.

While implementing green SCM and green HRM, one interesting observation YHS had encountered is the difference in green acceptance between younger and older employees. Employees of younger generation are likely to learn and embrace these new procedures quicker than the older ones. As shared by the MD: *"Older staff require more time and regular communication/training to ensure they comply with green procedures"*

Based on the quote from MD: *"All employees are the core assets of YHS to make things happen. Without them, we will not be able to achieve anything…It is necessary to incorporate people related polices together with green supply chain practices to achieve real environmental improvement for our company".* In another word, GHRM and GSCM *"are inseparable in order to achieve positive green results".*

Observation

YHS is a SME located in a small city of South-East region of China. Being in the food industry, it is necessary to ensure the factory is clean and green so as to produce high quality seafood products for domestic and overseas consumption.

It is obvious that, GSCM is necessary to achieve this objective with the support of GHRM to mitigate people related challenges. Although many of the green practices implemented in YHS are common and basic; however, as shared by the MD, these are effective measures that help to drive the company towards environmental conservation and ensure zero pollution during operations.

Company: UFC

Introduction

UFC is a manufacturer of sugar-free sweeteners based in an industrial estate outside of Bangkok city. It was setup in 1998 by some major investors from Japan. The main products of this company are Sorbitol and Maltitol powder that used in the production of candy, beverage or bakery which are lower in calories. The final products of UFC are exported to many countries in different regions, primarily to Japan as well as China, South East Asia, Australia, Canada and USA.

With a modern manufacturing plant on a 13-acre site, UFC has 190 employees and is classified as medium enterprise in Thailand. Except a small percentage of the scientists and senior management staff that are from Japan, most of the staff were locally hired and have been with the company for many years with relatively strong employee loyalty. UFC has been certified with ISO -14001 since 2001, together with many other international quality certifications in food safety; such as GMP and ISO-22000.

In this case study, a set of semi-structured survey questions have been sent to the three managers of the company taking part in this research. They have answered the questions by filling up the form and returned during face-to-face interview session during Dec 2017. The following are the managers involved in this case study research:

- Quality Control & Assurance Manager – 28 years with the company
- Human Resource Manager – 2 years with the company.
- Production Manager – 16 years with the company.

Besides interviews, other secondary data were also used in this research; such as company website, internal documents of job descriptions (JD), standard operating procedures (SOP), product brochures and marketing materials.

Organizational Structure

UFC in Thailand is being led by a Factory Manager reports directly to the President of the Holding Company in Japan. He is being assisted by a Vice Factory Manager that directly supervising the entire day to day operations. An Executive Manager reports to the Vice Factory Manager has six main departments under him:

- Purchasing & Accounting
- QC/QA
- Production
- Distribution/Warehouse
- Admin/Safety
- Engineering

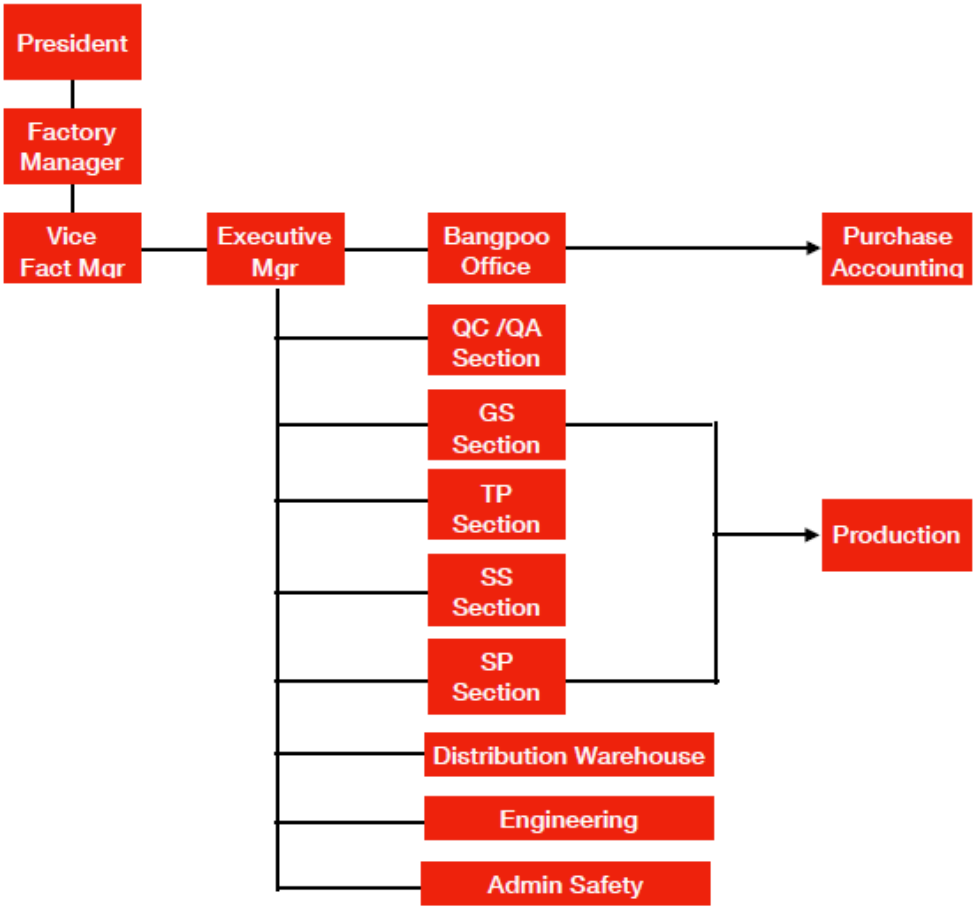

Figure (8) – Organizational Structure of UFC

Green Supply Chain Management

During on-site visit and information provided by the managers, the following are the key Green SCM practices implemented in the company:

Green Procurement

(1) Almost all suppliers for UFC are ISO-14001 as mandated by the company policy, except those smaller vendors providing services that are not core to the main supply chain activities.

(2) The quality assurance team in UFC conducts annual on-site audit on the main suppliers for both quality and environmental (noise, air and water contamination) related assessment.

Green Manufacturing

(1) UFC production plant practices production waste classification, all wastes generated during manufacturing process are classified under toxic, general and recycle.

(2) All recycle and toxic wastes are treated by qualified 3rd party waste processing vendor. In Thailand, all toxic waste processing vendors are regulated and certified by government.

(3) An annual waste control report is required to submit to Dept. of Industrial Works (DIW) under local environmental regulations. DIW is the official government agency overseeing factory pollution control in Thailand.

(4) Heat generated from the boiling process is converted to energy used in the factory. This is achieved by installation of natural gas powered boiler. This measure is to ensure the reduction of electricity usage in the production plant.

Green Distribution

(1) UFC has made some changes on the consolidation of goods delivery by using bigger trucks, so as to reduce carbon emission. Each trip of trucking has to carry at least 30 tons instead of 15 tons previously. For delivery of smaller orders, each trip has to carry at least 15 tons which is up from 12 tons few years ago.

(2) As UFC is located in industrial processing zone, shipping dept. has worked with logistics vendors to ensure multiple delivery/pickup to be carried out within the zone each day to improve trucking efficiency so as to reduce carbon emission.

(3) The company has stopped using plastic bags for their product packaging. Final products are either packed in paper bags or stored in recyclable containers.

(4) Another important measure on the green packaging is; instead of using ink printing or stickers, UFC has switched to using laser marking on the packaging two years ago to minimize environmental pollution.

Reverse Logistics

(1) UFC fully understood the importance of reverse logistics in order to ensure some of their packaging materials can be recycled and reused for both environmental conservation and cost reduction. Big drum containers that used to store final product of liquid form to be returned to UFC for reuse.

Key Drivers on GSCM Adoption

During the interviews, the managers were asked to name a few key drivers motivating UFC to implement Green SCM. The following are the inputs on key drivers:

(a) As required by customers – UFC currently exported around 80% of their total volume to Japan. As we all know today, Japanese customers are famous to be very demanding for greener and safer products, this has triggered UFC to pursue Green SCM relentlessly. The QC manager shared this during interview: *"Japan is more advance than us in Thailand, the customers over there are very environmentally conscious, they demand for greener products as we have to make changes to adapt…"*

(b) Company commitment – with the increasing awareness on environmental protection globally, going green is definitely helping UFC to enhance its company image and be recognized internationally as a socially responsible enterprise. As clearly stated in their company homepage as one of the key commitments: *"To serve our communities responsibly by protecting our natural ecology and utilizing environment-friendly technologies that makes optimum use of resources".*

Major Barriers in GSCM Implementation

During the discussion, the following list of barriers in order of significance were highlighted as major challenges impacting the implementation of Green SCM in the company:

(1) Technological Innovation: There are many new green technologies invented in food industry from Europe, Japan or USA. However, most of

them are still unavailable in Thailand. Even if they are brought into local market, it is usually very expensive that not suitable for SMEs in developing economies like Thailand. The production manager told the researcher: *"Our company sends us to overseas to attend trade exhibitions every year, I have seen many new technology in our industry that can save energy and produce less waste…however, most of them are still quite expensive and I would hope the price can come down soon…"*

(2) Employee: This company has been in business since 1988, many of the staff are very senior with long tenure. As compared to younger generation with better appreciation on environmental protection, it is sometimes difficult to change the mindset of these senior employees to embrace green policies. The HR manager acknowledged that: *"We are a great company, many of the pioneer employees stay with us since 1988 when we first opened…but this also give us some headache when our senior employees are less receptive to green procedures".*

(3) Government: Being a signatory nation on Paris Climate Agreement (1996), Thai government talks a lot about environmental conservation in recent years with new regulations passed in the parliament. However, so far there is limited financial support offered to SMEs in the country. The QC manager said about the government support: *"I would hope to see some tangible support from the government, such as low interest loans for us to purchase new production equipment or incentives to the industry for the companies to train their employees…"*

(4) Cost: There are tangible benefits in green management since waste from production process such as heat and recycle wastes can have financial return to UFC after project implementation. The production manager shared that: *"In the last few years, we have rollout some green initiatives to help us in cost reduction…if plan carefully and execute wisely, companies can enjoy benefits and yet go green!"*

(5) Customer: As majority of final products are exported to Japan (80%), customers in JP are very serious about green products and corporate

social responsibilities. In general, Japanese customers have no issue in paying premium for greener products.

Green Human Resource Management

In order to better implementing Green Supply Chain in the company, UFC also make adjustments in their human resource procedures so as to integrate these two management domains together for better results. The following are the key green practices implemented so far under HRM:

Job Analysis

- For some specific positions, there are requirements specified clearly under job descriptions; such as what control measures need to be in-place during emergency situations, in order to ensure no pollution to environment.

Recruitment & Selection

- Recruitment and selection for certain professional positions in UFC are based on qualifications and experiences of environment management; e.g., managers and engineers supporting boiler section, as well as jobs in QC/QA department.

- As an enterprise with strong corporate culture in environmental protection, UFC values highly on candidates with hand-on experience in ISO14001 or other similar environmental management systems. These candidates to be considered positively during recruitment process.

Reward

- No specific tangible reward given to employees with good performance in green management. However, games and quizzes on environmental conservation are played during annual year-end dinner, cash reward is given to participants with correct answers.

Induction

- Like in most companies, UFC also conduct induction workshop for all new staff. These new hires are to be briefed on first day on all relevant company policies and procedures, including green related measures.

- An environmental control manual with all green policies and procedures to be given to all new employees after the induction briefing.

Training

- Each year, UFC organizes field educational trips for employees to visit waste treatment vendors in order to understand the value of waste as well as the importance of waste recycling to greener living environment. According to the managers, these trips can be very useful for their staff to understand more about green management that will help to align with customers' expectation, as well as the develop their employees professionally: *"Every year, we try to organize a trip for new employees to visit waste recycling company, this is for them to appreciate the value and importance of waste classification and recycling. Our customers expect us to be green and it is everyone's responsibility to contribute towards greener living in our company…"*

- Selected professional and managerial staff are sent to attend external training conducted by Dept. of Industrial Works on new environmental regulations and technologies.

Performance Evaluation

- During annual performance appraisal, although there is no added weightage on staff with good performance on green control. However, points to be deducted on employees' appraisal with negative waste management performance. One respondent has this to share: *"When the employee is doing well, company will reward him greatly. If he is doing badly, I think it is fair that he should be reprimanded accordingly, especially if the poor performance is creating excessive wastage that causing environmental damage…"*

- Another manager also said that: “As we are serious about environmental sustainability, our management team is determined to measure green performance for every employee… all of them are given specific performance goals on energy and water consumption to be appraised annually.”

Based on the managers interviewed during case study discussion, the implementation of some of these GHRM practices are aimed at mediating the challenge of employees in the green adoption. Beside regular training and communication, all employees are required to visit waste treatment plants to understand the waste recycling process in order to appreciate the concept of environmental sustainability. As mentioned in earliest discussion, older employees are likely to take longer time to embrace green management: *“Senior employees may not fully appreciate the importance of environmental conservation as compared to the younger employees. More training and communication is needed…”*

UFC has introduced a punitive system on point deduction during annual performance appraisal if any negative behavior causing environmental pollution demonstrated by the employees.

The participants in this case study also shared about one core benefit of integrating Green HRM with Green SCM; that is:

> *“As employees are the important properties of our company, they make things happen. Hence, it is necessary to incorporate Green HRM together with Green SCM to achieve real green improvement for our company”.*

Additional Information on Energy and Water Consumption

The participants in this case study also shared that; according to the energy and water consumption records, UFC has achieved remarkable improvement over ten years in reduction of energy and water during production process.

	Electricity (Kwh/ton)	Natural Gas (Mmbtu/ton)	Water (Cum/ton)
2006	**135**	**3.60**	**9.0**
2017	**120**	**2.60**	**3.5**

Furthermore, the company has started to measure carbon emission in 2016, this important KPI will be used to determine the success or failure of company's green improvement initiatives annually. Overall, UFC maybe weak in collecting and monitoring performance measurement in the environmental control; however, they can be considered as one of the best enterprises to keep track of environmental related performance metrics as compared to other SMEs due to lack of resources.

Observation

In this case study, the three managers participated in the focus group interview shared that; strong support from top management in the company is a critical success factor of ensuring persistent and effective implementation of integrated GHRM and GSCM. As quoted by the QC manager:

"The top management of the company needs to be sincere and committed to environmental protection, this is the first and most important success factor for companies to go green!"

At the end of the focus group discussion, all three participants also encouraged other companies to start implementing integrated model so as to contribute to environmental sustainability for our living world.

Despite limited support from the local government, UFC can be considered as a success case among the three case studies carried out in Thailand. This can be observed by looking at the production plant with boiler energy exchange system, strong emphasis in production waste classification and recycling, as well as making changes to the product's packaging designs and materials. As discussed in the earlier section, this could be attributed to the strong corporate

culture of green management in UFC with influence from Japanese parent company.

Company: TFC

Introduction

TFC is a traditional manufacturing firm specializing in producing high quality PVC valves for building installation. This company has been in business for 28 years since 1990. As the founders were originally from Taiwan, there is still strong connection with Taiwan government and industry in technology and business exchange. Registered under Board of Investment (BOI) in Thailand, over 80% of their products are exported to overseas markets such as Europe, Japan and North America.

The manufacturing facility of TFC is located in Nakhon Pathom Province, which is at the outskirt of Bangkok. Currently, there are 150 employees in the company, many of them have been with TFC for more than 10 years. This company obtained ISO-9001 quality management certification in 2003 and ISO-14001 environmental management system in 2005. Due to the excellent quality of their products, TFC also won a national award of Thailand's Brand in 2007.

A set of semi-structured survey questions was given to the three management staff one month before on-site visit. The completed questionnaires were answered in advance and returned during face-to-face focus group discussion in Dec 2017. The three managers participated in this case study are as follows:

- HR Manager – 27 years working experience with this company
- Maintenance/Safety Manager – 26 years working experience with TFC
- Export/Import/Warehouse Manager – 2 years' service with this company.

Besides talking to the management staff of the company, participants from TFC also provided secondary data such as organization chart, work instructions, company manuals and product catalogue to be used in this research.

Organizational Structure

TFC is a family business, managed by the founder as Managing Director since day one. As outlined in the org chart (Figure 9), the company has four departments running core functions in Production, Safety, Human Resource and Quality Control. As this is a small and medium sized enterprise, manager in-charge of HR has been with the company since first year, he was also assigned to look after other sections such as molding, technical and maintenance teams. The children of the founder are also working in the company after completion of study at university, they are under development in preparation to take-over the company in the near future.

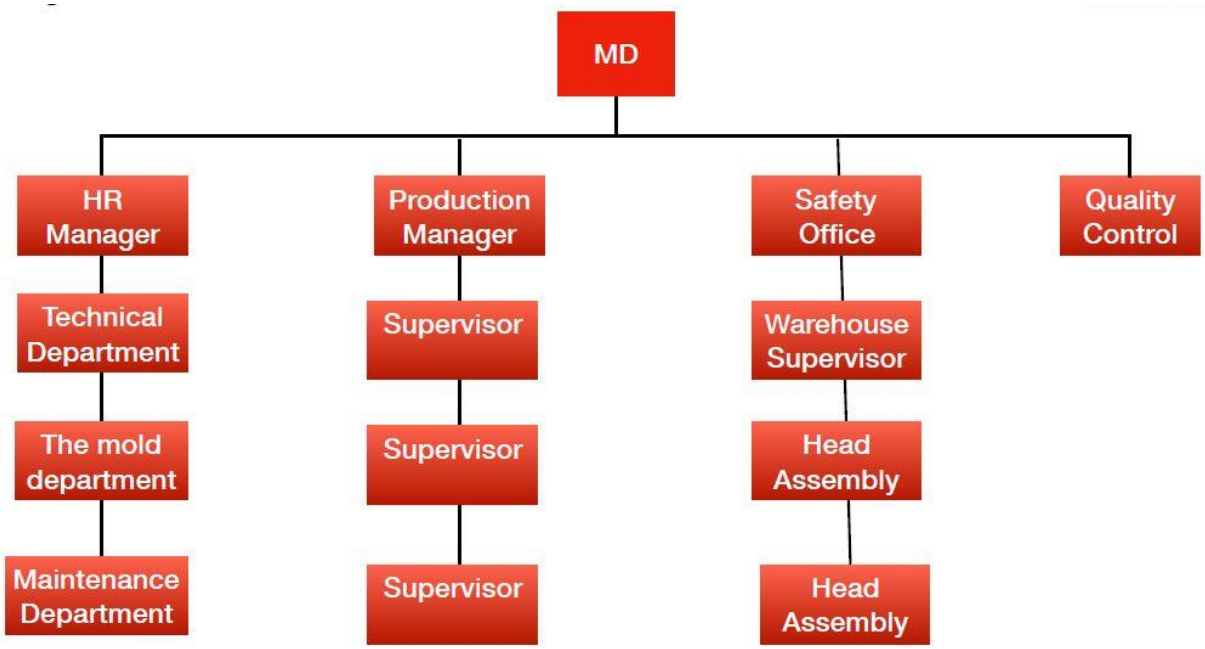

Figure (9) Organizational Structure of TFC

Green Supply Chain Management

To answer the research question on the implementation of green management practices in the company, participants from TFC have shared on the following valuable information during onsite interview under different components of supply chain management:

Green Procurement

Most of the suppliers used are either from Thailand or Taiwan. TFC adopts the following green procurement policies to ensure minimum environmental impacts on their purchasing activities:

(1) All new machines used in the factory have to be green certified with energy efficient control.

(2) Raw materials sourced must fulfill NSF (National Sanitation Foundation) standard under public health, safety, environment and sustainability assessment.

Green Manufacturing

TFC is very focused in ensuring any production activities will not cause harm to the environment. This can be observed during factory tour as the facility is well maintained at high standard similar to those manufacturing facilities in Japan. The following are the main green policies implemented on the production floor:

(1) The factory practices production waste classification – all wastes are disposed based on different categories - toxic, general and recycle.

(2) All recycle and toxic wastes are treated by qualified 3rd party waste processing vendor. In Thailand, toxic waste processing vendors have to be certified by local environmental bureau.

(3) Existing machines in the factory are fitted with energy saving invertor.

(4) Waste water and gas treatment systems installed in the factory to ensure no pollution to the environment during production.

Green Distribution

TFC implemented two specific measures to reduce environmental damage in the logistics activities:

(1) All vehicles arrive at the factory must turn off the engine in order to reduce carbon emission.

(2) All packaging materials used in TFC are in plain white color only. No coloring chemicals to be used in packaging materials.

Reverse Logistics

Instead of disposing the defective valves, TFC has committed to their customers to recycle or handle the disposal of defective products according to company's waste policy. Hence, these defective items can be returned to TFC for safe disposal.

Key Drivers for GSCM Adoption

The researcher also asked the three participants on why TFC decides to implement GSCM. The following are three main drivers discussed during face to face interview:

(a) Global trend in environmental conservation – The safety manager shared that: *"Under the on-going trend of protecting the environment globally, it is important for individuals, enterprises and all stakeholders to be green conscious so as to play a role in pursuing greener future for our earth…"*

(b) To improve competitiveness – More and more customers request for greener products. Some multinational clients have instituted very strict environmental protection policies when selecting suppliers. In order to stay competitively in this industry, TFC will have to adopt to GSCM to reduce any environmental impact when conducting their business activities. The warehouse manager disclosed that: *"Some big companies will conduct annual quality and sustainability audits in our factory, this is getting more and more common these days…"*

(c) To be socially responsible – Although Thailand is a developing country, the concept of Corporate Social Responsibility (CSR) has been spreading fast in the business community. As a manufacturing company registered under BOI, it is important for TFC to demonstrate socially responsible behavior as a good corporate citizen operating in Thailand, in order to receive continuous support from the government. The HR manager has this comment on CSR: *"CSR is getting bigger in Thailand now, we need to follow this trend and be a socially responsible corporate citizen…"*

Major Challenges in Implementing GSCM

In order to find out what are the main challenges in the implementation of GSCM, the respondents provided the following insights during interview (in order of importance):

(1) Cost – According to the warehouse manager, the unit price for greener materials is usually higher than the regular materials. On the average, the price difference can be around 20-30%. Similarly, buying an energy efficient production machine is also costlier than the one which is less energy efficient. Since SMEs are likely to be financially constraints, cost is a major barrier discouraging them from moving towards greener supply chain. The warehouse manager (she is the daughter of the company founder) shared with the researcher that: *"We have evaluated a few new machines that can give us better energy saving, however, they are quite expensive… we need to ensure the best use of funding since it is always limited…"*

(2) Customer – There are increasing demand for greener products. This is even more evident for parts used in the buildings such as water valves. Although there are large customers willing to pay premiums on green products, some customers are still reluctant to adsorb additional cost due to greener products. The HR manager acknowledged that: *"This is especially true for SME customers…difficult for us to increase pricing because of greener supply, they are also very price sensitive…"*

(3) Technological Innovation – While there are new green technologies developed in different industries, it is not widely available in Thailand. Such new technologies are also very expensive if brought into Thailand for testing, since they are still not widely used locally and lack economies of scale. The safety manager commented that: *"Some of our colleagues went overseas to participate in trade fairs, there are new green technologies in Germany and Switzerland can help us in reducing production waste…but they are still not available in Thailand yet… hopefully next year we will see them in Thailand".*

(4) Government - Thai government talks a lot about environmental conservation, there are also some new regulations passed in the parliament that help to promote environmental protection. However, there is minimum financial support given to SMEs in Thailand. This could be due to economic difficulty of the Thai government, since it is not a financially rich country like Singapore or Switzerland. This was raised by warehouse manager: *"We are not a rich country, there are many things that our government would like to do but no money… If possible, I hope they can help SMEs to apply more loans from the local banks".*

(5) Employee – Many employees in TFC have long tenure with the company. With a healthy mix of young and mature employees, most of them are receptive to company's green policies, collectively helping each other to create greener working environment. The HR manager agreed that: *"I am very proud to work with these staff, they are very open and cooperative with us in implementing additional measures in ensuring we have a clean and green working environment…"*

Green Human Resource Management

Another section of discussion with the three managers is about GHRM. According to TFC, they have launched some green initiatives in the area of human resource management to support the implementation of green SCM:

Recruitment & Selection - Experience in ISO14001 or other similar EMS to be considered positively during recruitment, however, there is no difference in wages or compensations.

Reward - No individual reward is given to employee that meet goal in environmental control, this is to ensure no misunderstanding and not to create negative feeling among the entire workforce. Since no one could achieve goal individually, all employees to be rewarded collectively if a specific green target is achieved, such as lower electricity consumption and waste reduction.

Induction - All new staff reporting to work on the first day to be briefed on all the company policies, including environmental control and safety related

procedures. They will also be given a company handbook on internal policies, clearly outline many of the green procedures; such as:

a) All vehicles must turn-off engine when park in the company facility.
b) Air-con and lighting must be off when not in use.
c) All machines to be shut down after work or during tea breaks.
d) Production wastes to be disposed under different categories.

When walking around the factory, many posters on environmental protection and work safety can be seen on the wall to educate and remind employees on practicing green behaviors at all time.

Training – The safety manager of TFC conducts regular internal workshops to all department heads in order for them to share and update their staff on latest environmental related government regulations; as well as to share some positive and negative examples on environmental pollution control. This manager shared that: *"To be on top of the changing regulations, as well as learning new green techniques, we need to provide regular training to our staff. It is better to have in-house training workshops during lunch break or after work to minimize any disruption to our production…"*

As the main challenge for TFC in green adoption is about cost, the company has rollout some of these GHRM practices to ensure cost reduction in pursuing eco-friendly. Many of the internal company policies on waste classification and recycling, together with energy saving are used to overcome the increasing operational costs.

During the interview, the respondents shared that there are some workers in the company still not fully bought into the idea of environmental conservation. This could be due to the upbringing and background of these employees as they may not get used to some of the green policies as required by the company: *"Employees from rural areas are likely weak in complying with company green policies. More training and communication is needed"* The HR manager supplemented further that: *"Continuous education and regular communication for our employees is key to ensure everyone is doing their fair share to ensure minimum environmental impact in our company".*

The participants from TFC were also asked to share what are some of the benefits in implementing green HRM to support green SCM. The following are the inputs from the team:

- *"GHRM and GSCM are complementary to each other to gain trust from employees, customers and community"*
- *"All supply chain activities are performed by human, injecting green practices in HRM will help to reduce risks in environment pollution"*

At the end of the focus group discussion, the safety manager summarized on their journey in going green: *"Ultimately, all employees feel good and proud about working in a green and healthy environment…"*

Observation

TFC can be considered as a Taiwanese subsidiary operating in Thailand. The founder and her family migrated to Bangkok almost 30 years ago and she has successfully built the company as a major supplier of PVC valves in Thailand today.

From the field study of TFC, it is obvious that, TFC is serious about environmental conservation. The production facility is well maintained and cleaned at all time. Many posters displayed on the wall to inform workers on the importance of safety as well as prevention of environmental pollution. The company has also applied and successfully certified under ISO-14001 in 2005 which can be considered very early for SMEs in Thailand. The cost of getting EMS certification and the efforts to make changes to internal processes to conform to ISO-14001 is a strong statement from TFC on its' commitment to green management.

From the information provided by the three participants, there are rooms for TFC to do more on GSCM and GHRM. They have also confirmed that, it is critical to integrate GHRM into the GSCM in order to be more effective in green management. On the successful implementation of GSCM and GHRM, one of the managers has advised on the following:

1. The implementation of GHRM and GSCM is good for employees as this can greatly enhance the awareness of environmental protection in the company, as well as to ensure everyone is in compliance to environmental regulations.
2. To ensure success, it is necessary to implement green management practices in phases. Trying to implement too much changes at one go will disrupt the organization and may cause undesirable consequences.

Company: THI

Introduction

Established since 1995, THI is a brass part manufacturer for air conditioner located near Bangkok in Thailand. The factory is based in Pathum Thani Province (north of Bangkok) with about 130 employees. This company was setup by a group of Japanese investors in the early 1990s in order to serve as the part supplier for major Japanese customers in air conditioning industry. Even until today, the senior executive management positions are still being occupied by Japanese that running the entire company.

THI's main products are distributor, flare nut, union, nut orifice that used in the air conditioners. Beside standard parts, they also accept customized design and fabrication based on customers' requests. THI supplies most of their products to Japanese customers based in Thailand and Japan; such as Daikin Industries, Amagasaki Pipe, Mitsubishi Electric Consumer and Okayama. In July 2007, THI successfully obtained the quality certification of ISO-9001. A year later in July 2008, the company has been certified under ISO-14001 under environmental management control.

With the help from local friend in Thailand, two managers from THI have agreed to be interviewed in this case study research. A semi-structured interview questionnaire was sent to these two participants a month in advance; followed by on-site factory visit in Dec, 2017 for face to face focus group discussion. The two managers from THI involved in this case study are:

- Production Control Manager – 16 years working experience in THI.

- QC Manager – 1 year of service in THI.

Besides talking to the employees of THI, data collection from secondary data sources such as company homepage, product brochures, news media, internal documents such as work instructions and standard operating procedures (SOPs) are also used in this research.

Organizational Structure

THI is a medium sized enterprise that has a flat organizational structure. The company is led by managing director with a few managers assisting him in running day to day operations. Two major functions under the organization are factory and general management. A factory manager is tasked to run the daily production with additional sales responsibility. General Manager is in-charge of office admin inclusive of finance and human resource. Other supporting departments are engineering and quality control which are key to ensuring product quality as well as the factory is running at optimum efficiency.

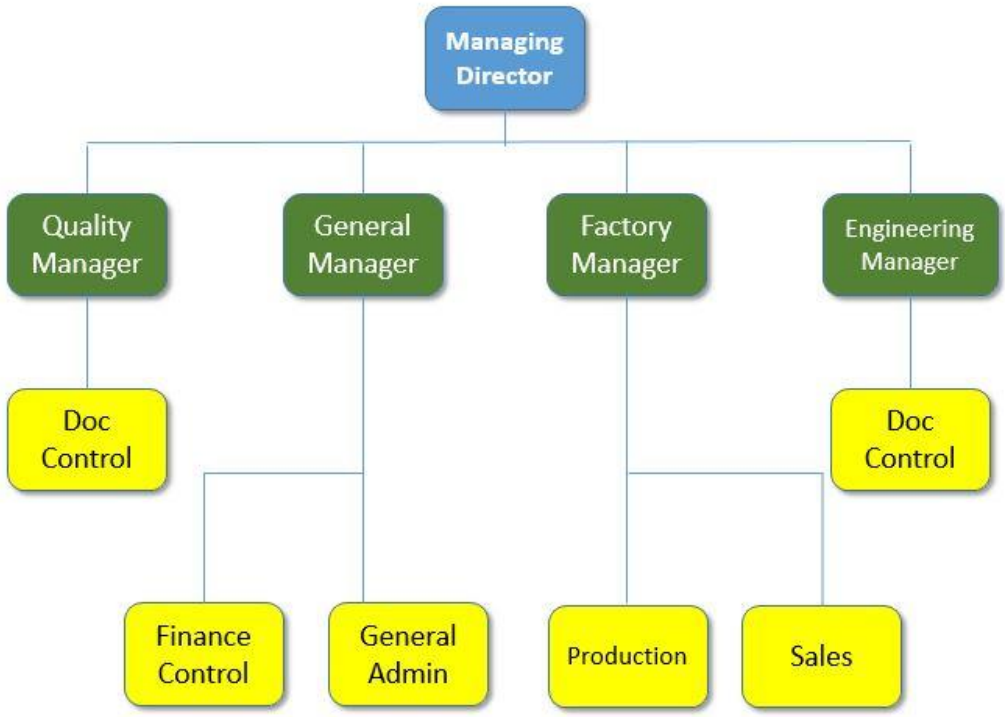

Figure (10) Organization Chart of THI

Green Supply Chain Management

The first part of the discussion with the two respondents is on Green SCM. As a ISO-14001 certified organization, THI has implemented various green management practices under different components of supply chain management:

Green Procurement

(1) Since most of the customers of THI are multinational corporations, they provide a list of approved suppliers to THI to source the raw materials and other necessary supplies. All of these qualified suppliers have to be ISO-14001 certified and undergoing environmental and quality control audits by the customers before they can be accepted under approved vendor list. THI can only procure parts and materials from these approved vendors to ensure consistency in quality with minimum impacts to the environment.

(2) THI also join some of these on-site quality and environmental assessment of the suppliers together with their clients. This is helpful for THI to learn more about the expectations of their major clients in the quality and environmental management.

Green Manufacturing

(1) In THI, there is strong emphasis on waste classification and recycle of their production wastes. Three categories of waste classification are used – general, toxic and recycle.

(2) All recycle and toxic wastes have to be carefully handled by licensed 3rd party waste management vendors. In Thailand, all waste management service providers have to be registered and licensed to ensure the wastes are properly handled in accordance to international standards of environmental control.

(3) Another important measure adopted by THI in the factory is to have LED lighting instead of the traditional incandescent lighting. It is at least five times more energy efficient that can help to reduce electricity and improve environmental conservation.

Green Distribution

(1) THI has a few trucks and vehicles used in the transportation. The company has implemented a policy to mandate all vehicles used have to pass Euro emission standard level 4 or higher. This is to ensure minimum emission pollution to the environment during logistics operations.

(2) THI also outsource some of their logistics and transportation activities to 3rd party logistics vendors. Similarly, all trucks and cars used by these vendors must conform to Euro-4 emission standard when providing services to THI.

(3) THI uses a lot of carton boxes in the distribution process. These boxes can be recycled by the customers without incurring severe environmental damages.

(4) Another green initiative adopted by THI is to re-design packaging requirements in order to minimize the use of plastic materials. All plastic packing materials can be returned to THI for recycling.

(5) THI has stopped using ink printing or stickers on their packaging materials. The warehouse operations switch to using laser marking to eliminate environmental pollution.

Reverse Logistics

(1) As mentioned under Green Distribution, all plastic materials can be returned to THI for recycling and reuse. The company will arrange with the transportation vendors to facilitate the return.

Key Drivers for Green SCM Adoption

It is clear that, THI has acknowledged the importance of implementing green management practices for their supply chain activities. Both participants from THI have been asked to share what are the main motivations for THI to adopt these green SCM initiatives? The following are the three key drivers:

> (a) Cost reduction – These green practices help to minimize production wastes as well as enable many of these wastes to be recycled. According to both managers, there are tangible cost benefits associated to waste reduction and recycling. As quoted by the production control manager: *"Our cost on waste disposal has dropped since implementing*

waste recycling control…also for our monthly electricity bill because of new LED lighting…"

(b) Global trend in environmental conservation – Undeniably, going green is a global trend in all countries around the globe. Business entities need to be quick enough to transform themselves in order to adopt green management in their day to day activities. The QC manager agreed that: *"Every day you read the news, the earth is getting warmer and the weather is getting more and more erratic…everyone needs to do their part to protect our earth before it is too late".*

(c) Company's goal – The executive management of the company are from Japan, they have set goal a few years ago for THI to be accepted domestically and internationally as a green enterprise. Hence, not only THI received ISO-14001 certification in 2008, they have since rolled out many green initiatives to further enhance environmental conservation. The production control manager shared that: *"Our big bosses are from Japan, they are very eco-conscious…They usually lead by example and all of us follow…"*

Major Barriers in GSCM Adoption

An important discussion in this case study is to find out what are the major obstacles for small enterprises to adopt Green Supply Chain Management in their operations. The following are the inputs from the two participants in order of significance:

(1) Cost – In general, special materials or new machines that are greener can be quite costly compared to the regular materials or machines. Any SMEs keen to incorporate green practices in their operations, they will need to assess the tangible benefits through ROI analysis before any investment to be made on green projects. The production control manager quoted this example: *"This is the same as buying a Tesla electric car which is usually more expensive than the traditional petrol car unless it is heavily subsidized by the government…"*

(2) Technological Innovation – There are more and more new green technology invented globally to support environmental conservation. However, there is limited awareness in Thailand, especially to the SMEs. More need to be done to ensure new technology can be adopted in SMEs such as active promotion and training. The QC manager remarked that: *"I have discussed with some suppliers on new machines that can have lower energy consumption… most of them are either too costly or not applicable to smaller enterprises as they are mainly for mass production…many of the local dealers are not keen to bring into Thailand".*

(3) Government - Government in Thailand is supportive in environmental conservation, there are also some new regulations passed in the parliament. However, these regulations are largely punitive; there is limited policy in offering financial support to SMEs in the country. *"I would hope the government can be more proactive in supporting SMEs in training, funding as well as education…"* as echoed by the QC manager during the interview.

(4) Employee – Basically, most of the employees in THI are supportive to company implementing green measures to improve environment. There is no major concern in this category. The production control manager agreed that: *"Our staff are quite receptive to new procedures and controls to ensure we stay green in our day to day production activities, we don't have much issues about the employees…"*

(5) Customer – Although the products manufactured by THI are supplied to Japanese companies based in Thailand; the final customers are actually from Japan, Europe and North America. Customers from developed countries are very supportive to using greener products to reduce carbon emission and environmental pollution. The production control manager said that: *"Some of our customers even provide training and technical support to us in order to have greener production in our factory… These are very good customers that truly concern about our earth".*

Green Human Resource Management

According to the two managers, THI has done well in human resource management to obtain full support from employees to ensure successful implementation of GSCM. Through open discussion with them, the following are the main people related measures launched in THI to support GSCM strategy:

Recruitment & Selection

For some specific positions, such as environmental control and safety officers, there are specific green related professional qualifications outlined under selection criteria. Also, THI highly values relevant working experience in ISO14001 or other similar EMS; candidates with such qualification likely to be considered positively.

Reward

All staff are welcome to submit any green related suggestion to improve production processes or final products. If the suggestion is accepted and implemented, the staff will be rewarded accordingly.

Induction

Similar to other companies, all new staff to be briefed on first day on all the company policies, including green related procedures. This is to support new hires to adjust to the working environment as quick as possible.

Training

Every month, THI schedules regular internal workshops for safety officer to share and update all employees on latest safety and environmental related government regulations; as well as to share some positive and negative examples to ensure no repeat of past mistakes. One manager shared that: *"Our production is operating in 3-shift for 6 days a week… it is difficult to release a big group of staff to attend external training. By having internal trainings, we have experienced managers to share with everyone on the latest government regulations and new operating procedures…"*

Company also support individual employees to undertake specific external professional courses in environmental control or industrial safety, as long as they are job related.

Performance Evaluation

No specific green measurement KPI used in the performance appraisal of the staff. Only general housekeeping measurements are used in the annual PA with the production workers.

The respondents from THI shared that, some of the GHRM measures used to serve as a mediating factor to overcome increasing operating cost due to greener supply chain. Company management is especially keen to hear from the employees on any good suggestions in cost reduction and pollution control, monetary rewards to be given to the employee when his or her suggestion is implemented.

When a question of what major challenges facing THI while implementing green HRM, both respondents shared that, in fact the employees working in THI are very cooperative and receptive to environmental conservation. Like in most advanced economies, most people living in Thailand (especially within the big Bangkok region) are strong supporters of greener living environment. One key point raised repeatedly during focus group discussion is frequent communication; as shared by the production control manager: *"Our management team conducts regular dialogue sessions to all employees on the sharing of internal green policies and external governmental regulations, this has helped to alleviate any doubt or confusion from our workers…"*

Based on the case study of THI, they have successfully integrated Green HRM into Green SCM. Both managers have shared the following three major benefits of merging these two green strategies together:

a) *"Any company that successfully implemented green management initiatives will create clean and healthy working environment for everyone working in the factory as well as for the surrounding community".*

b) As mentioned before, there are tangible cost reduction due to waste recycling. Based on the QC manager: *"These savings may not be significant, however, this is a good motivation for any SME thinking of introducing new green initiatives in their supply chain ops…"*

c) Employees working in a green enterprise usually feel good and proud of being part of an organization that is taking care of the environment. As according to the production control manager: *"This is critical in boosting the morale of our workforce as well as attracting better talents…"*

d) *"Ultimately, both GHRM and GSCM working together to achieve goals in environmental conservation"*

Observation

THI is a positive example of SME in Thailand paying attention in introducing green management strategies to improve environment as well as to mitigate carbon emission.

At the end of the interview, the respondents were asked to give any suggestions to other SMEs in the implementation of Green SCM and Green HRM, the following are the recommendations:

a) Professional consultant support - If there is sufficient funding, it is recommended for SMEs to seek help from professional consultants in the implementation of GHRM and GSCM, this is to ensure highest possible success rate in the project implementation.

b) Lead by example - One major success factor in any strategy implementation is for all management staff to lead by example in day to day operations to ensure green policies are strictly followed through that send positive signal to all employees. As quoted by the production control manager: *"Any simple activities every day can set good examples for our employees; such as using energy efficient vehicle, walking instead of driving for short distance commute or switch off light when leaving office…"*