GREEN SUPPLY CHAIN PRACTICES, ENVIRONMENTAL MANAGEMENT ACCOUNTING AND PERFORMANCE OF MALAYSIAN ISO 14001 MANUFACTURING ORGANISATIONS

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DEDICATION

To my beloved parents, Mr. Wong Nam Jee and Mdm. Loh Chung Thian.

To my beloved husband, Mr. Toh Chuan Kooi

To my beloved daughter, Miss Toh An Qi

“It always seems impossible until it is done, thank you for your unconditional love and support.

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ABSTRACT

Globalisation and the growth of sustainable development have forced organisations to act sensitively toward environmental issues. The implementation of green supply chain practices (GSCPs) and environmental management accounting (EMAs) are gaining popularity as a management approach in facilitating organisations to identify positive environmental improvement activities to reduce environmental impacts and induce cost-saving. Nevertheless, studies revealed the GSCPs and EMAs remain minimally practised. Many organisations are not aware the significance of both to environmentally sustainable development. Moreover, the investigation of cost-saving leverages from the implementing of GSCP and EMA practices to environmental performance (ENP) and economic performance (ECP) is still ongoing. Therefore, the objective of this research is to develop a structural framework based on the natural resources-based view (NRBV) theory to empirically test the relationship between GSCPs, EMAs, ENP and ECP. A quantitative survey was employed, and a questionnaire was developed to collect data from Malaysian ISO 14001 certified organisations that have been registered for more than three years with SIRIM QAS International. A total of 399 postage surveys were distributed to the environmental management representatives (EMRs) who were the targeted respondents for this study. A total of 121 completed questionnaires were returned and yielded a response rate of 30.3%. To test the hypothesised relationship proposed by this study, Partial Least Square Structural Equation Modelling (PLS-SEM) was employed and analysed via the SmartPLS3 algorithms. The findings revealed that GSCPs directly and positively related to both EMAs and ENP but not directly to ECP. The relationship between GSCPs and ECP was indirect through ENP. Further, EMAs directly and positively related to ENP and ECP, and ENP was directly and positively related to ECP. It is also found that the mediating role of EMA was significant between GSCPs and ENP. This study provides a new mediating relationship and empirical insights into the current development of GSCPs, EMA, ENP and ECP. The results provide empirical support for the economic gain in the form of cost-saving that can be leveraged from the collective implementation of GSCPs and EMA. These are beneficial analyses to achieve cost reductions by improving ENP. Operational managers, supply chain managers, accountants and environmental management representatives are offered insights into how GSCP and EMA contribute to improving environmental and economic performance by implementing GSCPs and adopting relevant and reliable information from EMAs. Both physical and monetary information were significant in identifying the key sustainability drivers when making decisions concerning environmental protection. The results provide insights for managers and accountants to support better environmental investment, environmental costing determinations and provisions for environmental risk assessments.

ABSTRAK

Globalisasi dan pembangunan lestari yang pesat telah memaksa organisasi untuk bertindak secara sensitif terhadap isu-isu alam sekitar. Amalan-amalan pelaksanaan rantaian bekalan Hijau (GSCPs) dan perakaunan pengurusan alam sekitar (EMAs) mendapat populariti sebagai satu pendekatan pengurusan yang membantu organisasi mengenalpasti aktiviti-aktiviti pemuliharaan alam sekitar yang positif untuk mengurangkan kesan alam sekitar dan mendorong penjimatan kos. Walau bagaimanapun, kajian menunjukkan GSCPs dan EMAs diamalkan secara minima. Kebanyakan organisasi tidak sedar tentang kepentingan kedua-duanya terhadap pembangunan alam sekitar yang mampan. Tambahan pula, kajian memanfaatkan penjimatan kos daripada melaksanakan amalan GSCP dan EMA prestasi alam sekitar (ENP) dan prestasi ekonomi (ECP) masih lagi dijalankan. Oleh itu, objektif kajian ini adalah untuk membangunkan rangka kerja struktur berdasarkan pandangan teori berasaskan sumber asli (NRBV) untuk menguji hubungan antara GSCPs, EMAs, ENP dan ECP secara empirikal. Kajian kuantitatif digunakan, dan borang soal selidik telah dibangunkan untuk mengumpul data daripada organisasi Malaysia yang mempunyai ISO 14001 dan telah didaftarkan lebih daripada tiga tahun dengan SIRIM QAS International. Sebanyak 399 kaji selidik telah dipos kepada wakil pengurusan alam sekitar (EMRs) yang telah disasarkan sebagai responden untuk kajian ini. Sejumlah 121 borang soal-selidik yang lengkap telah dipulangkan dan menghasilkan kadar respon sebanyak 30.3%. Untuk menguji hubungan seperti hipotesis yang dicadangkan oleh kajian ini, Permodelan Persamaan Struktur Separa Terkecil (PLS-SEM) digunakan dan dianalisis melalui algoritma SmartPLS3. Hasil kajian ini mendedahkan bahawa GSCPs secara langsung dan secara positif berkait dengan kedua-dua EMAs dan ENP tetapi tidak secara langsung dengan ECP. Hubungan antara GSCPs dan ECP adalah secara tidak langsung melalui ENP. Selanjutnya, EMAs secara langsung dan secara positif berkait dengan ENP dan ECP, dan ENP adalah secara langsung dan secara positif berkait dengan ECP. Selain itu, peranan pengantaraan EMA adalah signifikan di antara GSCPs dan ENP. Kajian ini menyediakan hubungan pengantaraan baru dan pemahaman empirikal dalam arus perkembangan GSCPs, EMA, ENP dan ECP. Keputusan ini memberikan sokongan empirikal terhadap keuntungan ekonomi dalam bentuk penjimatan kos yang boleh dimanfaatkan dari pelaksanaan bersama GSCPs dan EMA. Ini adalah analisis yang bermanfaat untuk mencapai pengurangan kos dengan memperbaiki ENP. Pengurus-pengurus operasi, akauntan, pengurus rantaian bekalan dan wakil-wakil pengurusan alam sekitar berikan pemahaman bagaimana GSCP dan EMA menyumbang kepada peningkatan prestasi alam sekitar dan ekonomi dengan melaksanakan GSCPs dan menggunakan maklumat yang relevan dan boleh dipercayai dari EMAs. Kedua-dua maklumat fizikal dan kewangan adalah signifikan dalam mengenal pasti pemacu utama kelestarian apabila membuat keputusan tentang perlindungan alam sekitar. Keputusan kajian juga menyediakan kefahaman kepada pengurus dan akauntan untuk kajian membantu persekitaran pelaburan, penentuan kos alam sekitar dan peruntukan-peruntukan bagi penilaian risiko alam sekitar dengan lebih baik.

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AVE	-	Average Variance Extracted
CC	-	Cooperation with Customer
CFA	-	Confirmatory Factor Analysis
ECO	-	Eco-design
ECP	-	Economic Performance
EMA	-	Environmental Management Accounting
EMR	-	Environmental Management Representative
EMS	-	Environmental Management System
ENP	-	Environmental Performance
EPS	-	Earnings Per Share
GP	-	Green Purchasing
GSCM	-	Green Supply Chain Management
GSCPs	-	Green Supply Chain Practices
IEM	-	Internal Environmental Management
IR	-	Investment Recovery
ISO	-	International Organisation Standardisation
LCA	-	Life-Cycle Analysis
NRBV	-	Natural Resource Based View
PLS	-	Partial Least Square
RBV	-	Resource Based View
RL	-	Reverse Logistics
ROA	-	Return On Asset
ROE	-	Return On Equity
ROS	-	Return On Sale
SC	-	Supply Chain
SCM	-	Supply Chain Management
SEC	-	Supplier Environmental Collaboration
SEM	-	Structural Equation Modelling
SPSS	-	Statistical Package for Social Science

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

With increasing global awareness of environmental protection, consumers are more environmentally-conscious and demanding environmentally friendly products (Hassan *et al.*, 2014; Habidin *et al.*, 2016). The growing environmental demands indicate an urgent need for organisations to adjust their strategies to incorporate environmental concerns into their businesses and organisations (Chin-Chun *et al.*, 2013; Martusa, 2013). As the pressure for environmental demands increases and more organisations are globalising, traditional product development strategies are not enough to satisfy the new global environmental requirements (Eltayeb *et al.*, 2010; Arlbjorn and Luthje, 2012). Therefore, it is crucial to develop effective environmental strategies to satisfy customers' needs and remain competitive.

Malaysia, as a rapidly developing Asian country, is facing many pressures and doubts in environmental and corporate sustainability issues (Goh and Nabsiah, 2010; Ong *et al.*, 2016). Success in handling environmental management issues may provide new opportunities to increase competitiveness and new ways to add value to core business programs (Abd Rahman *et al.*, 2014). It is challenging for organisations to balance the increase in environmental concerns toward the industrialised economy in Malaysia as it pursues an agenda of rapid modernisation and urbanisation.

The Eleventh Malaysia Plan (2016-2020) is breaking free from the conventional wisdom to develop green growth and encourage the 3Rs, that is; Reduce, Reuse and Recycle. Another initiative is the establishment of the Business

and Environmental Awareness by the Malaysian International Chamber of Commerce and Industry, together with the Business Council for Sustainable Development. These underscore Malaysian organisations' interest to devise strategies for recycling, reusing, and disposing of used and toxic discharge safely. However, despite government efforts and growing public awareness of environmental issues, environmental problems continue to persist.

Open-burning, black smoke emissions and water pollution are the major environmental offences committed by Malaysian organisations as reported by the Department of Environment (DOE) in 2016. Various environmental issues have also made headlines, such as the pollution incident in Sungai Selangor which caused several water treatment plants in the state to cease operations as a result of dumping industrial waste into the river (The Star online, 2014). A similar pollution incident occurred later in 2016 in Johor River which reported a high ammonia content due to the discharge of the palm oil mill's effluent (The Star online, 2016).

The waste disposal incidents have led to many arguments stating that organisations must move their businesses in a more environmentally sustainable direction. The pollution problem could be minimised if organisations adopt an environmental management system to dispose of industrial waste properly and safely. Furthermore, the applicable Environmental performance (ENP) and economic performance (ECP) measurements can help organisations focus on continuous waste reduction with the ultimate economic gain in cost-saving. These organisational performance can guide organisation to move in the right direction to achieve sustainable development and competitiveness (Lin *et al.*, 2011; Zhu *et al.*, 2012).

In Malaysia, the ISO 14001 certification is the most recognised environmental management approach employed by environmentally conscious organisations to manage its environmental aspects (Eltayeb *et al.*, 2011). The ISO 14001 Standard has received growing attention as it is perceived to assist organisations in developing systematic pollution prevention procedures to effectively handle the industrial wastes (Goh and Nabsiah, 2010; Arimura *et al.*, 2011; Di Noia and Nicoletti, 2016). According to Haslinda and Fuong (2010), the ISO 14001

Standard has been developed to provide organisations with a framework for Environmental Management Systems (EMS) with specific policies, procedures and auditing protocol for controlling operations that create waste materials or emissions.

The ISO 14001 certified organisations are recognised as having the ability to reduce environmental impacts over time by consistently correcting and adjusting the environmental reduction initiatives, policies, plans and objectives (Darnall, 2006; Arimura *et al.*, 2011; Coglianese and Nash, 2011). The operational capabilities developed through systematic EMS practices are expected to facilitate ISO 14001 certified organisations in integrating proactively with organisational strategic environmental reduction initiatives to improve environmental performance over time (Darnall, 2006, Arimura *et al.*, 2011, Curkovic and Sroufe, 2011, Heras-Saizarbitoria *et al.*, 2011).

According to Darnall *et al.* (2008), it is important to extend proactive environmental initiatives and pollution preventive actions to the supply chain instead of emphasising within the organisation's operational boundaries. The extension and establishment of the environmental conscious mindset to the entire value chain have the potential to reduce the direct and indirect environmental impacts of an organisation's final product (Darnall *et al.*, 2008).

Given the increasing demand for more environmentally friendly products and organisations going global, the challenges and pressures for more proactive involvements in environmental protection have pushed these ISO 14001 certified organisations to seriously consider adopting more comprehensive environmental management practices such as Green Supply Chain Practices (GSCPs) to integrate with the ISO 14001 existing EMS (Rusli *et al.*, 2013; Hassan *et al.*, 2016).

In the last two decades, GSCPs have emerged as a set of procedures that reduce the sources of waste or pollution by using the life-cycle assessment to cover the entire life-cycle of a product's environmental impacts (Eltayeb *et al.*, 2011; Zhu *et al.*, 2012; Trito *et al.*, 2013; Abd Rahman *et al.*, 2014; Hassan *et al.*, 2014). According to Rusli *et al.* (2013), GSCPs focus on minimising adverse environmental

impacts from the initial acquisition of raw materials up to the disposal of the product (Zhu and Sarkis, 2007; Eltayeb *et al.*, 2010; Chin-Chun *et al.*, 2012). Also, Hassan *et al.* (2016) contended that the implementation of the GSCPs benefits the ISO 14001 certified organisations by enhancing environmental responsibility and converting potential environmental threats into competitive opportunities or new businesses.

GSCPs are recognised to facilitate the ISO 14001 certified organisations lower environmental impacts throughout the entire supply chain (Darnall *et al.*, 2008; Zhu *et al.*, 2012; Hsu *et al.*, 2013). The application of GSCPs includes the intra- and inter-organisational environmental practices covering the upstream to downstream (Green *et al.*, 2012; Zhu *et al.*, 2012) by focusing on environmental reduction collaboration and reciprocity (Khairani *et al.*, 2016). The intra- and inter-organisational integration demonstrates the effectiveness of greening the supply chain to gain collaboration, commitment and competitive advantage in environmental protection (Cheng *et al.*, 2008; Abd Rahman *et al.*, 2014).

Several GSCPs have developed to reduce environmental issues, which include the internal environmental management system (IEM), green purchasing (GP), eco-design (ECO) and reverse logistics (RL). These GSCPs promote efficiency and synergy between business partners to minimise wastage to enhance environmental performance and are cost-saving (Green *et al.*, 2012; Zailani *et al.*, 2012; Zhu *et al.*, 2012).

It is the elimination of environmental risks and the continuous waste minimisation actions that enhance the ability of ISO 14001 certified organisations to reduce air emissions, wastewater and solid waste (Zhu *et al.*, 2012; Hassan *et al.*, 2016). According to Eltayeb *et al.* (2011), GSCPs captured the source of environmental reduction that aims at elimination, reduction and prevention of the pollutions associated with suppliers and customers. The literature suggests that implementing GSCPs assists ISO 14001 certified organisations in decreasing air emissions, wastewater, solid wastes and the frequency of environmental accidents improved ENP (Eltayeb *et al.*, 2011; Zhu *et al.*, 2012; Mahmood *et al.*, 2013; Abd Rahman *et al.*, 2014; Hassan *et al.*, 2014)

Furthermore, the continuous waste reduction actions led to decrease in costs associated with the material purchased, energy consumption, waste treatment, waste discharged and fines for environmental accidents which improved the organisations' ECP (Eltayeb *et al.*, 2011; Zhu *et al.*, 2012; Tritos *et al.*, 2013). The implementation of GSCPs can help ISO 14001 certified organisations improve environmental and economic performance (Eltayeb *et al.*, 2011; Mahmood *et al.*, 2013; Abd Rahman *et al.*, 2014; Mohd Rozar *et al.*, 2015). However, evidence shows that the adoption of GSCPs in Malaysian ISO 14001 certified organisations remains low (Eltayeb *et al.*, 2011; Conding *et al.*, 2013; Mahmood *et al.*, 2013).

Malaysia is moving forward in becoming an industrialised economy (Eltayeb *et al.*, 2011; Mokhtar *et al.*, 2016). It is necessary for Malaysian ISO 14001 certified organisations to proactively adopt GSCPs to improve ENP through the focus in reducing the sources of waste or pollution rather than reducing the environmental impacts after they have been created. Nevertheless, a lack of environmental information restricts organisations from being environmentally proactive (Eltayeb *et al.*, 2009; Zailani *et al.*, 2017). The information-related barrier has hindered Malaysian manufacturers from implementing green practices due to the complexity in measuring environmental effects and transmitting environmental-related information to all related parties (Lin and Ho, 2008; Wooi and Zailani, 2010; Shaharudin *et al.*, 2015; Zailani *et al.*, 2017).

The literature has recognised the importance of environmentally informative techniques that capture data to generate valuable resources to support managers in decision-making (Dixon *et al.*, 2012; Lopez-Valeiras *et al.*, 2015; Ong *et al.*, 2016). Environmental Management Accounting (EMA) is one of the key mechanisms that address diverse aspects of environmental management from the ISO 14001 Standards (Ong *et al.*, 2016). According to Mokhtar *et al.* (2015), EMA is a reliable source of information for its relevance in capturing environmental activities. It is widely accepted to help organisations identify, control, and improve their environmental and economic performance (Dayana *et al.*, 2010; Jamil *et al.*, 2015; Mokhtar *et al.*, 2016).

EMA has been introduced as a decision-making tool to support ISO 14001 certified organisations with valuable environmental information in decision-making, planning, monitoring and evaluating to ensure the achievement of the strategic environmental objectives (Ramli and Ismail, 2013; Mokhtar *et al.*, 2016; Ong *et al.*, 2016). According to Dayana *et al.* (2010), EMA provides relevant and reliable information to identify key sustainability drivers to facilitate the appropriation of the potential benefits in environmental protection and neutralising environmental threats (Kokubu and Nashioka, 2008; Vasile and Man, 2012; Jamil *et al.*, 2015).

EMA information supports the organisational environmental management strategies through the process of identifying, collecting, controlling, and analysing by using information from both the Monetary Environmental Management Accounting (MEMA) and Physical Environmental Management Accounting (PEMA) (Dayana *et al.*, 2010; Jamil *et al.*, 2015; Mokhtar *et al.*, 2016). Studies have proven that EMA measures organisations' environmental performance and/or cost-saving gained from the continuous improvement in environmental activities (Jamil *et al.*, 2015; Khalid *et al.*, 2015; Mokhtar *et al.*, 2016).

According to Burritt and Shcaltegger (2014), EMA provides information to enhance the interrelationship between supply chain partners and strengthen the collaboration for value-creation that potentially shift investment from pollution control toward pollution prevention (Burritt and Schaltegger, 2014; Mokhtar *et al.*, 2016). Both PEMA and MEMA support ISO 14001 certified organisations to better identify the activities that negatively impact the environment and positively improve the environment protection (Ramli and Ismail, 2013; Ong *et al.*, 2016). Hence, studies are yet to fully understand how EMA effectively supports GSCPs implementation with the true environmental cost estimations in decision-making for environmental protection with regard to lower environmental impacts, process/product design and performance evaluations (Lin and Ho, 2008; Ong *et al.*, 2016; Zailani *et al.*, 2017). This study argues that EMA postulates as an internal resource to integrate intra- and inter-organisational collaboration and performance evaluation to yield ENP improvement.

Drawing from the Natural Resource Based View (NRBV), GSCPs and EMA practices can be considered strategic resources that directly and indirectly improve organisational performance (Hart, 1995). The effective utilisation of an organisation's environmental resources develops valuable competitive capabilities that are not easy to duplicate for competitors.

GSCPs are the supply chain level imperatives, and its successful implementation depends on the abilities of the organisation to obtain environmental information-related to environmentally sustainable development and outcomes (Green *et al.*, 2012). These competitive strategic resources are believed to equip the ISO 14001 certified organisations with unique competencies and tacit capabilities to achieve sustainable environmental development.

To extend the understanding and analysis of the interaction of GSCPs, EMA, ENP and ECP, leverage from implementing GSCPs and EMA beneficial analysis, this study investigates the relationship between GSCPs and EMA and the improvement of environmental and economic performance. With this perspective and motivation, this study examines various mediating effects including the mediation of EMAs between GSCP and ENP, the mediating effects of ENP between GSCPs and ECP and the mediation of ENP between EMA and ECP. The ultimate economic payback through cost-saving measures is one of the important goals that this study must continue to exploit and explore, particularly among ISO 14001 certified organisations in Malaysia.

1.2 The ISO 14001 Certification Scenario in Malaysia

The manufacturing industry is considered a significant cause of environmental deterioration, where manufacturing operations such as sourcing, manufacturing and logistics are believed to be responsible for most environmental problems (Khairani *et al.*, 2016). Further, the current changes in environmental requirements that influence manufacturing activities have increased pressure on

Malaysian manufacturing to become more proactive and develop comprehensive environmental reduction initiatives (Eltayeb *et al.*, 2011; Mokhtar *et al.*, 2016).

With the mission to be an industrialised economy, Malaysia has shifted from material production to manufacturing. The manufacturing sector has been an important economic contributor to Malaysian gross domestic product (GDP). For the year 2017, Malaysia's economy remained resilient at 5.6% (Q4 2016: 4.5%). The Department of Statistics (2017) has shown that the main contributors to Malaysian GDP are the service sector with 54.2% followed by the manufacturing sector with 22.8%.

The manufacturing sector expanded by 5.6%, a faster pace than 4.7% in the previous quarter which was spearheaded by Electrical, Electronic and Optical Products with 7.9%, mainly in the production of printed circuit boards and semiconductors (DOSM, 2017). Petroleum, chemical, rubber and plastic products grew by 3.1% and vegetable, animal oils, fats and food processing by 8.2% (DOSM, 2107). Generally, the manufacturing sector was the major driver of Malaysia's economy. Figure 1.1 shows Malaysia's Gross Domestic Product First Quarter Report (2017).

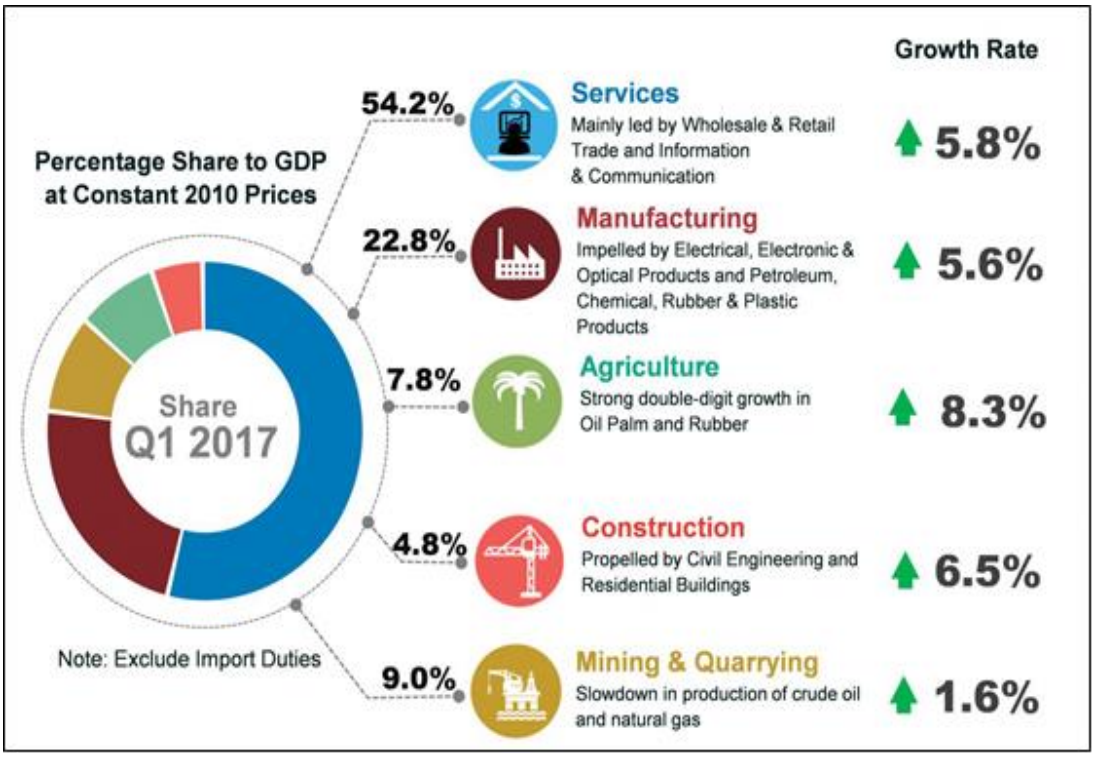

Figure 1.1: Gross Domestic Product First Quarter 2017

Source: Department of Statistics Malaysia (2017)

Industrial growth is pivotal to the progress and development of environmentally conscious manufacturers (Zailani *et al.*, 2017). It is crucial to balance environmental threats with the demands of economic modernisation that place competing demands on the responsibility toward the environment (Wooi and Zailani, 2010; Eltayeb *et al.*, 2011; Mahmood *et al.*, 2013; Hassan *et al.*, 2016). Consequently, the manufacturing organisations in Malaysia are obligated and expected to take on more advanced and sophisticated environmental management systems for environmental protection (Zailani *et al.*, 2017).

Respectively, the Malaysian government plays a significant role in the development of green industrialisation (Samuel *et al.*, 2013). The Ninth Malaysia Plan (2006-2010) focused on a green growth campaign emphasising long-term sustainable development. The Tenth Malaysia Plan (2011-2015) and Eleventh Malaysia Plan (2016-2020) aim to protect economic development growth, particularly in the private sector, toward more sustainable patterns of consumption and production. The manufacturing organisations in Malaysia are encouraged to continue improving its commitment and ability to mitigate environmental impacts

(Haslinda and Fuong, 2010). One of the most popular initiatives is the adoption of the ISO 14001 Standard which is recognised for its EMS practices on tracking, managing and improving organisational performance according to environmental goals and targets (Goh and Nabsiah, 2010).

The ISO 14001 certification has an excellent diffusion that is rooted in widespread awareness among organisations to achieve environmental efficiency and profitability. The ISO 14001 Standard stretches toward the reduction of environmental impacts over time by consistently correcting internal policies, assessments, plans, and taking actions to continuously strive to meet environmental objectives (Coglianese and Nash, 2001; Darnall, 2006; Arimura *et al.*, 2011). More than 319,324 organisations worldwide are certified by the ISO 14001 Standard as updated by the ISO survey (2015). Figure 1.2 shows the global ISO 14001 total in progress.

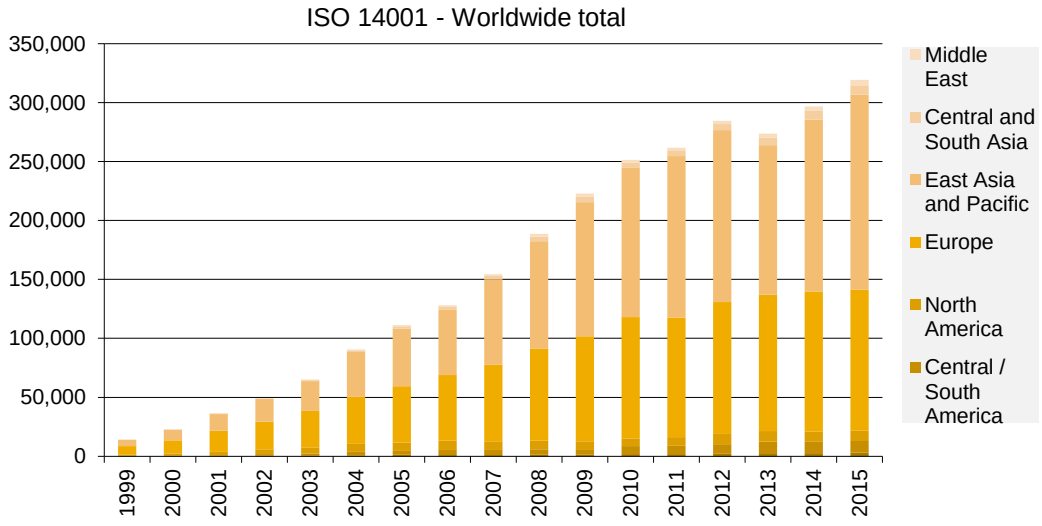

Figure 1.2: ISO 14001 Worldwide Total

Source: ISO survey (2015)

Similarly, in Malaysia, ISO 14001 certification has shown a significant increase in interest over the years. A total of 2,402 certificates were issued to organisations in 2015 with an average growth rate of 15% per year stem from 2005 to 2015. Table 1.1 shows the statistical progress of ISO 14001 certification in Malaysia.

Table 1.1: ISO 14001 Certification of Malaysia

ISO 14001 - East Asia and Pacific											
Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Malaysia	694	593	667	997	1,281	1,673	1,934	1,906	2,244	2,282	2,402

Source: ISO survey (2015)

The ISO 14001 Standard, published by the International Organisation for Standardisation (ISO) in 1996, is designed to be applied to any sized organisation and industrial sector (Goh and Nabsiah, 2010). It is not restricted to large corporations or those with economic leverage (Arifin *et al.*, 2016). The adoption of the ISO 14001 Standard demonstrates to its customers, suppliers, competitors and the regulators that the certified organisations are serious about environmental stewardship and committed to environmental protection (Goh and Nabsiah, 2010; Arimura *et al.*, 2011; Di Noia and Nicoletti, 2016).

In Malaysia, as the ISO 14001 certification is voluntary, the challenge for businesses is to play a proactive role in the acceleration and enhancement of the organisation's environmental management system. Particularly, the certification of ISO 14001 has been seen as an important indicator for Malaysian environmentally sensitive industries to manifest their commitment and responsibility toward environmental improvement (Goh and Nabsiah, 2010; Ong *et al.*, 2016).

According to the Malaysian SIRIM QAS International, ten business sectors registered with SIRIM, namely the agriculture and forestry; oil, gas and energy; electrical and electronic; IT and telecommunication; transport equipment and automotive; plant, machinery and utilities; chemical and material; food and consumer product manufacturing; construction and services. Among the reasons for these business sectors to adopt ISO 14001 certification is to fulfil customers' environmental requirements (Haslinda and Fuong, 2010), meet government environmental regulations (Haslinda and Fuong, 2010), reduce operational cost (Arifin *et al.*, 2016), enhance the company's image (Haslinda and Fuong, 2010) and improve environmental responsibility to proactively mitigate environmental impacts (Khor and Udin, 2012; Muslan *et al.*, 2013). In general, these industries generate

significant air emissions, wastewater, noise, pollutants, and toxic and hazardous waste to the environment (DOE, 2015).

As Malaysia has become one of the largest manufacturing bases in South-East Asia (Chin-Chun *et al.*, 2013; Eltayeb *et al.*, 2010), is certified with ISO 14001 guides environmental management with the controls necessary to address increasing environmental issues. The EMS of ISO 14001 has become an important practice to meet the new global environmental demands for environmentally friendly products, processes, systems and technologies (Vachon and Klassen, 2006; Darnall *et al.*, 2008; Eltayeb and Zailani, 2009; Zhu *et al.*, 2008).

Being recognised as an ISO 14001 certified organisation helps develop employee's awareness about environmental aspects; improves relations with relevant legal authorities; refines environmental objectives and management methods; enhances environmental responsibility and reduces operational costs (Goh and Nabsiah, 2010; Haslinda and Fuong, 2010; Curkovic and Sroufe, 2011). Its framework encourages self-organising and self-regulating (Curkovic and Sroufe, 2011), and enhances the groundwork for continuously integrating sustainable development principles into the existing business practices (Arimura *et al.*, 2011; Darnall and Kim, 2012; Testa *et al.*, 2014). According to Haslinda and Fuong (2010), the ISO 14001 certification accelerates Malaysian organisations' competency to retain global customers and thrive in a more critical global economy.

ISO 14001 certified organisations anticipate the responsibility, transparency, and engagement toward environmental protection. The certified organisations are recognised for their engagement in EMS which provides considerable value for business management with clear goals and targets toward environmentally sustainable development. Given this, Malaysian ISO 14001 certified organisations need to be examined for the extent to which they practice environmentally sustainable development.

1.3 Problem Statement

Malaysia is facing serious environmental challenges due to its rapid economic growth and industrialisation over the last decades (Eltayeb and Zailani, 2009; Seman *et al.*, 2012). The Malaysian government is taking the environmental protection seriously with the reinforcement for the Environmental Quality Act of 1974 and the Solid Waste and Public Cleansing Management Act in 2007. However, the Department of Environment (2016) reported a gradual increase in environmental offences that are mainly committed by the manufacturing industry. In the annual court case offence report (DOE, 2016), water pollution was recorded as the second highest offence after air pollution from industrial effluents. Such cases highlight the immediate need to address environmental issues.

The Environmental Protection Expenditure Report (2015) further showed a total of RM2.244 billion was spent on environmental protection. Bank Negara Malaysia (DOSM, 2015) reported an increase of 0.3% in environmental expenditure as compared to 2013. The operational and capital expenditure were the major contributors to environmental protection at 60.8% and 39.2% respectively. The statistics indicate cost investment was primarily focused on operational environmental protection activities, but environmental issues and offences were not improved commensurately to the efforts and investments.

A more comprehensive environmental reduction initiative such as the implementation of GSCPs is required to assist the Malaysian ISO 14001 certified organisations to effectively reduce the environmental issues. The Malaysian government has been promoting and financing high impact research on green technologies (Abdul Aziz *et al.*, 2018). The Ministry of Energy, Green Technology, and Water (KeTTHA) emphasises green growth to help organisations cut greenhouse gas emissions for each unit of economic growth to 35% from 2005 levels by 2030 (Green Technology Master Plan 2017-2030).

It is vital for organisations to continuously improve their environmental management competency and not do so solely to acquire ISO 14001 certification.

Green practices require conducting activities in ways that could enrich the environment and help organisations to better improve their environmental and economic performance (Abd Rahman *et al.,* 2014; Abdul Aziz *et al.,* 2018). Hence, this study examines the extent of GSCPs implementation among ISO 14001 certified organisations and investigates how the adoption of GSCPs impacts environmental reduction in emission, waste and environmental accidents which, in turn, help Malaysian manufacturing to reduce environmental offences and improve its pollution situation.

Consequently, it is a challenge for Malaysian ISO 14001 certified manufacturing organisations to balance the increasing environmental concerns and demands of an industrialised economy. Many organisations are striving to achieve competitive advantages by considering green aspects (Zailani *et al.*, 2017). Waste management, recycling, energy saving, process redesign for environmental and conserving material consumption were among the green initiatives adopted by organisations (Abdul Aziz *et al.,* 2018). Malaysia's Vision 2020 is targeting to become a developed nation and focuses on the aspect of environmental sustainability (Eleventh Malaysia Plan 2016-2020). Nevertheless, it is not easy for an organisation to integrate an environmentally friendly strategy into their business processes without considering the cost and resources.

Therefore, the GSCPs implementation that effectively integrates their supply chain resources to reduce waste, and is associated with the reduction in purchasing of materials, energy consumption and fines for environmental accidents, is the primary focus for organisations to achieve environmental competence. This study adopts the GSCPs that include intra- and inter-organisational environmental reduction initiatives involving the upstream to downstream supply chain to achieve the reduction activities.

Studies have shown positive ENP associated with the application of GSCPs in ISO 14001 certified organisations (Wooi and Zailani, 2010; Conding *et al.,* 2013; Hassan *et al.*, 2014). However, controversies still exist. The GSCPs is not significant to ENP (Green *et al.*, 2012; Laosirihongthong *et al.*, 2013; Murali *et al.*, 2013). For

instance, Eltayeb *et al.* (2011) showed fragmented results of GSCPs implementation whereby only ECO initiatives being positive toward ENP. Zhu *et al.* (2007) revealed that the adoption of GP and ECO achieved better ENP than other green practices. Further, Green *et al.* (2012), Tritos *et al.* (2013) and Abd Rahman *et al.* (2014) revealed a positive and mild relationship between GSCPs and ENP. These results recognised the positive relationship yet ambiguous and inconsistent results. Therefore, this study argues the IEM, GP, ECO and RL need to be implemented collectively to achieve positive ENP.

The ability of organisations to effectively reduce costs when implementing GSCPs is another vital reason for organisations to reduce environmental issues. Studies have shown that the cost-saving nature of GSCPs implementation led to improvements in ECP (Iraldo *et al.*, 2009; Zhu *et al.*, 2010; Testa and Iraldo, 2010; Green *et al.*, 2012; Wu and Lin, 2013). Adopting GSCPs contributes to cost reduction through material saving, lower energy consumption and less discharge or waste-handling (Eltayeb *et al.*, 2011; Abd Rahman *et al.*, 2014).

However, the adoption of GSCPs is seen as a trade-off between environmental reduction and cost investments (Green *et al.*, 2012; Zhu *et al.*, 2012; Zailani *et al.*, 2017). According to Soda *et al.* (2016), GSCPs is a cost-intensive initiative but not a cost-saving approach because the initial investments to cut down emissions and wastes are always required (Eltayeb *et al.*, 2011; Soda *et al.*, 2016). As such, implementing GSCPs reduces profitability. Eltayeb *et al.* (2011), Zhu *et al.* (2012) and Green *et al.* (2012) revealed a positive but moderate to mild relationship between GSCPs and ECP. Studies have yet to understand the coexisting conflicting views and relationship fully. Hence, this study argues that GSCPs embedded with waste reduction activities have a positive and direct relationship with ENP and ECP.

Nevertheless, Fraj *et al.* (2013) revealed an indirect link between ENP and ECP. Zhu *et al.* (2013) revealed improvements in ENP resulted in positive ECP and cost-saving of materials purchased, energy and water consumption, and waste-handling and waste discharge. The underlying relationships that explain the improvement of ECP through the improvement of ENP by leveraging the

implementation of GSCPs are rather limited in research (Zhu *et al.*, 2013). The understanding of the interactive relationship between GSCPs, ENP and ECP helps to explain the complexity of an organisation's strategic resources that potentially link and strengthen the relationships. Hence, this study investigates the intervention relationship between GSCPs, ENP and ECP and argues that ECP can be maximised through the improvement of ENP and thus the mediating effect of ENP is examined in this study.

The increasing interest in environmental and sustainability issues has led to the development of EMA which refers to the accounting information needs of managers in relation to corporate activities that affect the environment and economic performance. Zainal *et al.* (2017) showed evidence of MEMA and PEMA information being collected from the supply chain environmental activities. The empirical study by Latan *et al.* (2018) revealed a positive and significant influence between the corporate environmental strategy and EMA. Salim *et al.* (2018) further revealed that supplier integration has a direct positive impact on EMA implementation and the development of EMA.

However, Mokhtar *et al.* (2016) found no significant relationship between EMS and EMA as there is a lack of consideration for accounting aspects. The study of the relationship between the EMA and environmental initiatives especially in the supply chain is still very limited and fragmented. In this study, the GSCPs are integrated in various stages of development from raw material extraction to the end-of-life stage and argues that there is a positive and direct relation between GSCP and EMA.

Studies have found that implementing EMA helps overcome the limitations in conventional management accounting (Ramli and Ismail, 2013; Jamil *et al.*, 2015; Khalid *et al.*, 2015) as EMA provides environmental information based on the past, current and future information for assessing and monitoring environmental performance toward organisational strategy objectives (Viere *et al.*, 2011; Christ *et al.*, 2016; Jalil *et al.*, 2016; Ong *et al.*, 2016). It is imperative to obtain relevant and reliable environmental information when making decisions on environmental

improvement. Abdullah *et al.* (2016) revealed that insufficient environmental information hindered the adoption of the green product, green process and green system innovation initiatives in Malaysian manufacturing companies.

However, the use of environmental information is not so evident in decision-making for green-related practices. Evidence showed low adoption of EMA in Malaysian organisations (Jalaludin *et al.*, 2010; Mokhtar *et al.*, 2016). Jalaludin *et al.* (2010) and Mokhtar *et al.* (2016) revealed that empirical investigations of EMA are still understandably sparse. Hence, we are yet to realise the implementation of EMA and its positive impact on ENP and ECP.

In this study, monetary and physical environmental management accounting information was adopted to facilitate the managers in evaluating and benchmarking ENP and ECP. Both MEMA and PEMA support decision-making on environmental and cost reduction (Maletič *et al.*, 2014; Jalaludin *et al.*, 2010; Kasim *et al.*, 2016), energy and materials consumption (Jalaludin *et al.*, 2010), stimulate green design (Chan *et al.*, 2014) and cost-effective programs (Dayana *et al.*, 2010; Ramli *et al.*, 2013). Ong *et al.* (2016) confirmed that EMA is capable of identifying positive and negative environmental activities. Jalaludin *et al.* (2011) revealed the adoption of MEMA and PEMA have a significant and positive relationship with ENP and ECP. Therefore, this study argues that the adoption of EMA positively affects environmental and economic performance.

Studies on EMA have mainly focused on the direct relationship of EMA to ENP and ECP, but limited studies to consider EMA as complementary resources to mediate the sustainable strategies and organisational performance. Further, MEMA and PEMA information are yet to be included in an organisation's comprehensive strategy as a coherent set of decision-making measures. This study argues that both PEMA and MEMA can intervene the relationship between GSCPs and ENP through EMA. Hence, this study examines the mediating effect of EMA between GSCPs and ENP.

Several studies used the basic resource based viewed to explain GSCPs and EMA adoption as a general management initiative to influence the outcomes of environmental strategies (Eltayeb and Zailani, 2007; Ramli and Ismail, 2013; Shaharudin *et al.*, 2015). These studies failed to consider GSCPs and EMA as specific resources in environmental strategies and their effects on organisational capabilities (Al-Mawali and Lam, 2016; Mokhtar *et al.*, 2016). Masoumik *et al.* (2014) reiterated that GSCPs has a causal relationship with an organisational performance that stipulates the differential capabilities in stressing pollution prevention, product stewardship and sustainability. These three interconnected strategies are suggested under the NRBV framework (Hart, 1995).

In addition, practising GSCPs and EMA anticipates the unique complementary resources to develop internal tacit environmental knowledge to support the application of environmental responsibility within the supply chain (Masoumik *et al.*, 2014). Using NRBV to explain the relationship between GSCPs, EMA, ENP and ECP advance the knowledge of environmental challenges for the development of competitively valuable capabilities (Hart, 1995; Teece, 1998). As such, NRBV is relevant for explaining and analysing the relationship between GSCPs, EMA, ENP and ECP.

As a developing country, Malaysia prioritises economic development. However, the manufacturing sectors are continuously facing pressures and scrutiny for more environmentally friendly in sourcing, processing and disposing of products. Highlighted by the Department of Statistics Malaysia (2016), manufacturing sector was the highest contributor to environmental protection expenditure with an annual growth rate of 3.9% compared to 2010. Therefore, it is significant for balancing the environmental and economic performance when the demands of economic modernisation place competing demands on responsibility toward the environment. Previous studies, however, reflect the lack of a comprehensive framework that combines the GSCPs implementation, EMA information for environmental decision-making and the evaluation of the relationship between ENP and ECP. Therefore, this study expands the focus on the relationship of GSCPs, EMA, ENP and ECP of Malaysian ISO 14001 certified organisations.

1.4 Research Questions

Based on the above discussion, this study addresses the following research questions (RQ).

RQ1: To what extent is the GSCPs and EMAs in ISO 14001 certified manufacturing firms?

RQ2: Is GSCPs directly and positively related to EMA, ENP and ECP in ISO 14001 certified firms?

RQ3: Is EMAs directly and positively related to ENP and ECP in ISO 14001 certified firms?

RQ4: Is ENP directly and positively related to ECP in ISO 14001 certified firms?

RQ5: Does ENP mediate the relationship between GSCPs and ECP in ISO 14001 certified firms?

RQ6: Does ENP mediate the relationship between EMAs and ECP in ISO 14001 certified firms?

RQ7: Does EMAs mediate the relationship between GSCPs and ENP in ISO 14001 certified firms?

1.5 Research Objectives

To answer the research questions, this study has the below specific research objectives (RO):

RO1: To examine the extent of GSCPs and EMAs adoption in ISO 14001 certified firms.

RO2: To investigate if GSCPs implementation enhances EMA, ENP and ECP in ISO 14001 certified firms.

RO3: To investigate if EMAs implementation enhances ENP and ECP in ISO 14001 certified firms.

RO4: To investigate if ENP improvement enhances ECP in ISO 14001 certified firms.

RO5: To investigate the mediation effect of ENP on the relationship between GSCPs and ECP in ISO 14001 certified firms.

RO6: To investigate the mediation effect of ENP on the relationship between EMAs and ECP in ISO 14001 certified firms.

RO7: To investigate the mediation effect of EMAs on the relationship between GSCPs and ENP in ISO 14001 certified firms.

1.6 Scope of the Study

The population of this study is limited to 14001 certified manufacturing firms in Malaysia that have been registered for three years. The reason for selecting ISO 14001 certified companies is because the adoption of EMS prescribes the framework and guidelines to identify, document, control, monitor and assess environmental issues. ISO 14001 certified organisations are expected to be equipped with environmental attributes to seek more comprehensive green initiatives within their operations and are more likely to extend these to their supply chain partners. Also, ISO 14001 certified organisations are more likely to adopt GSCPs and waste management practices (Darnall *et al.*, 2008; Arimura *et al.*, 2011; Chin-Chun *et al.*, 2013).

A list of ISO 14001 certified companies is obtained from the SIRIM QAS International Malaysian Certified directory (SIRIM, 2017). The primary criterion is Malaysia manufacturing companies with ISO 14001:2004 certification that has been registered for three years or more. The main reason is to make sure the certified organisations have sufficient experience in environmental management practices and successfully passed the first SIRIM reassessment. The three years certification anticipates the certified organisations' ability to handle waste in accordance with the ISO 14001 Standard.

This study sends questionnaires to 399 from 683 ISO 14001 certified manufacturing organisations in Malaysia who registered for three years or more with SIRIM QAS International. According to Eltayeb *et al.* (2010) and Mahmood *et al.*

(2013), the Malaysian ISO 14001 certification organisations' response rate to GSCPs is expected to be low in the manufacturing sector. All the 399 samples that met the criteria were included in the study. Hence, a census method was adopted in sampling and data collection.

The target respondents are Environmental Management Representatives (EMR) who are considered as the most appropriate respondents to answer the questionnaire. EMRs are aware of the organisation's environmental commitments toward environmental improvements and are able to provide the information necessary for this study. In particular, this study examines the GSCPs and EMA as the primary factors influencing the ENP and ECP of the ISO 14001 certified manufacturing organisations in Malaysia.

1.7 Significance of the Study

The proposed framework identifies the relationship among GSCPs, EMA, ENP and ECP which has several implications as follows:

1) The intra- and inter-organisational integration represent the collective GSCPs competence to assist managers in building the strategic supply chain relationships to achieve ENP and ECP improvements.
2) The GSCPs and EMA implementation encourages collaboration and sharing of environmental information to enhance ENP and improve ECP.
3) The cost-saving objectives can be achieved via the better use of the EMA information to quantify the environmental impacts which, in turn, assist managers in identifying activities that positively improve ENP and ECP.

This study offers a number of insights into how supply chain managers and EMRs can successfully integrate their supply chain partners by implementing GSCPs and using EMA information to achieve sustainable organisational development. The successful adoption of GSCPs entails higher levels of inter-organisational collaboration and coordination in environmental protection activities. EMA, as an

environmental management tool, provides accurate and comprehensive environmental information when making decisions on environmental improvements and cost-saving initiatives. The findings of this study are significant to EMRs and supply chain managers in decision-making and benchmarking the organisational progress in collaborating the green initiatives with their supply chain partners.

Organisation operational managers are continuously challenged to lower operational costs and improve organisational performance. Successfully adopting GSCPs and EMAs anticipates the appropriate utilisation of organisational complementary resources to develop organisational capabilities to obtain performance advantages in terms of cost efficiency, pollution reduction and low material consumption (Yunus and Michalisin, 2016; Latan *et al.*, 2018). The results in this study are significant to operation managers to identify the production of specific accounting information that measures physical measurements to assess material flow, energy consumption and waste disposal in the supply chain. This study provides managerial and practical insights into EMA and GSCP as complementary resources to improve ENP and ECP.

Organisational accountants are seeking useful tools to provide relevant EMA information to improve ENP and ECP. EMA provides organisations with the true estimates of environmental costs while supporting managerial decision-making with regard to green purchasing, product life-cycle assessment, process/product design and performance evaluations. The findings of this study are significant to organisational accountants because it provides empirical evidence of EMA as a complementary tool in identifying and allocating environment-related costs to the environmental protection activities. Additionally, the transparency of the EMA information through the implementation of GSCPs assists accountants in developing better provisions for environmental risk assessments, environmental costing determinations, environmental investment decisions and compliance with environmental accounting regulations. This study provides practical insights into facilitating EMA when implementing GSCPs to improve ENP and ECP benchmarks.

The ISO 14001 certified organisations' ability to simultaneously develop and adopt various types of GSCPs and EMAs are sources of competitive resources that help advance the understandings of NRBV. This study examines the mediating effects of EMA and ENP between GSCPs and ECP and explains the resources used to support the green initiatives within the supply chain to enhance cost-saving in an organisation. It is crucial to examine how these resourceful capabilities are developed to stress the importance of an organisation's competitive advantage to yield sustainable development. The findings of this study benefit the Malaysian ISO 14001 certified organisations by providing managerial and practical insights into the adoption of GSCPs and EMA as valuable resources for developing environmental competency.

This study seeks to add to the body of knowledge by providing a new mediating relationship and empirical insights on the current development of GSCPs, EMA, ENP and ECP. Hence, this study provides operational managers, supply chain managers, accountants, and EMR practitioners the managerial and practical insights of how GSCPs and EMA act as key strategic practices to influence an organisation's ENP and ECP with an ultimate cost-saving advantage.

1.8 Operational Definitions

Following are the operational definitions for the current study.

1.8.1 Green Supply Chain Practices (GSCPs)

GSCPs which include of internal environmental management (IEM), green purchasing (GP), eco-design (ECO) and reverse logistics (RL) are environmental initiatives to reduce, reuse, and recycle materials using processes that have lower environmental impacts. It is integrated into all stages of production including the selection of suppliers, the supply of raw materials, product design, manufacturing, distribution and disposal. The focus on waste management is to maximise the

efficiency of cost and resources throughout the supply chain with the aim to improve the environmental and economic performance (Ninlawan *et al.*, 2010; Perotti *et al.*, 2012).

1.8.2 Internal Environmental Management (IEM)

IEM is a proactive practice that improves environmental management systems with the aim of reducing the amount of effluent by systematically redesigning the manufacturing process using an environmental policy and plan. Its objectives are to reduce internal environmental impacts, provide resources and training to workers, check implementation progress through systematic auditing, correct deviations from goal attainment and instigate management reviews to ensure the environmental goals are being reached (Sarkis, 2012; Zhu *et al.*, 2012; Tritos *et al.*, 2013).

1.8.3 Green Purchasing (GP)

GP refers to the procurement of materials that have a reduction effect on environmental concerns when comparing with the competing materials that serve the same purpose. GP aims to ensure the purchased products do not contain environmentally undesirable components and ensure suppliers comply with environmental objectives (Eltayeb *et al.*, 2011; Sarkis, 2012; Chin-Chun *et al.*, 2013).

1.8.4 Eco-design (ECO)

ECO is an environmentally friendly attempt of using the philosophy of design in physical objects that are built with an environmental conscious mindset. Using the life-cycle assessment, ECO ensures that environmental risks are captured at the

initial design stage (Conding *et al.*, 2012; Green *et al.*, 2012) and produces products that are energy efficient, hazard free and contain recyclability attributes (Eltayeb *et al.*, 2010; Zailani *et al.*, 2012).

1.8.5 Reverse Logistics (RL)

RL is the recovery practice to discard products or packaging for recycling, reusing, remanufacturing, repairing, or disposing. The product travels in a reverse supply chain network to claim used and defective products from customers and suppliers (Zhu *et al.*, 2008; Khor and Udin, 2012).

1.8.6 Environmental Management Accounting (EMA)

EMA refers to the provision and analysis of monetary and physical EMA information to support internal environmental management processes (Dixon *et al.*, 2012). It is a concept of sustainability management which comprises a set of accounting tools and practices to support managerial decision-making on environmental and economic performance (Jamil *et al.*, 2015). EMA is defined as a decision-making tool that enhances the organisational investment decision-making process by identifying, collecting, controlling, analysing and using environmental cost information on materials, energy, and waste within the decision process (Viere *et al.*, 2011; Christ *et al.*, 2016; Jalil *et al.*, 2016; Ong *et al.*, 2016b).

1.8.7 Monetary Environmental Management Accounting (MEMA)

MEMA refers to the supply of financial information to management about the environmental impact of its activities. It is information about environmental-related cost, earning and saving, and is measured in monetary value (Hassan *et al.*, 2014; Jamil *et al.*, 2015; Khalid *et al.*, 2015).

1.8.8 Physical Environmental Management Accounting (PEMA)

PEMA refers to the supply of information to management that accounts for the organisation's impact on the natural environment about the use, flows and destinations of energy, water and materials, measured in physical terms such as kilograms, tonners, kilowatt hours and decibels (Hassan *et al.*, 2014; Jamil *et al.*, 2015; Khalid *et al.*, 2015).

1.8.9 Environmental Performance (ENP)

ENP is the measurement used by organisations to measure the ability of an organisation to reduce air emissions, effluent, solid waste and environmental accidents while decreasing the consumption of hazardous and toxic materials (Zhu *et al.*, 2008). ENP aims to reduce environmental impacts and generate cost savings that reflect an organisation's ability to satisfy demands for environmentally sustainable development (Eltayeb *et al.*, 2011; Green *et al.*, 2012).

1.8.10 Economic Performance (ECP)

ECP is the measurement used by organisations to measure the ability to reduce costs associated with the purchase of materials, energy consumption, waste treatment, waste discharge and fines for environmental accidents (Zhu *et al.*, 2008a; Heras-Saizarbitoria *et al.*, 2011; Green *et al.*, 2012).

1.8.11 ISO 14001 Standard

ISO 14001 is an internationally recognised system that stretches the reduction of environmental impacts over time by consistently collecting internal policies, assessments, plans, and implementing actions. The aim is to support environmental

protection initiatives and prevent pollution while balancing socio-economic needs (Coglianese and Nash, 2001; Darnall, 2006; Arimura *et al.*, 2011).

1.8.12 Supply Chain Partners

Supply chain partners are the independent firms involved in manufacturing a product including the raw material suppliers, component producers, product assemblers, wholesalers, retailer merchants and distributors are all members of a supply chain (Mollenkopf *et al.*, 2007; Viere *et al.*, 2011; Sarkis, 2012).

1.8.13 Natural Resource Based View (NRBV)

NRBV is a theory of competitive advantage based on a company's relationship to the natural environment (Hart, 1995). NRBV articulates the relationships within the organisation's environmental resources, capabilities, and competitive advantage (Hart, 1995; Shi *et al.*, 2012). It posits that resources lead to the development of unique organisational capabilities to achieve sustainable environmental performance (Barney, 1991).

1.9 Organisation of the Thesis

This study is structured in chronological chapters. Chapter 1 reviews the introduction and background of the study including the problem statement, research questions and objectives, the scope and significance of the study. Chapter 2 reviews the relevant literature on ISO 14001 certification organisations in Malaysia and examines the definition and concept of GSCM, GSCPs, EMA, ENP and ECP. An outline of GSCPs including IEM, GP, ECO and RL is described. Organisational performance as benchmarked by ENP on ECP is also reviewed.

On top of that, EMA information detailed to MEMA and PEMA is reviewed. This chapter reviews the significance of NRBV to GSCPs and EMA and their underlying theoretical foundations. The chapter concludes by detailing the research hypotheses and research model. Chapter 3 the details of the research philosophy and design. This chapter reviews the research approach and method of data collection. The Statistical Package for Social Science (SPSS) is used to analyse the descriptive statistics and the Structural Equation Modelling (SEM) is used to analyse the measurement model and structural model. Factor analysis, reliability and validity are also discussed. Chapter 4 analyses the findings that include testing the hypotheses and mediation relationships. Chapter 5 concludes the study by summarising the key findings, detailing its contributions, identifying its limitation, and offering suggestions for future study.

REFERENCES

Abd Rahman, A., Ho, J. A., & Rusli, K. A. (2014). Pressures, green supply chain management practices and performance of ISO 14001 certified manufacturers in Malaysia. *International Journal of Economics and Management, 8*(spec.), 1-24.

Abdullah, M., Zailani, S., Iranmanesh, M., & Jayaraman, K. (2016). Barriers to green innovation initiatives among manufacturers: the Malaysian case. *Review of Managerial Science, 10*(4), 683-709.

Ahmad, K., & Mohamed Zabri, S. (2015). Factors explaining the use of management accounting practices in Malaysian medium-sized firms. *Journal of Small Business and Enterprise Development, 22*(4), 762-781.

Albelda, E. (2011). The role of management accounting practices as facilitators of the environmental management: Evidence from EMAS organisations. *Sustainability Accounting, Management and Policy Journal, 2*(1), 76-100.

AlKhajeh, M. H. A., & Khalid, A. A. (2018). The Relationship of Implementing Management Accounting Practices (MAPs) with Performance in Small and Medium Size Enterprises. *Journal of Accounting and Auditing: Research & Practice*, 2018 (750324).

Al-Mawali, H., & Lam, T.-D. (2016). Customer Accounting and Environmental Uncertainty: Sequential Explanatory Study. *International Review of Management and Marketing, 6*(3).

Ali, F., Rasoolimanesh, S. M., Sarstedt, M., Ringle, C. M., & Ryu, K. (2018). An assessment of the use of partial least squares structural equation modeling (PLS-SEM) in hospitality research. *International Journal of Contemporary Hospitality Management, 30*(1), 514-538.

Amrou, A., & Klassen, R. D. (2010). The impact of supply chain structure on the use of supplier socially responsible practices. *International Journal of Operations & Production Management, 30*(12), 1246-1268.

Anbumozhi, V., & Kanda, Y. (2005). Greening the production and supply chains in Asia: Is there a role for voluntary initiatives. *IGES Kansai Research Centre KRC*.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological bulletin, 103*(3), 411.

Andersson, R., Eriksson, H., & Torstensson, H. (2006). Similarities and differences between TQM, six sigma and lean. *The TQM Magazine, 18*(3), 282-296.

Angell, L. C., & Klassen, R. D. (1999). Integrating environmental issues into the mainstream: an agenda for research in operations management. *Journal of Operations Management, 17*(5), 575-598.

Arifin, K., Ismail, Z. S., Juhari, M. L., Razman, M. R., & Ahmad, M. (2016). Implementation of ISO 14001 in controlling environmental issues and its effect towards increasing costs amongst organisations in Malaysia. *Journal of Food, Agriculture and Environment, 14*(2), 147-151.

Arimura, T. H., Darnall, N., Ganguli, R., & Katayama, H. (2016). The effect of ISO 14001 on environmental performance: Resolving equivocal findings. *Journal of environmental management, 166*, 556-566.

Arimura, T. H., Darnall, N., & Katayama, H. (2011). Is ISO 14001 a gateway to more advanced voluntary action? The case of green supply chain management. *Journal of Environmental Economics and Management, 61*(2), 170-182.

Arlbjørn, J. S., & Lüthje, T. (2012). Global operations and their interaction with supply chain performance. *Industrial Management + Data Systems, 112*(7), 1044-1064.

Åstebro, T., & Serrano, C. J. (2015). Business partners: Complementary assets, financing, and invention commercialization. *Journal of Economics & Management Strategy, 24*(2), 228-252.

Azevedo, S. G., Carvalho, H., & Cruz Machado, V. (2011). The influence of green practices on supply chain performance: a case study approach. *Transportation Research Part E: Logistics and Transportation Review, 47*(6), 850-871.

Azmin. (2014, October 14). Sungai Selangor pollution incident caused by industrial waste. *The Star Online,* http://www.thestar.com.my/news/nation/2014/2010/2012/sungai-selangor-azmin/#jEHw2012J2014A2012QeVlCmc.2099.

Babbie, E. (2015). *The practice of social research*: Cengage Learning.

Bajdor, P., & Grabara, J. K. (2011). Implementing "Green"elements into the supply chain - the literature review and examples. *Annales Universitatis Apulensis : Series Oeconomica, 13*(2), 584-589.

Barclay, D., Higgins, C., & Thompson, R. (1995). *The Partial Least Squares (pls) Approach to Casual Modeling: Personal Computer Adoption Ans Use as an Illustration*.

Barla, P. (2007). ISO 14001 certification and environmental performance in Quebec's pulp and paper industry. *Journal of Environmental Economics and Management, 53*(3), 291-306.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management, 17*(1), 99-120.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*(6), 1173.

Beamon, B. M. (1999). Designing the green supply chain. *Logistics information management, 12*(4), 332-342.

Becker, J.-M., Klein, K., & Wetzels, M. (2012). Hierarchical latent variable models in PLS-SEM: guidelines for using reflective-formative type models. *Long Range Planning, 45*(5-6), 359-394.

Bennett, M., Schaltegger, S., & Zvezdov, D. (2011). Environmental management accounting *Review of management accounting research* (pp. 53-84): Springer.

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

Brammer, S., & Pavelin, S. (2006). Voluntary environmental disclosures by large UK companies. *Journal of Business Finance & Accounting, 33*(7-8), 1168-1188.

Bryman, A. (2016). *Social research methods*: Oxford university press.

Buniamin, Sharifah (2010). The quantity and quality of environmental reporting in annual report of public listed companies in Malaysia. *Issues in Social and Environmental Accounting, 4*(2), 115-135.

Burritt, R., & Schaltegger, S. (2014). Accounting towards sustainability in production and supply chains. *The British Accounting Review, 46*(4), 327-343.

Burritt, R. L., Hahn, T., & Schaltegger, S. (2002). Towards a comprehensive framework for environmental management accounting—Links between business actors and environmental management accounting tools. *Australian Accounting Review, 12*(27), 39-50.

Burritt, R. L., Schaltegger, S., Bennett, M., Pohjola, T., & Csutora, M. (2011a). *Environmental management accounting and supply chain management* (Vol. 27): Springer Science & Business Media.

Burritt, R. L., Schaltegger, S., Bennett, M., Pohjola, T., & Csutora, M. (2011b). Sustainable supply chain management and environmental management accounting *Environmental management accounting and supply chain management* (pp. 3-20): Springer.

Byrne, B. M. (2013). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*: Routledge.

Cepeda, G., Nitzl, C., & Roldán, J. L. (2018). Mediation analyses in partial least squares structural equation modeling: Guidelines and empirical examples. *H. Latan, H., & R. Noonan (Eds.), Partial least squares path modeling: Basic concepts, methodological issues and applications. New York: Springer*.

Chan, H. K., Wang, X., & Raffoni, A. (2014). An integrated approach for green design: Life-cycle, fuzzy AHP and environmental management accounting. *The British Accounting Review, 46*(4), 344-360.

Chan, R. Y. (2005). Does the Natural-Resource-Based View of the Firm Apply in an Emerging Economy? A Survey of Foreign Invested Enterprises in China*. *Journal of Management Studies, 42*(3), 625-672.

Cheng, J.-H., Yeh, C.-H., & Tu, C.-W. (2008). Trust and knowledge sharing in green supply chains. *Supply Chain Management: An International Journal, 13*(4), 283-295.

Chenhall, R. H., & Langfield-Smith, K. (1998). Adoption and benefits of management accounting practices: an Australian study. *Management accounting research, 9*(1), 1-19.

Chernick, M. R., Gonz áez-Manteiga, W., Crujeiras, R. M., & Barrios, E. B. (2011). Bootstrap methods *International encyclopedia of statistical science* (pp. 169-174): Springer.

Chin, W. W. (1998). The partial least squares approach to structural equation modeling. *Modern methods for business research, 295*(2), 295-336.

Chin, W. W. (2010). How to write up and report PLS analyses *Handbook of partial least squares* (pp. 655-690): Springer.

Chin, W. W., Thatcher, J. B., Wright, R. T., & Steel, D. (2013). Controlling for common method variance in PLS analysis: the measured latent marker variable approach *New perspectives in partial least squares and related methods* (pp. 231-239): Springer.

Chin-Chun, H., Keah Choon, T., Suhaiza Hanim Mohamad, Z., & Vaidyanathan, J. (2013). Supply chain drivers that foster the development of green initiatives in an emerging economy. *International Journal of Operations & Production Management, 33*(6), 656-688.

Chin, W. W., & Newsted, P. R. (1999). Structural equation modeling analysis with small samples using partial least squares. *Statistical strategies for small sample research, 1*(1), 307-341.

Chiou, T.-Y., Chan, H. K., Lettice, F., & Chung, S. H. (2011). The influence of greening the suppliers and green innovation on environmental performance and competitive advantage in Taiwan. *Transportation Research Part E: Logistics and Transportation Review, 47*(6), 822-836.

Choi, D., & Hwang, T. (2015). The impact of green supply chain management practices on firm performance: the role of collaborative capability. *Operations Management Research, 8*(3-4), 69-83.

Christ, K. L., & Burritt, R. L. (2017). Water management accounting: A framework for corporate practice. *Journal of Cleaner Production, 152*, 379-386.

Christ, K. L., Burritt, R., Varsei, M., Adams, C., & Schaltegger, S. (2016). Towards environmental management accounting for trade-offs. *Sustainability Accounting, Management and Policy Journal, 7*(3).

Christmann, P. (2000). Effects of "best practices" of environmental management on cost advantage: The role of complementary assets. *Academy of Management journal, 43*(4), 663-680.

Christmann, P., & Taylor, G. (2001). Globalization and the environment: Determiants of firm self-regulation in China. *Journal of International Business Studies, 32*(3), 439-458.

Coglianese, C., & Nash, J. (2001). *Regulating from the inside: can environmental management systems achieve policy goals?* : Resources for the Future.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences 2nd edn: Erlbaum Associates, Hillsdale.

Conding, J., Zubir, A. F. M., Hashim, S., Lanang, S., Ain, N., & Fadly Habidin, N. (2013). The Investigation of Green Practices, Green Innovation and Green Performance in Malaysian Automotive Industry. *Environmental Management & Sustainable Development, 2*(1).

Conding, J., Zubir, M., Fadzlin, A., Adwini Hashim, S., Lanang, S., Ain, N., *et al.* (2012). A Proposed of Green Practices and Green Innovation Model in Malaysian Automotive Industry. *Environmental Management & Sustainable Development, 1*(2).

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*: Sage publications.

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. (2003). Advanced mixed methods research designs. *Handbook of mixed methods in social and behavioral research*, 209-240.

Crocker, L., & Algina, J. (1986). *Introduction to classical and modern test theory*: ERIC.

Cucchiella, F., Koh, L., Walker, H., & Jones, N. (2012). Sustainable supply chain management across the UK private sector. *Supply Chain Management: An International Journal, 17*(1), 15-28.

Curkovic, S., & Sroufe, R. (2011). Using ISO 14001 to promote a sustainable supply chain strategy. *Business Strategy and the Environment, 20*(2), 71-93.

Darnall, N. (2006). Why firms mandate ISO 14001 certification. *Business & Society, 45*(3), 354-381.

Darnall, N., Henriques, I., & Sadorsky, P. (2008). Do environmental management systems improve business performance in an international setting? *Journal of International Management, 14*(4), 364-376.

Darnall, N., Jolley, G. J., & Handfield, R. (2008). Environmental management systems and green supply chain management: complements for sustainability? *Business Strategy and the Environment, 17*(1), 30-45.

Darnall, N., & Kim, Y. (2012). Which types of environmental management systems are related to greater environmental improvements? *Public Administration Review, 72*(3), 351-365.

Darnall, N. M. (2002). *Why firms signal "green": Environmental management system certification in the United States.* Unpublished Ph.D., The University of North Carolina at Chapel Hill, Ann Arbor.

Das, P. K. (2016). Environmental Accounting: A Conceptual Study of Indian Context. *World Academy of Science, Engineering and Technology, International Journal of Social, Behavioral, Educational, Economic, Business and Industrial Engineering, 10*(8), 2825-2831.

Das, T. K., & Teng, B.-S. (2000). A resource-based theory of strategic alliances. *Journal of management, 26*(1), 31-61.

Dawson, J. F. (2014). Moderation in management research: What, why, when, and how. *Journal of Business and Psychology, 29*(1), 1-19.

Deshmukh, A. J., & Vasudevan, H. (2014). Emerging supplier selection criteria in The contect of traditional vs green supply chain management. *International Journal of Managing Value & Supply Chains, 5*(1).

Di Noia, A. E., & Nicoletti, G. M. (2016). ISO 14001 Certification: Benefits, Costs and Expectations for Organization. *Studia Oeconomica Posnaniensia, 4*(10), 94-109.

Diamantopoulos, A. (1994). Modelling with LISREL: A guide for the uninitiated. *Journal of Marketing Management, 10*(1-3), 105-136.

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective. *Journal of the Academy of Marketing Science, 40*(3), 434-449.

Dixon, K., Mohd Khalid, F., & Lord, B. (2012). Environmental management accounting implementation in environmentally sensitive industries in Malaysia.

DOE. (2016). Department of Environment. https://www.doe.gov.my/portalv1/wp-content/uploads/2016/2003/kes-mahkamah-oktober-2016.pdf.

DOSM. (2015). Compendium of environment statistics 2015. *Department of Statistics Malaysia*,https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=162&bul_id=YlluUUM161NGNKZ121ZRUZvYUtqV161d162Zz109&menu_id=NWVEZGhEVlNMeitaMHNzK162htRU105dz109.

DOSM. (2017). Gross domestic product first quarter 2017. *Department of Statistics Malaysia*,https://www.dosm.gov.my/v1/index.php?r=column/cthemeByCat&cat=100&bul_id=N101pkNXY105QXdIUkF106Mi190SnlRQzB105UT109&menu_id=TE105CRUZCblh104ZTZMODZIbmk102aWRRQT109#.

Du Toit, M., Du Toit, S. H. C., & Hawkins, D. M. (2001). *Interactive LISREL: User's guide*: Scientific Software International.

Duarte, S., & Cruz-Machado, V. (2013). Lean and green supply chain initiatives: a case study. *IIE Annual Conference. Proceedings*, 2168-2177.

Eltayeb, T., & Zailani, S. (2007). The implementation of green supply chain management practices: a conceptual framework.

Eltayeb, T. K., & Zailani, S. (2009). Going green through green supply chain initiatives towards environmentally sustainable. *Operations and Supply Chain Management, 2*(2), 93-110.

Eltayeb, T. K., Zailani, S., & Filho, W. L. (2009). Green business among certified companies in Malaysia towards environmentally sustainable: benchmarking on the drivers, initiatives and outcomes. *International Journal of Environmental Technology and Management, 12*(1), 95-125.

Eltayeb, T. K., Zailani, S., & Jayaraman, K. (2010). The examination on the drivers for green purchasing adoption among EMS 14001 certified companies in Malaysia. *Journal of Manufacturing Technology Management, 21*(2), 206-225.

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

F. Hair Jr, J., Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review, 26*(2), 106-121.

Falk, R., & Miller, N. (1992). A primer for soft modelling. Ed. *Univ of Akron Pr, Akron, Ohio*.

Fang, C., & Zhang, J. (2018). Performance of green supply chain management: A systematic review and meta analysis. *Journal of Cleaner Production, 183*, 1064-1081

Ferron-Vilchez, V. (2016). Does symbolism benefit environmental and business performance in the adoption of ISO 14001? *Journal of Environmental Management, 183*, 882-894.

Field, A. (2009). Discopering Statistics Using SPSS, Thrid Edition: London: Sage.

Firoz, M., & Ansari, A. A. (2010). Environmental accounting and international financial reporting standards (IFRS). *International Journal of Business and Management, 5*(10), 105-112.

Fisher, J. (1995). Contingency-based research on management control systems: categorization by level of complexity. *Journal of accounting literature, 14*, 24.

Fleischmann, M., Bloemhof-Ruwaard, J. M., Dekker, R., Van der Laan, E., Van Nunen, J. A., & Van Wassenhove, L. N. (1997). Quantitative models for reverse logistics: A review. *European Journal of Operational Research, 103*(1), 1-17.

Fornell, C., & Bookstein, F. L. (1982). Two structural equation models: LISREL and PLS applied to consumer exit-voice theory. *Journal of Marketing research*, 440-452.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 39-50

Fraj, E., Mart ńez, E., & Matute, J. (2013). Green marketing in B2B organisations: an empirical analysis from the natural-resource-based view of the firm. *The Journal of Business & Industrial Marketing, 28*(5), 396-410.

Fullerton, R. R., Kennedy, F. A., & Widener, S. K. (2013). Management accounting and control practices in a lean manufacturing environment. *Accounting, Organizations and Society, 38*(1), 50-71.

Furneaux, B., & Wade, M. R. (2011). An exploration of organizational level information systems discontinuance intentions. *Mis Quarterly*, 573-598.

Fuzi, N. M., Habidin, N. F., & Effendy, S. (2016). Environmental Management Accounting Practices and Environmental Performance for Malaysian Manufacturing Industry. *International Journal of Academic Research in Business and Social Sciences, 6*(11), 135-141.

Gandhi, M. A. I., & Sharma, S. (2014). A Review of Research Methodologies Linking Green Supply Chain Practices and Green Supply Chain Performance. *International Journal of Supply Chain Management, 3*(4).

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

Gefen, D., & Straub, D. (2005). A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. *Communications of the Association for Information systems, 16*(1), 5.

Ghobakhloo, M., Tang, S. H., Zulkifli, N., & Ariffin, M. K. A. (2013). An Integrated Framework of Green Supply Chain Management Implementation. *International Journal of Innovation, Management and Technology, 4*(1), 86.

Gholami, R., Sulaiman, A. B., Ramayah, T., & Molla, A. (2013). Senior managers' perception on green information systems (IS) adoption and environmental performance: Results from a field survey. *Information & Management, 50*(7), 431-438.

Gibassier, D., & Alcouffe, S. (2018). Environmental Management Accounting: The Missing Link to Sustainability? : Taylor & Francis.

Gil, M. A., Jimenez, J. B., & Lorente, J. C. (2001). An analysis of environmental management, organizational context and performance of Spanish hotels. *Omega, 29*(6), 457-471.

Goh, Y. N., & Nabsiah, A. W. (2010). The Effect of ISO 14001 Environmental Management System Implementation on SMEs Performance: An Empirical Study in Malaysia. *Journal of Sustainable Development, 3*(2), 215-220.

Goldstein, H., & Drucker, J. (2006). The economic development impacts of universities on regions: Do size and distance matter? *Economic development quarterly, 20*(1), 22-43.

Gond, J.-P., Grubnic, S., Herzig, C., & Moon, J. (2012). Configuring management control systems: Theorizing the integration of strategy and sustainability. *Management Accounting Research, 23*(3), 205-223.

Gordon, L. C., & Kung, D. S. (2012). Corporate Compliance Issues in Managing Supply Chains in the Environmental-Friendly 21st Century. *Journal of International Technology and Information Management, 21*(4), 81-104.

Green Jr, K. W., Whitten, D., & Inman, R. A. (2008). The impact of logistics performance on organizational performance in a supply chain context. *Supply Chain Management: An International Journal, 13*(4), 317-327.

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

Greene, J. C., Caracelli, V. J., & Graham, W. F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational evaluation and policy analysis, 11*(3), 255-274.

Guilford, J. P. (1954). Psychometric methods.

Gunarathne, N., & Lee, K.-H. (2015). Environmental Management Accounting (EMA) for environmental management and organizational change: An eco-control approach. *Journal of Accounting & Organizational Change, 11*(3), 362-383.

Guo-Ciang, W. (2013). The influence of green supply chain integration and environmental uncertainty on green innovation in Taiwan's IT industry. *Supply Chain Management, 18*(5), 539-552.

Hair, J. F. J., Black, W.C., Babin, B.J., Anderson, R.E. . (2010). *Multivariate Data Analaysis A Global Perspective*. Upper Saddle Rive, NJ: Pearson Education.

Hakim, M. N. (2016). Role of Management Accounting Practices in Creating Values: A Case Study of Asia Highway. *Asia-Pacific Management Accounting Journal, 9*(1).

Handfield, R., Sroufe, R., & Walton, S. (2005). Integrating environmental management and supply chain strategies. *Business Strategy and the Environment, 14*(1), 1-19.

Handfield, R. B., Walton, S. V., Seegers, L. K., & Melnyk, S. A. (1997). "Green" value chain practices in the furniture industry. *Journal of Operations Management, 15*(4), 293-315.

Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., & Thiele, K. O. (2017). Mirror, mirror on the wall: a comparative evaluation of composite-based

structural equation modeling methods. *Journal of the Academy of Marketing Science, 45*(5), 616-632.

Hair, J. F., Sarstedt, M., Ringle, C. M., & Mena, J. A. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. *Journal of the academy of marketing science, 40*(3), 414-433.

Hair Jr, J. F., Matthews, L. M., Matthews, R. L., & Sarstedt, M. (2017). PLS-SEM or CB-SEM: Updated guidelines on which method to use. *International Journal of Multivariate Data Analysis, 1*(2), 107-123.

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

Hart, S. L., & Ahuja, G. (1996). Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment, 5*(1), 30-37.

Hart, S. L., & Dowell, G. (2011). Invited editorial: a natural-resource-based view of the firm: fifteen years after. *Journal of management, 37*(5), 1464-1479.

Haslinda, A., & Fuong, C. C. (2010). The Implementation of ISO 14001 Environmental Management System in Manufacturing Firms in Malaysia. *Asian Social Science, 6*(3), 100-107.

Hassan, M., Abidin, R., Nordin, N., & Yusoff, R. (2014). Greening the Business Environment. *International Journal of Applied Engineering Research, 9*(22), 17991-18001.

Hassan, M. G., Abidin, R., Nordin, N., & Yusoff, R. Z. (2016). GSCM practices and sustainable performance: A preliminary insight. *Journal of Advanced Management Science*.

Hatch, M. J., & Cunliffe, A. L. (2012). *Organization theory: modern, symbolic and postmodern perspectives*: Oxford university press.

Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: Does method really matter? *Psychological science, 24*(10), 1918-1927.

Hazen, B. T., Cegielski, C., & Hanna, J. B. (2011). Diffusion of green supply chain management. *International Journal of Logistics Management, 22*(3), 373-389.

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial management & data systems, 116*(1), 2-20.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing *New challenges to international marketing* (pp. 277-319): Emerald Group Publishing Limited.

Heras-Saizarbitoria, I., Molina-Azor ń, J. F., & Dick, G. P. (2011). ISO 14001 certification and financial performance: selection-effect versus treatment-effect. *Journal of Cleaner Production, 19*(1), 1-12.

Hershberger, S. L. (2003). The growth of structural equation modeling: 1994-2001. *Structural Equation Modeling, 10*(1), 35-46.

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

Herzig, C., Viere, T., Schaltegger, S., & Burritt, R. L. (2012). *Environmental Management Accounting: Case Studies of South-East Asian Companies*: Routledge.

Hoejmose, S., Brammer, S., & Millington, A. (2012). "Green" supply chain management: The role of trust and top management in B2B and B2C markets. *Industrial Marketing Management, 41*(4), 609-620.

Hofmann, E., & Bosshard, J. (2017). Supply chain management and activity-based costing: Current status and directions for the future. *International Journal of Physical Distribution & Logistics Management, 47*(8), 712-735.

Holden, M. T., & Lynch, P. (2004). Choosing the appropriate methodology: Understanding research philosophy. *The marketing review, 4*(4), 397-409.

Hoyle, R. H. (1999). *Statistical strategies for small sample research*: Sage.

Hsu, C.-C., Choon Tan, K., Hanim Mohamad Zailani, S., & Jayaraman, V. (2013). Supply chain drivers that foster the development of green initiatives in an emerging economy. *International Journal of Operations & Production Management, 33*(6), 656-688.

Hu, A. H., & Hsu, C.-W. (2010). Critical factors for implementing green supply chain management practice: an empirical study of electrical and electronics industries in Taiwan. *Management Research Review, 33*(6), 586-608.

Huang, X., Tan, B. L., & Ding, X. (2012). Green Supply Chain Management Practices: A Sectoral Investigation into Manufacturing SMEs in China. *International Proceedings of Economics Development & Research, 29*.

Huang, X., Tan, B. L., & Dong, L. (2012). Pressures on green supply chain management: a study on manufacturing small and medium-sized enterprises in China. *International Business and Management, 4*(1), 76-82.

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic management journal, 20*(2), 195-204.

Hunt, S. D. (1991). Positivism and paradigm dominance in consumer research: toward critical pluralism and rapprochement. *Journal of consumer research*, 32-44.

International Federation of Accountants (IFAC). (1998). International Management Accounting Practice Statement (IMAP #1): Management Accounting Concept. *Financial and Management Accounting Committee*. March 1998, 85-99.

Iraldo, F., Testa, F., & Frey, M. (2009). Is an environmental management system able to influence environmental and competitive performance? The case of the eco-management and audit scheme (EMAS) in the European union. *Journal of Cleaner Production, 17*(16), 1444-1452.

Ismail, K., Isa, C. R., & Mia, L. (2018). Evidence on the usefulness of management accounting systems in integrated manufacturing environment. *Pacific Accounting Review, 30*(1), 2-19.

Ismail, W. K. W., & Abdullah, L. (2012). A new Environmental Performance Index using analytic hierarchy process: A case of ASEAN countries. *Environmental Skeptics and Critics, 1*(3), 39.

Jain, V. K., & Sharma, S. (2012). Green Supply Chain Management Practices in Automobile Industry: An Empirical Study. *Journal of Supply Chain Management Systems, 1*(3), 20-26.

Jain, V. K., & Sharma, S. (2014). Drivers Affecting the Green Supply Chain Management Adaptation: A Review. *IUP Journal of Operations Management, 13*(1), 54-63.

Jalaludin, D., Sulaiman, M., Ahmad, N., & Nazli, N. (2010). Environmental management accounting: an empirical investigation of manufacturing

companies in Malaysia. *Journal of Asia-Pacific Centre for Environmental Accountability, 16*(3), 31-45.

Jalaludin, D., Sulaiman, M., & Nazli Nik Ahmad, N. (2011). Understanding environmental management accounting (EMA) adoption: a new institutional sociology perspective. *Social Responsibility Journal, 7*(4), 540-557.

Jalil, M. H., Abar, M. N., & Dadashian, F. (2016). Environmental Management Accounting Model on the Basis of Environmental Management System in Leather Industry. *International Journal of Environmental Science and Development, 7*(1), 52.

Jamil, C. Z. M., Mohamed, R., Muhammad, F., & Ali, A. (2015). Environmental management accounting practices in small medium manufacturing firms. *Procedia-Social and Behavioral Sciences, 172*, 619-626.

Jasch, C. (2003). The use of Environmental Management Accounting (EMA) for identifying environmental costs. *Journal of Cleaner Production, 11*(6), 667-676.

Jasch, C. (2009). What Is EMA and Why Is It Relevant? *Environmental and Material Flow Cost Accounting: Principles and Procedures*, 1-35.

Jasch, C., Ayres, D., & Bernaudat, L. (2010). Environmental management accounting (EMA) case studies in Honduras–an integrated UNIDO project. *Issues Soc. Environ. Account, 4*(8).

Jira, C., & Toffel, M. W. (2013). Engaging supply chains in climate change. *Manufacturing & Service Operations Management, 15*(4), 559-577.

Johansson, G. (2002). Success factors for integration of ecodesign in product development: A review of state of the art. *Environmental Management and Health, 13*(1), 98-107.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher, 33*(7), 14-26.

Jöreskog, K. G., & Sörbom, D. (1984). LISREL-VI user's guide.

Kadasah, N. A. (2013). Attitudes of Managers towards the Potential Effects of ISO 14001 in Saudi Arabia: Factor Analysis. *International Business Research, 6*(7), p91.

Kanapathy, K., Yee, G. W., Zailani, S., & Aghapour, A. H. (2016). An intra-regional comparison on RoHS practices for green purchasing management among

electrical and electronics SMEs in Southeast Asia. *International Journal of Procurement Management, 9*(3), 249-271.

Kaplowitz, M. D., Hadlock, T. D., & Levine, R. (2004). A comparison of web and mail survey response rates. *Public opinion quarterly, 68*(1), 94-101.

Kasim, E. S., Rajamanoharan, I. D., & Omar, N. (2016). Role Of Management Accountants In Automotive Supply Chain Management. *Asia-Pacific Management Accounting Journal, 11*(1).

Kaufmann, L., & Gaeckler, J. (2015). A structured review of partial least squares in supply chain management research. *Journal of Purchasing and Supply Management, 21*(4), 259-272.

Keddie, S. L. (2017). Towards Environmental Management Accounting for Trade-Offs. *Social and Environmental Accountability Journal, 37*(3), 223-225.

Khairani, N. S., Rajamanoharan, I. D., & Thirumanickam, N. (2016). Green Supply Chain Management Practices: Evidence from Malaysia. *Malaysian Accounting Review, 11*(2).

Khaksar, E., Abbasnejad, T., Esmaeili, A., & Tamošaitienė, J. (2016). The effect of green supply chain management practices on environmental performance and competitive advantage: a case study of the cement industry. *Technological and Economic Development of Economy, 22*(2), 293-308.

Khalid, F. M., Ahmad, N., & Hasan, S. J. (2015). Awareness of Environmental Management Accounting for Decision Making: A case study on an institution of higher learning. *National Symposium & Exhibition on Business & Accounting 2015 (NSEBA IV), ISBN 978-967-42982-7-2.*

Khew, C. (2016, July 18). Johor makes 'urgent request' for additional treated water from Singapore. *The Star Online,* Read more at http://www.thestar.com.my/news/nation/2016/2007/2018/johor-makes-urgent-request-for-additional-treated-water-from-singapore/#k2013KlH2011itKGFbwerk.2099.

Khor, K. S., & Udin, Z. M. (2012). Impact of Reverse Logistics Product Disposition towards Business Performance in Malaysian E&E Companies. *Journal of Supply Chain and Customer Relationship Management, 2012*, 1-19.

Kim, S. T. (2010). *Implementation of green supply chain management: Impact on performance outcomes in small- and medium-sized electrical and electronic firms.* Unpublished Ph.D., The University of Nebraska - Lincoln, Ann Arbor.

King, A. A., & Lenox, M. J. (2001). Does it really pay to be green? An empirical study of firm environmental and financial performance: An empirical study of firm environmental and financial performance. *Journal of Industrial Ecology, 5*(1), 105-116.

Kline, R. B. (2011). *Principles and Practice of Structural Equation Modeling.* New York: Guilford Press.

Koe Hwee Nga, J. (2009). The influence of ISO 14000 on firm performance. *Social Responsibility Journal, 5*(3), 408-422.

Koh, S., Gunasekaran, A., & Tseng, C. (2012). Cross-tier ripple and indirect effects of directives WEEE and RoHS on greening a supply chain. *International journal of production economics, 140*(1), 305-317.

Kokubu, K., & Nashioka, E. (2005). Environmental management accounting practices in Japan *Implementing environmental management accounting: Status and Challenges* (pp. 321-342): Springer.

Kokubu, K., & Nashioka, E. (2008). Environmental management accounting practices in Japanese manufacturing sites *Environmental management accounting for cleaner production* (pp. 365-376): Springer.

Koufteros, X., Vonderembse, M., & Jayaram, J. (2005). Internal and External Integration for Product Development: The Contingency Effects of Uncertainty, Equivocality, and Platform Strategy. *Decision Sciences, 36*(1), 97-133.

Krikke, H., le Blanc, I., & van de Velde, S. (2004). Product modularity and the design of closed-loop supply chains. *California Management Review, 46*(2), 23-39.

Kumar, S., & Putnam, V. (2008). Cradle to cradle: Reverse logistics strategies and opportunities across three industry sectors. *International journal of production economics, 115*(2), 305-315.

Lam, C.-M., Iris, K., Medel, F., Tsang, D. C., Hsu, S.-C., & Poon, C. S. (2018). Life-cycle cost-benefit analysis on sustainable food waste management: The case of Hong Kong International Airport. *Journal of Cleaner Production, 187*, 751-762.

Laosirihongthong, T., Adebanjo, D., & Choon Tan, K. (2013). Green supply chain management practices and performance. *Industrial Management & Data Systems, 113*(8), 1088-1109.

Latan, H., Jabbour, C. J. C., de Sousa Jabbour, A. B. L., Wamba, S. F., & Shahbaz, M. (2018). Effects of environmental strategy, environmental uncertainty and top management's commitment on corporate environmental performance: The role of environmental management accounting. *Journal of Cleaner Production, 180*, 297-306.

Lee, C.-W. (2008). Green suppliers with environmental performance in the supply chain perspective. *Asia Pacific Management Review, 13*(4), 731-745.

Lee, K.-H. (2012). Carbon accounting for supply chain management in the automobile industry. *Journal of Cleaner Production, 36*, 83-93.

Lee, K.-H., & Wu, Y. (2014). Integrating sustainability performance measurement into logistics and supply networks: A multi-methodological approach. *The British Accounting Review, 46*(4), 361-378.

Lee, L., Petter, S., Fayard, D., & Robinson, S. (2011). On the use of partial least squares path modeling in accounting research. *International Journal of Accounting Information Systems, 12*(4), 305-328.

Lee, S. M., Jin Sung, R., Choi, D., & Noh, Y. (2013). Pressures affecting green supply chain performance. *Management Decision, 51*(8), 1753-1768.

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

Li, X., & Olorunniwo, F. (2008). An exploration of reverse logistics practices in three companies. *Supply Chain Management: An International Journal, 13*(5), 381-386.

Li, Y. (2011). Research on the Performance Measurement of Green Supply Chain Management in China. *Journal of Sustainable Development, 4*(3), 101-107.

Lin, C.-Y., & Ho, Y.-H. (2008). An empirical study on logistics service providers' intention to adopt green innovations. Journal of Technology Management & Innovation, 3(1), 17-26.

Lin, R.-J., Chen, R.-H., & Nguyen, T.-H. (2011). Green supply chain management performance in automobile manufacturing industry under uncertainty. *Procedia-Social and Behavioral Sciences, 25*, 233-245.

Linton, J. D., Klassen, R., & Jayaraman, V. (2007). Sustainable supply chains: an introduction. *Journal of Operations Management, 25*(6), 1075-1082.

Lisi, I. E. (2015). Translating environmental motivations into performance: The role of environmental performance measurement systems. *Management Accounting Research, 29*, 27-44.

Lohmöller, J.-B. (2013). *Latent variable path modeling with partial least squares*: Springer Science & Business Media.

López-Gamero, M. D., Molina-Azorín, J. F., & Claver-Cortes, E. (2009). The whole relationship between environmental variables and firm performance: Competitive advantage and firm resources as mediator variables. *Journal of environmental management, 90*(10), 3110-3121.

Lopez-Valeiras, E., Gomez-Conde, J., & Naranjo-Gil, D. (2015). Sustainable innovation, management accounting and control systems, and international performance. *Sustainability, 7*(3), 3479-3492.

Lorenz, A. (2015). *Contemporary management accounting in the UK service sector*. University of Gloucestershire.

Luthra, S., Kumar, V., Kumar, S., & Haleem, A. (2011). Barriers to implement green supply chain management in automobile industry using interpretive structural modeling technique: An Indian perspective. *Journal of Industrial Engineering and Management, 4*(2), 231-n/a.

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological methods*, *4*(1), 84.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening variable effects. *Psychological methods, 7*(1), 83.

MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. *MIS quarterly, 35*(2), 293-334.

Mahmood, W., Hasrulnizzam, W., Ab Rahman, M. N., Md Deros, B., Jusoff, K., Saptari, A., *et al.* (2013). Manufacturing Performance in Green Supply Chain Management. *World Applied Sciences Journal 21 (Special Issue of Engineering and Technology)*, 76-84.

Mahmood, W. H. W., Ab Rahman, M. N., Deros, B. M., Jusoff, K., Saptari, A., Ebrahim, Z., *et al.* (2013). Manufacturing Performance in Green Supply Chain Management. *Special issue of Engineering and Technology, WASJ*, *21*, 76-84.

Maletič, M., Maletič, D., Dahlgaard, J. J., Dahlgaard-Park, S. M., & Gomišček, B. (2014). Sustainability exploration and sustainability exploitation: From a literature review towards a conceptual framework. *Journal of Cleaner Production, 79*, 182-194.

Maletič, M., Maletič, D., Dahlgaard, J. J., Dahlgaard-Park, S. M., & Gomišček, B. (2015). Effect of sustainability-oriented innovation practices on the overall organisational performance: An empirical examination. *Total Quality Management & Business Excellence*, 1-20.

Manaf, L. A., Samah, M. A. A., & Zukki, N. I. M. (2009). Municipal solid waste management in Malaysia: Practices and challenges. *Waste management, 29*(11), 2902-2906.

Martusa, R. (2013). Green Supply Chain Management: Strategy to Gain Competitive Advantage. *Journal of Energy Technologies & Policy, 3*(11).

Masoumik, S. M., Abdul-Rashid, S. H., & Udoncy Olugu, E. (2014). Gaining Competitive Advantage through Strategic Green Supply Chain Management: From a Literature Review towards a Conceptual Model. *International Journal of Supply Chain Management, 3*(3).

Maylor, H., Blackmon, K., & Huemann, M. (2016). *Researching business and management*: Macmillan International Higher Education.

McNeish, D. (2017). Exploratory factor analysis with small samples and missing data. *Journal of personality assessment, 99*(6), 637-652.

Mentzer, J. T., DeWitt, W., Keebler, J. S., Min, S., & *et al.* (2001). Defining supply chain management. *Journal of Business Logistics, 22*(2), 1-26.

MIDA. (2007). Performance of the manufacturing and related services sectors 2005.

Miller, C. C., & Cardinal, L. B. (1994). Strategic planning and firm performance: A synthesis of more. *Academy of Management journal, 37*(6), 1649.

Min, H., & Galle, W. P. (1997). Green purchasing strategies: trends and implications. *International Journal of Purchasing and Materials Management, 33*(2), 10-17.

Mohd Rozar, N., Mahmood, W., Hasrulnizzam, W., Ibrahim, A., & Razik, M. A. (2015). A study of success factors in green supply chain management in manufacturing industries in Malaysia. *Journal of Economics, Business and Management, 3*(2), 287-291.

Mokhtar, N., Jusoh, R., & Zulkifli, N. (2016). Corporate characteristics and environmental management accounting (EMA) implementation: evidence from Malaysian public listed companies (PLCs). *Journal of Cleaner Production*, (2016), 1-12.

Mokhtar, N., Zulkifli, N., & Jusoh, R. (2015). The implementation of environmental management accounting and environmental reporting practices: a social issue life cycle perspective. *International Journal of Management Excellence, 4*(2), 515-521.

Mollenkopf, D., Russo, I., & Frankel, R. (2007). The returns management process in supply chain strategy. *International Journal of Physical Distribution & Logistics Management, 37*(7), 568-592.

Mollenkopf, D., Stolze, H., Tate, W. L., & Ueltschy, M. (2010). Green, lean, and global supply chains. *International Journal of Physical Distribution & Logistics Management, 40*(1/2), 14-41.

Mooi, E., & Sarstedt, M. (2011). A concise guide to market research, chapter 9:"Cluster analysis". *Berlin: Springer-Verlag*, *10*, 978-973.

MOSTI. (2016). Ministry of Science, Technology and Innovation *Department of Standards Malaysia,* http://www.jsm.gov.my/cabdirectories?p_auth=HEu41Ieh&p_p_id=cabdirectoriessearch_WAR_CABDirectoriesSearchportlet&p_p_lifecycle=41&p_p_state=normal&p_p_mode=view&p_p_col_id=column-42&p_p_col_count=41&_cabdirectoriessearch_WAR_CABDirectoriesSearchportlet_javax.portlet.action=triggerIPC_usingTypeI&type=ACB.

Moullin, M. (2007). Performance measurement definitions: Linking performance measurement and organisational excellence. *International Journal of Health Care Quality Assurance, 20*(3), 181-183.

Moyano-Fuentes, J., Sacristán-Díaz, M., & Martínez-Jurado, P. J. (2012). Cooperation in the supply chain and lean production adoption. *International Journal of Operations & Production Management, 32*(9), 1075-1096.

Mukesh, K., Salim, A. T., & Ramayah, T. (2013). *Business research methods*: First

Murali, S., Saiku M, B., & Ho, J.-A. (2013). Making the case for operating "Green": impact of environmental proactivity on multiple performance outcomes of Malaysian firms. *Journal of Cleaner Production, 42*, 69-82.

Musa, H., & Chinniah, M. (2016). Malaysian SMEs Development: Future and Challenges on Going Green. *Procedia-Social and Behavioral Sciences, 224*, 254-262.

Muslan, N., Hamid, A. B. A., Tan, H., & Idris, H. (2013). *Practices of Green Supply Chain Management (GSCM) towards Manufacturing Sustainability, V66*, 14

Nakamura, M., Takahashi, T., & Vertinsky, I. (2001). Why Japanese firms choose to certify: a study of managerial responses to environmental issues. *Journal of Environmental Economics and Management, 42*(1), 23-52.

Nawrocka, D., Brorson, T., & Lindhqvist, T. (2009). ISO 14001 in environmental supply chain practices. *Journal of Cleaner Production, 17*(16), 1435-1443.

Nguyen, N. P. (2018). Performance implication of market orientation and use of management accounting systems: The moderating role of accountants' participation in strategic decision making. *Journal of Asian Business and Economic Studies, 25*, 33-49.

Nguyen, Q. A., & Hens, L. (2015). Environmental performance of the cement industry in Vietnam: the influence of ISO 14001 certification. *Journal of Cleaner Production, 96*, 362-378.

Ninlawan, C., Seksan, P., Tossapol, K., & Pilada, W. (2010). *The implementation of green supply chain management practices in electronics industry, (2012),* Vol III. Paper presented at the Proceedings of the International Multiconference of Engineers and Computer Scientists.

Nishitani, K. (2011). An empirical analysis of the effects on firms' economic performance of implementing environmental management systems. *Environmental and Resource Economics, 48*(4), 569-586.

Nitzl, C., Roldan, J. L., & Cepeda, G. (2016). Mediation analysis in partial least squares path modeling: Helping researchers discuss more sophisticated models. *Industrial management & data systems, 116*(9), 1849-1864.

Noordin, R., Zainuddin, Y., Mail, F., & Mail, R. (2014). Strategic Management Accounting: State-of-the-Art. *Malaysian Journal of Business and Economics (MJBE), 1*(1).

Nunnally, J. (1978). Psychometric theory (2nd edit.) mcgraw-hill. *Hillsdale, NJ*.

Nunnally, J. C., & Bernstein, I. (1994). *Psychometric Theory (McGraw-Hill Series in Psychology)* (Vol. 3): McGraw-Hill New York.

Ofoegbu, E. O., Akanbi, P. A., & Joseph, A. I. (2013). Effects of contextual factors on the performance of small and medium scale enterprises in Nigeria: A Case Study of Ilorin Metropolis. *Advances in Management and Applied Economics, 3*(1), 95-114.

Olson, E. G. (2008). Creating an enterprise-level "green" strategy. *Journal of business strategy, 29*(2), 22-30.

Olugu, E. U., Wong, K. Y., & Shaharoun, A. M. (2010). A comprehensive approach in assessing the performance of an automobile closed-loop supply chain. *Sustainability, 2*(4), 871-889.

Ong, T. S., Teh, B. H., Goh, H. H., & Thai, S. B. (2016). ISO14001 Certification and Financial Performance of Companies. *Asia-Pacific Management Accounting Journal, 10*(2).

Östlund, U., Kidd, L., Wengström, Y., & Rowa-Dewar, N. (2011). Combining qualitative and quantitative research within mixed method research designs: a methodological review. *International journal of nursing studies, 48*(3), 369-383.

Peng, D. X., & Lai, F. (2012). Using partial least squares in operations management research: A practical guideline and summary of past research. *Journal of Operations Management, 30*(6), 467-480.

Perotti, S., Zorzini, M., Cagno, E., & Guido, J. L. M. (2012). Green supply chain practices and company performance: the case of 3PLs in Italy. *International Journal of Physical Distribution & Logistics Management, 42*(7), 640-672.

Plambeck, E. L. (2012). Reducing greenhouse gas emissions through operations and supply chain management. *Energy Economics, 34*, S64-S74.

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of management, 12*(4), 531-544.

Pondeville, S., Swaen, V., & De Rongé, Y. (2013). Environmental management control systems: The role of contextual and strategic factors. *Management accounting research, 24*(4), 317-332.

Potoski, M., & Prakash, A. (2005). Green clubs and voluntary governance: ISO 14001 and firms' regulatory compliance. *American Journal of Political Science, 49*(2), 235-248.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods, 40*(3), 879-891.

Proto, M., & Supino, S. (2000). Ecomanagement quality system: ISO 14000. The state of the art in Italy. *Total Quality Management, 11*(4-6), S767-S772.

Psomas, E. L., Fotopoulos, C. V., & Kafetzopoulos, D. P. (2011). Motives, difficulties and benefits in implementing the ISO 14001 Environmental Management System. *Management of Environmental Quality, 22*(4), 502-521.

Ramirez, A. M., & Girdauskiene, L. (2013). Creation of knowledge and reverse logistics. empirical analysis from perspective of the resource based view theory. *Engineering Economics, 24*(5), 478-487.

Ramli, A., & Ismail, M. S. (2013). Environmental Management Accounting Practices: A Survey of ISO 14001 Certified Malaysian Organizations.

Rao, P. (2002). Greening the supply chain: A new initiative in South East Asia. *International Journal of Operations & Production Management, 22*(5/6), 632.

Rao, P., & Holt, D. (2005). Do green supply chains lead to competitiveness and economic performance? *International Journal of Operations & Production Management, 25*(9/10), 898-916.

Rao, P. H. (2014). Measuring Environmental Performance across a Green Supply Chain: A Managerial Overview of Environmental Indicators. *VIKALPA, 39*(1), 57.

Ringle, C. M., Sarstedt, M., Mitchell, R., & Gudergan, S. P. (2018). Partial least squares structural equation modeling in HRM research. *The International Journal of Human Resource Management*, 1-27.

Robinson, C. (2012). *Exploring the Relationship between Environmental Operations and Supply Chain Practices, Complementary Assets, and Performance.* Unpublished Ph.D., University of South Carolina, Ann Arbor.

Rothaermel, F. T., & Boeker, W. (2008). Old technology meets new technology: Complementarities, similarities, and alliance formation. *Strategic Management Journal, 29*(1), 47-77.

Rusli, K. A., Abd Rahman, A., Ho, J. A., & Abdullah, R. (2013). How green is your supply chain? Evidence from ISO 14001 certified manufacturers in Malaysia. *Pertanika Journal of Social Sciences & Humanities, 21*(spec. June), 213-230.

Russo, M. V., & Fouts, P. A. (1997). A resource-based perspective on corporate environmental performance and profitability. *Academy of Management journal, 40*(3), 534-559.

Saeidi, S. P., & Othman, M. S. H. (2017). The mediating role of process and product innovation in the relationship between environmental management accounting and firm's financial performance. *International Journal of Business Innovation and Research, 14*(4), 421-438.

Saeidi, S. P., Sofian, S., & Saeidi, P. (2011). *Environmental Management Accounting and Firm Performance.* Paper presented at the International Conference on Management (ICM 2011) Proceeding.

Said, J. (2016). The Mediating Effects of Organizational Learning Orientation on the Relationship between Strategic Management Accounting Information Use and Organizational Performance. *Asia-Pacific Management Accounting Journal, 5*(2).

Salim, K. M., Amin, A. M., & Sulaiman, M. (2018). Material Flow Cost Accounting, Perceived Ecological Environmental Uncertainty, Supplier Integration and Business Performance: A Study of Manufacturing Sector in Malaysia. *Asian Journal of Accounting and Governance, 8*, 107-122.

San Onga, T., Tehb, B. H., Ngc, S. H., & Sohd, W. N. (2016). Environmental Management System and Financial Performance. *Environmental Management, 8*(2), 26-52.

Sarkis, J. (1998). Evaluating environmentally conscious business practices. *European Journal of Operational Research, 107*(1), 159-174.

Sarkis, J. (2012). A boundaries and flows perspective of green supply chain management. *Supply Chain Management, 17*(2), 202-216.

Sarkis, J., Hasan, M. A., & Shankar, R. (2006). *Evaluating environmentally conscious manufacturing barriers with interpretive structural modeling.* Paper presented at the Optics East 2006.

Sarkis, J., Spens, K. M., & Kovács, G. (2012). A study of barriers to greening the relief supply chain. *Relief Supply Chain Management for Disasters: Humanitarian Aid and*, 196.

Sarkis, J., Zhu, Q., & Lai, K.-h. (2011). An organizational theoretic review of green supply chain management literature. *International journal of production economics, 130*(1), 1-15.

Sarstedt, M., Hair, J. F., Ringle, C. M., Thiele, K. O., & Gudergan, S. P. (2016). Estimation issues with PLS and CBSEM: Where the bias lies! *Journal of Business Research, 69*(10), 3998-4010.

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial least squares structural equation modeling *Handbook of market research* (pp. 1-40): Springer.

Saunders, M. N., Saunders, M., Lewis, P., & Thornhill, A. (2011). *Research methods for business students, 5/e*: Pearson Education India.

Schaltegger, S., Bennett, M., Burritt, R. L., & Jasch, C. (2008). Environmental management accounting (EMA) as a support for cleaner production *Environmental management accounting for cleaner production* (pp. 3-26): Springer.

Schaltegger, S., & Synnestvedt, T. (2002). The link between 'green'and economic success: environmental management as the crucial trigger between environmental and economic performance. *Journal of environmental management, 65*(4), 339-346.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of educational research, 99*(6), 323-338.

Seman, N. A. A., Zakuan, N., Jusoh, A., & Arif, M. S. M. (2012). Green supply chain management: A review and research Direction. *International Journal of Managing Value and Supply Chains, 3*(1), 1-14.

Shaharudin, M. R., Govindan, K., Zailani, S., Tan, K. C., & Iranmanesh, M. (2017). Product return management: Linking product returns, closed-loop supply chain activities and the effectiveness of the reverse supply chains. *Journal of cleaner production, 149*, 1144-1156.

Shaharudin, M. R., Zailani, S., & Tan, K. C. (2015). Barriers to product returns and recovery management in a developing country: investigation using multiple methods. *Journal of Cleaner Production, 96*, 220-232.

Sharma, B. (2004). Marketing strategy, contextual factors and performance: An investigation of their relationship. *Marketing Intelligence & Planning, 22*(2/3), 128-143.

Sharma, M. M. (2013). A Study on the Concept of Green Supply Chain Management. *Journal of Supply Chain Management Systems, 2*(1), 1-7.

Sharma, S., Durand, R. M., & Gur-Arie, O. (1981). Identification and analysis of moderator variables. *Journal of marketing research*, 291-300.

Sharma, B. (2008). Technology Strategy, Contextual Factors and Business Performance: An Investigation of Their Relationship. South Asian Journal of Management, 15(3), 19-39

Shi, V. G., Koh, S. L., Baldwin, J., & Cucchiella, F. (2012). Natural resource based green supply chain management. *Supply Chain Management: An International Journal, 17*(1), 54-67.

Shi, Y., & Gregory, M. (1998). International manufacturing networks—to develop global competitive capabilities. *Journal of Operations Management, 16*(2), 195-214.

Simpson, D. F., & Power, D. J. (2005). Use the supply relationship to develop lean and green suppliers. *Supply Chain Management, 10*(1), 60-68.

Soda, S., Sachdeva, A., & Garg, R. K. (2016). Implementation of green supply chain management in India: Bottlenecks and remedies. *The Electricity Journal, 29*(4), 43-50.

Solovida, G. T., & Latan, H. (2017). Linking environmental strategy to environmental performance: Mediation role of environmental management accounting. *Sustainability Accounting, Management and Policy Journal, 8*(5), 595-619.

Srivastava, S. K. (2007). Green supply-chain management: a state-of-the-art literature review. *International journal of management reviews, 9*(1), 53-80.

Srivastava, S. K. (2008). Network design for reverse logistics. *Omega, 36*(4), 535-548.

Sroufe, R. (2003). Effects of environmental management systems on environmental management practices and operations. *Production and Operations Management, 12*(3), 416-431.

Stefan, A., & Paul, L. (2008). Does it pay to be green? A systematic overview. *The Academy of Management Perspectives, 22*(4), 45-62.

Sulaiman, M., & Ahmad, N. N. N. (2006). Towards a sustainable future. *Accountants Today*, 29-33.

Sulaiman, M., & Rahman, N. A. (2013). Does the Environment Matter? Empirical Evidence From an Institution of Higher Learning in Malaysia. *International Journal of Business and Society, 14*(2), 177.

Sulaiman, M., & Mokhtar, N. (2010). Environmental Management Accounting: Some emperical evidence from Malaysia. *Malaysian Institute of Accountants*, 11-51.

Sulaiman, S. (2016). The dynamics of management accounting in Malaysia: a research note. *Asia-Pacific Management Accounting Journal, 3*(1).

Sumiani, Y., Haslinda, Y., & Lehman, G. (2007). Environmental reporting in a developing country: a case study on status and implementation in Malaysia. *Journal of Cleaner Production, 15*(10), 895-901.

Susilowati, D., Mustadjab, M. M., Setiawan, B., & Rahayu, M. (2013). The influence of green suply chain management (GSCM) toward economic performance on agribusiness apples. *Academic Research International, 4*(4), 115-125.

Svensson, G. (2003). Holistic and cross-disciplinary deficiencies in the theory generation of supply chain management. *Supply Chain Management, 8*(3/4), 303-316.

Tan, C. L., Yeo, S. F., & Low, C. H. (2018). Green Supply Chain Management Practices and Organizational Performance: An Empirical Study in Malaysian Manufacturing Firms. *Jurnal Pengurusan (UKM Journal of Management), 52*.

Tang, Z., & Tang, J. (2012). Stakeholder–firm power difference, stakeholders' CSR orientation, and SMEs' environmental performance in China. *Journal of Business Venturing, 27*(4), 436-455.

Teece, D. J. (1998). Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. *California management review, 40*(3), 55-79.

Testa, F., & Iraldo, F. (2010). Shadows and lights of GSCM (Green Supply Chain Management): determinants and effects of these practices based on a multi-national study. *Journal of Cleaner Production, 18*(10), 953-962.

Testa, F., Rizzi, F., Daddi, T., Gusmerotti, N. M., Frey, M., & Iraldo, F. (2014). EMAS and ISO 14001: the differences in effectively improving environmental performance. *Journal of Cleaner Production, 68*, 165-173.

Tey, J. S., Goh, K. C., Kek, S. L., & Goh, H. H. (2013). Current practice of waste management system in Malaysia: towards sustainable waste management.

Tritos, L., Adebanjo, D., & Keah Choon, T. (2013). Green supply chain management practices and performance. *Industrial Management + Data Systems, 113*(8), 1088-1109.

Tritos, L., Adebanjo, D., & Tan, K. C. (2013). Green supply chain management practices and performance. *Industrial Management & Data Systems, 113*(8), 1088-1109.

Tsai, W.-H., & Hung, S.-J. (2009). A fuzzy goal programming approach for green supply chain optimisation under activity-based costing and performance evaluation with a value-chain structure. *International Journal of Production Research, 47*(18), 4991-5017.

Tuan, Z. T. M., Malcolm, S., & Hadrian, D. (2010). Management accounting and organisational change: an exploratory study in Malaysian manufacturing firms. *Journal of Applied Management Accounting Research, 8*(2), 51.

UNDSD. (2001). Environmental management accounting procedures and principles: United Nations Division for Sustainable Development.

Vachon, S., & Klassen, R. D. (2006). Extending green practices across the supply chain. *International Journal of Operations & Production Management, 26*(7), 795-821.

Vachon, S., & Klassen, R. D. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. *International journal of production economics, 111*(2), 299.

Van der Stede, W. A., Young, S. M., & Chen, C. X. (2005). Assessing the quality of evidence in empirical management accounting research: The case of survey studies. *Accounting, organizations and society, 30*(7-8), 655-684.

Vasile, E., & Man, M. (2012). Current dimension of environmental management accounting. *Procedia-Social and Behavioral Sciences, 62*, 566-570.

Viere, T., von Enden, J., & Schaltegger, S. (2011). Life cycle and supply chain information in environmental management accounting: a coffee case study *Environmental Management Accounting and Supply Chain Management* (pp. 23-40): Springer.

Vinayagamoorthi, V., Murugasen, S., Kasilingam, L., Venkatraman, K., & Mahalingam, G. (2012). Environmental management accounting–A decision making tools. *International Journal of Management, 3*(3), 144-151.

Vinzi, V. E., Chin, W. W., Henseler, J., & Wang, H. (2010). Perspectives on partial least squares *Handbook of partial least squares* (pp. 1-20): Springer.

Wagner, M. (2010). The role of corporate sustainability performance for economic performance: A firm-level analysis of moderation effects. *Ecological Economics, 69*(7), 1553-1560.

Wagner, M., Schaltegger, S., & Wehrmeyer, W. (2001). The relationship between the environmental and economic performance of firms. *Greener Management International, 2001*(34), 94-111.

Walker, K., & Wan, F. (2012). The harm of symbolic actions and green-washing: Corporate actions and communications on environmental performance and their financial implications. *Journal of business ethics, 109*(2), 227-242.

Walizer, M. H. & Wienir, P., L. 1978. *Research methods and analysis: Searching for*.

Wernerfelt, B. (1995). The resource-based view of the firm: Ten years after. *Strategic Management Journal (1986-1998), 16*(3), 171.

Wold, S., Martens, H., & Wold, H. (1983). The multivariate calibration problem in chemistry solved by the PLS method *Matrix pencils* (pp. 286-293): Springer.

Wong, C. W., Lai, K.-h., Shang, K.-C., Lu, C.-S., & Leung, T. (2012). Green operations and the moderating role of environmental management capability of suppliers on manufacturing firm performance. *International Journal of Production Economics, 140*(1), 283-294.

Wong, K. K.-K. (2013). Partial least squares structural equation modeling (PLS-SEM) techniques using SmartPLS. *Marketing Bulletin, 24*(1), 1-32.

Wooi, G. C., & Zailani, S. (2010). Green supply chain initiatives: investigation on the barriers in the context of SMEs in Malaysia. *International Business Management, 4*(1), 20-27.

Wu, G.-C., & Lin, W.-C. (2013). Effects of buyer influence and green supply-chain readiness on environmental performance: The mediating role of environmental collaboration. *International Journal of Organizational Innovation (Online), 6*(2), 68-78.

Yunus, E. N., & Michalisin, M. D. (2016). Sustained competitive advantage through green supply chain management practices: a natural-resource-based view approach. *International Journal of Services and Operations Management, 25*(2), 135-154.

Zailani, S. H. M., Eltayeb, T. K., Chin-Chun, H., & Keah Choon, T. (2012). The impact of external institutional drivers and internal strategy on environmental performance. *International Journal of Operations & Production Management, 32*(6), 721-745.

Zailani, S., Govindan, K., Shaharudin, M. R., & Kuan, E. E. L. (2017). Barriers to product return management in automotive manufacturing firms in Malaysia. *Journal of Cleaner Production, 141*, 22-40.

Zamani, Z. (2015, April 21). Malaysia's recycling rate is still low. *The SunDaily*, http://www.thesundaily.my/news/1391122.

Zamri, F. I. M., Hibadullah, S. N., Fuzi, N. M., Desa, A. F. N. C., & Habidin, N. F. (2013). Green Lean Six Sigma and Financial Performance in Malaysian Automotive Industry. *Business Management and Strategy, 4*(1), 97-106.

Zhang, D., Hamid, A. B. A., Thoo, A. C., & Kooi, C. L. (2015). Green Supply Chain Management: A Literature Review. *Sains Humanika, 5*(2).

Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of consumer research, 37*(2), 197-206.

Zhou, P., Poh, K. L., & Ang, B. W. (2007). A non-radial DEA approach to measuring environmental performance. *European journal of operational research, 178*(1), 1-9.

Zhu, Q., & Geng, Y. (2013). Drivers and barriers of extended supply chain practices for energy saving and emission reduction among Chinese manufacturers. *Journal of Cleaner Production, 40*, 6-12.

Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. (2010). Green supply chain management in leading manufacturers: Case studies in Japanese large companies. *Management Research Review, 33*(4), 380-392.

Zhu, Q., & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International journal of production research, 45*(18/19), 4333.

Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. *International Journal of Operations & Production Management, 25*(5), 449-468.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2008a). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics, 111*(2), 261-273.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2008b). Green supply chain management implications for "closing the loop". *Transportation Research Part E: Logistics and Transportation Review, 44*(1), 1-18.

Zhu, Q., Sarkis, J., & Lai, K.-h. (2012). Examining the effects of green supply chain management practices and their mediations on performance improvements. *International Journal of Production Research, 50*(5), 1377-1394.

Zsidisin, G. A., & Hendrick, T. E. (1998). Purchasing's involvement in environmental issues: a multi-country perspective. *Industrial Management + Data Systems, 98*(7), 313-320.

Zsidisin, G. A., & Siferd, S. P. (2001). Environmental purchasing: a framework for theory development. *European Journal of Purchasing & Supply Management, 7*(1), 61-73.