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The role of Guanxi in green supply chain management in Asia's emerging economies: A conceptual framework

Ruoqi Geng^a, S. Afshin Mansouri^{a,*}, Emel Aktas^b, Dorothy A. Yen^a

^a Brunel Business School, Brunel University London, Uxbridge, Middlesex UB8 3PH, United Kingdom

^b Cranfield School of Management, Cranfield University, Cranfield, Bedford MK43 0AL, United Kingdom

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ABSTRACT

In recent decades, rapid industrial modernization and economic growth have brought substantial environmental problems such as air pollution, hazardous waste, and water pollution for the Asian emerging economies (AEE), in particular China, Taiwan, India, Malaysia, Indonesia, Thailand, and South Korea. These countries have started to adopt green supply chain management (GSCM) as a strategy to reduce the environmental impact. There are anecdotal evidences that the adoption of GSCM in this region is partly influenced by Guanxi – a cultural norm, which plays a significant role in relationship governance within supply chain activities among the AEE. Based on a systematic literature review, we develop a conceptual framework that characterizes the drivers and barriers for the adoption of GSCM practices, incorporating Guanxi as a moderator in the manufacturing sector of the AEE. The conceptual framework addresses the roles of two types of Guanxi in the adoption of GSCM: the relational Guanxi at individual level based on social exchange theory and the aggregated Guanxi at firm level derived from social capital theory. This recognition of Guanxi at two separate decision levels help companies better manage their relationships while they green their supply chains. Directions for future research and managerial implications are discussed accordingly.

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* Corresponding author.

E-mail addresses: Ruoqi.Geng@brunel.ac.uk (R. Geng), Afshin.Mansouri@brunel.ac.uk (S.A. Mansouri), Emel.Aktas@cranfield.ac.uk (E. Aktas), Dorothy.Yen@brunel.ac.uk (D.A. Yen).

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1. Introduction

In recent decades, the rapid economic growth in Asian emerging economies (AEE) has resulted in major environmental problems. This phenomenon is actually a global issue, as the majority of products consumed in developed countries have their raw materials, part of the manufacturing processes, and many other operations located in developing countries (Lai & Wong, 2012). One of the main concerns of Western investors is the lack of stable legal and regulatory systems that could be employed to monitor and facilitate business operations in the AEE. Instead, firms often rely on Guanxi (translated as 'relationships' and 'connections' in English, Luo, 1997; Seligman, 1999) norms to regulate business dealings (Tseng, Kwan, & Cheung, 1995), referring to the cultural characteristics of interpersonal relationship ties that exist within a society. Recent green supply chain management (GSCM) literature has focused largely on drivers of and barriers to the adoption of GSCM practices ignoring the impact of the culturally specific concept of Guanxi in the AEE.

In recent years, a large number of Western manufacturers have relocated their manufacturing bases and production facilities to AEE, taking advantage of lower labor and material costs (Tang & Zhou, 2012). These relocations have placed continuing pressure on the AEE, particularly China, Taiwan, India, Malaysia, Indonesia, Thailand, and South Korea, to improve all aspects of their supply chains (Faber & Frenken, 2009; Lai & Wong, 2012). For instance, Fig. 1 shows the increasing carbon emissions in these countries. The increases in emissions for China and India are shown in panel (b) because of their significantly higher CO₂ emissions than other countries. Fig. 1 also shows that the increases in emissions in Thailand, South Korea, Indonesia, Taiwan, and Malaysia are measured in the hundreds, while those in India and China are counted in the thousands. Meanwhile, the growing global awareness of environmental peril is placing increasing pressure on manufacturers in the AEE to adopt environmentally friendly production practices (Faber & Frenken, 2009).

As a result of rapid industrial modernization and economic growth, manufacturers in the AEE contribute significantly to their countries' economic growth. Fig. 2 shows the share of manufacturing in total gross domestic product (GDP) and total exports in the AEE. As the manufacturing sector in that area is expected to continue its rapid growth, the balance between economic growth and environmental damage has become a critical issue that requires focused managerial attention (Lee, 2008; Zhu, Sarkis & Lai, 2008). Therefore, manufacturers are now accepting the urgency of adopting green

strategies with both customers and suppliers to reduce the damage caused by their products and services to the environment (Zhu & Geng, 2013; Zhu & Sarkis, 2004).

Over the past decade, GSCM has emerged as a significant strategy within the domain of sustainability, involving activities ranged from green purchasing to product recycling with suppliers and customers (Walker & Jones, 2012). In particular, GSCM refers to the employment of comprehensive environmental consideration within supply chain management. GSCM therefore incorporates the design of products, the selection and sourcing of material, manufacturing processes, final product delivery to customers, and disposal or recycling at the end of a products' useful life (Zhu & Sarkis, 2004). Despite the fact that the transition from traditional supply chains to GSCM has been driven by multiple factors that motivate manufacturers to adopt GSCM practices, there are also barriers that hinder the implementation of those practices (González-Torre, Álvarez, Sarkis, & Adenso-Díaz, 2010; Porter & Van der Linde, 1995).

The extant literature reports that companies in the AEE have started adopting GSCM practices due to an increase in motivational drivers from stakeholders such as customers (Zhu, Sarkis, & Geng, 2005; Lai & Wong, 2012), legislative authorities (Birkin, Cashman, Koh, & Liu, 2009; Liu et al., 2012), and suppliers (Lee, 2008; Yen & Yen, 2012). There are two reasons why stakeholder theory is appropriate for explaining the motivational drivers for GSCM. Firstly, stakeholders are increasingly demanding that the companies in the AEE address environmental issues. Secondly, GSCM practices require inter-organizational collaboration with all stakeholders in a highly competitive environment (Walker & Jones, 2012). Stakeholder theory aims to identify and group the input and the output environments of each company (chiefly suppliers and consumers), its competitive environment (companies that produce similar products or offer similar services), and its regulatory environment (Delmas & Toffel, 2004; DiMaggio & Powell, 1983). These stakeholder groups are thus included in this study because previous research suggests that the characteristics of specific groups impact the willingness of a focal company to adopt GSCM practices (Kassinis & Vafeas, 2006).

Researchers have reported that relational governance plays a significant role in achieving a competitive advantage, including the maintenance of good relationships between a company and its partners in the supply chain (Cheng, 2011; Wang & Wei, 2007). While relational governance in the West is administered largely by legislation and regulations such as contracts, in the AEE it is driven by morality and social norms (Tomás Gómez Arias, 1998) and governed by Guanxi (Yen, Yu,

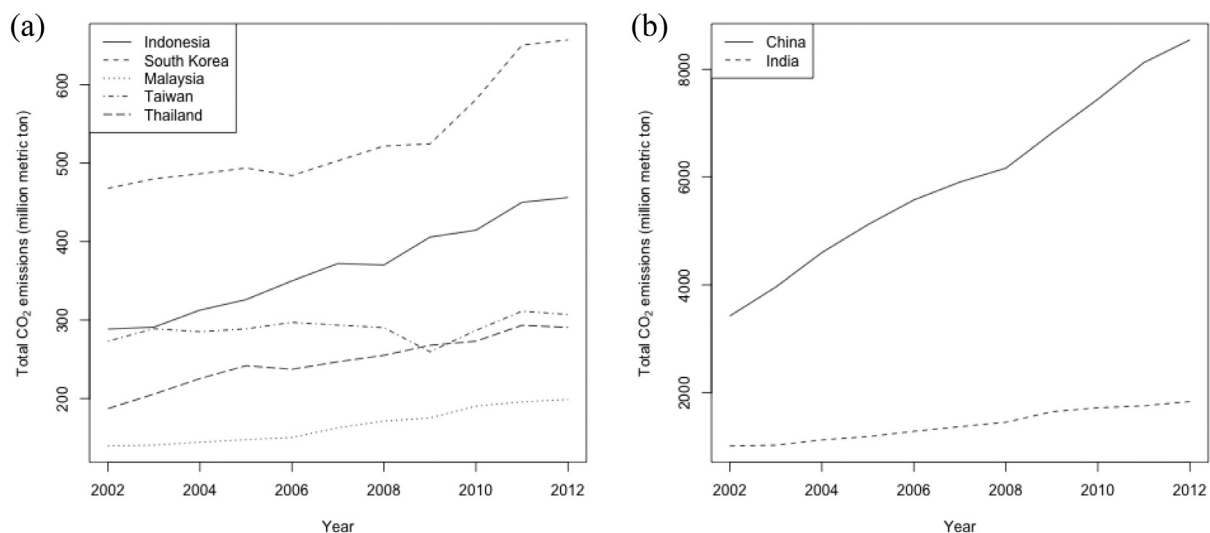


Fig. 1. The total carbon dioxide emissions in AEE. (Source: The World Bank, 2014)



Fig. 2. Contribution of manufacturing sector to total GDP and export in the AEE in 2013.
(Source: World Databank, 2014)

& Barnes, 2007). For instance, a Chinese supply chain manager might make a purchase from a supplier because the owner of the supplying firm has helped the manager's children gain admission to a prestigious school (Dunfee & Warren, 2001). By contrast, people in the West tend to separate personal and business relationships in terms of reciprocity (Lin & Si, 2010), therefore, personal connections established between individuals could not be used to govern the relationships between firms as readily is done in the AEE.

Chua, Morris, and Ingram (2009) found that the most preferred relational approach for managers in China is to develop and maintain Guanxi throughout their business networks. Influenced by the strong Confucian emphasis on interpersonal relationships, Guanxi encourages appropriate behavior between the ruler and the subject, who could be the spouse, the siblings, or friends (Zhao, Flynn, & Roth, 2006), in an effort to ensure the development of social harmony, order, and stability. Given the prevalence of Confucianism, Guanxi is considered as one of the most important relational characteristics in the AEE, which affects a firm's business decisions and behaviors (Lee, Pae and Wong, 2001; Luk et al., 2008; Park & Luo, 2001).

Referred to the Asian style of interpersonal networking, Guanxi has a fully developed body of literature in organizational theory research focusing on inter-firm business relationships involving Chinese counterparts (Luo, Huang, & Wang, 2012). In the supply chain context, researchers have emphasized the significance of Guanxi in buyer-supplier relationships (Metters, Zhao, Bendoly, Jiang, & Young, 2010). For example, Barnes, Yen, and Zhou (2011) indicated that Guanxi is crucial for developing business relationships in the Chinese markets for Western investors. Zhao, Huo, Flynn, and Yeung (2008) suggested that Guanxi has a positive effect on buyer-supplier relationships in China through reciprocal exchange of favors and obligations. However, there is scant literature that discusses the role of Guanxi in the GSCM context. In fact, studies on the effects of Guanxi in GSCM are in their infancy, simply noting Guanxi's importance without detailing how Guanxi might influence, positively or otherwise, the adoption of GSCM principles.

To the best of our knowledge, there are only two studies that have explored the role of Guanxi in GSCM in any depth (Cheng, Yip, & Yeung, 2012; Luo, Chong, Ngai, & Liu, 2014). However, the results of these two studies are contradictory. Cheng et al. (2012) found that better Guanxi links with suppliers would have a positive effect on the adoption of GSCM practices, because higher levels of Guanxi would increase a buyer's transaction-specific investments and valuable resources while reducing a supplier's opportunistic behaviors. However, Luo et al. (2014) found that the higher levels of Guanxi between the focal company and its suppliers reduced the focal company's willingness to

implement GSCM practices. Luo et al.'s (2014) finding is in line with Peng and Luo (2000), who showed that Guanxi hindered buyers' adoption of SCM practices because buyers tend to spend too much time and effort in maintaining their Guanxi ties. Therefore Luo et al. (2014) argued that buyers' investment in GSCM practices was insufficient due to the tremendous time and effort invested in building and maintaining Guanxi links. While the existing literature offers contradictory results on Guanxi and the adoption of SCM or GSCM practices, we believe that it is important to clarify the role of Guanxi in the adoption of GSCM in the manufacturing sector in the AEE. In so doing, our study opens a new avenue of research by proposing roles for different types of Guanxi in the adoption of GSCM practices while accounting for various drivers and barriers. Specifically, we focus on two types of Guanxi: 1) relational Guanxi at the individual level and based on social exchange theory; 2) aggregated Guanxi at the firm level and derived from social capital theory.

This study aims to shed light on the influences of drivers, barriers, and Guanxi on the adoption of GSCM. In order to achieve this aim, we integrate academic findings through a systematic literature review of GSCM practices in the manufacturing sector. We firstly examine how drivers and barriers affect the adoption of GSCM practices, using stakeholder theory to identify four key drivers: suppliers, customers, communities, and competitors. Secondly, we investigate the three key barriers: influence of sub-suppliers, complexity of regulations, and the cost of adoption. Thirdly, we establish the moderating effect of Guanxi on the relationships between drivers/barriers and the adoption of GSCM practices. Based on critical discussions of the literature, a conceptual framework is derived, together with four propositions that explain the relationships among drivers, barriers, and Guanxi for the adoption of GSCM practices in the AEE. By doing so, we address the following research question:

What role does Guanxi play in the adoption of GSCM by manufacturing companies in the AEE?

The rest of the paper is organized as follows: Section 2 explains the systematic literature review methodology that we adopted in this research. Section 3 presents the review results. Section 4 interprets and discusses the results and Section 5 concludes the paper.

2. Methodology

We adopt a systematic approach to review the literature as described by Tranfield, Denyer, and Smart (2003) and Denyer and

Tranfield (2009). Fig. 3 shows the three key areas in our review. The GSCM adoption process is usually initiated by drivers (Lee, 2008; Lee & Klassen, 2008), so we selected drivers as the focal area of this study, accompanied by barriers that hinder the GSCM adoption (Govindan, Kaliyan, Kannan, & Haq, 2014). While the role of Guanxi has been noted in the SCM literature as a critical relationship governance mechanism for achieving business success in Asia (Carr & Pearson, 1999; Cheng, 2011), our study also explores the role of Guanxi in the adoption of GSCM practices, before considering the complex relationship between drivers, barriers, and GSCM practices.

From October 2014 through March 2015, we searched five leading databases that index the majority of the academic literature in the area of operations management. These include ABI/INFORM, Scopus, Emerald, Business Source Premier, and ScienceDirect. The search included articles with search terms appearing in titles, abstracts, and keywords. Table 1 lists the keywords used in our search. We divided the search terms into four groups by country or region and scope. We then categorized words with similar meanings related to influential factors as drivers, enablers, and pressures. For instance, to find articles that discuss influential factors, we used “AND” to combine the search terms under region or country and GSCM practices with any search term under the influential factors section. Moreover, the wildcard character “*” sign was used at the end of some search terms to expand the scope of the search through different keywords that represent similar concepts (e.g., “relatio*” to capture both “relational” and “relation”).

To ensure that we obtained the best available evidence for this review, we implemented four inclusion and exclusion criteria (Tranfield et al., 2003). A paper needs to satisfy all of the following four criteria to be included in our literature review:

- (i) The paper should report a research in the context of AEE. An emerging economy is a region with social or business activity in the process of rapid growth and industrialization (Meyer & Thaijongrak, 2013). The AEE were selected based on either nominal or inflation-adjusted GDP from the BRIC and MIKT countries – Brazil, Russia, India, China, Mexico, Indonesia, Nigeria, Turkey – and the MSCI Emerging Markets Index (MSCI Research, 2014). Seven countries were ultimately selected for inclusion: China, India, South Korea, Malaysia, Taiwan, Thailand, and Indonesia because AEE.

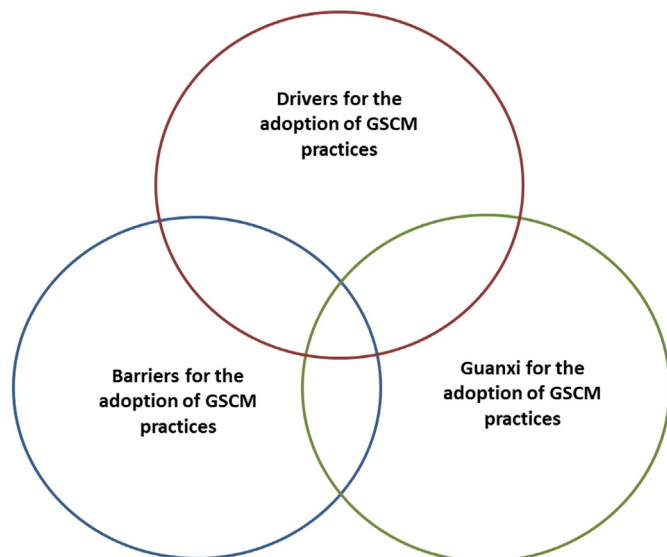


Fig. 3. The scope of the literature research.

Table 1
The key words used for searching the literature.

AND				
Region/Country	GSCM practices		Influential factors	Guanxi
	AND		OR	
China	Green	Practice*	Influen*	Guanxi
India	Sustainab*	Activities	Driver	Personal relatio*
Thailand	Environment*	Operation*	Enabler	Informal relatio*
Malaysia	Purchas*	Logistic*	Pressure	Personal network
South Korea	Supplier*	Product	Influence	Inter-personal relatio*
Indonesia	Reverse logistics	Manufact*	Barrier	
Taiwan	Eco-design	Adopt	Obstacle	
Asia			Preventer	
Emerging economies			Antecedent	

*: Any string of characters.

- (ii) For the SCM activities, the paper should address the management of all activities that transform natural resources, other raw materials, and components into finished products delivered to end customers.
- (iii) The manufacturing industry studied in the paper should include companies that produce goods by using labor and machines, tools, chemical and biological processing, or formulation (Zhu, Geng, Sarkis and Lai, 2011).
- (iv) The paper need to be published in peer-reviewed journals in English. Since the GSCM concept is evolving rapidly, we selected articles based on journal quality to ensure the inclusion of the most important articles. For this, the initial proposal limited searches to journals in the CABS (Chartered Association of Business Schools) Academic Journal Guide 2015¹ to ensure the quality of the articles (Alhejji, Garavan, Carbery, O'Brien, & McGuire, 2015; Ashby, Leat, & Hudson-Smith, 2012).

3. Review results

Using all combinations of search terms in the operations and SCM fields, this search found 359 results from peer-reviewed journals. After removing the duplicates, 270 papers remained. We then read the titles, abstracts, and keywords and applied the four inclusion-exclusion criteria to these papers, which resulted in 79 papers for the full review. Finally, we read the full texts of these 79 papers and examined whether their results and insights were relevant to our research question. After this final screening, 42 papers were included in this study. Table 2 presents the CABS ranking for each of the accessed journals and the number qualified papers published in them. There were 20 journals which published scholarly work on GSCM practices, barriers, drivers, and Guanxi.

The leading role in the publication of GSCM in the AEE region is held by the *International Journal of Production Economics* with eight papers, followed by the *International Journal of Operations and Production Management* with five papers. Details of these papers are summarized in Table 3.

The search was conducted between October 2014 and March 2015. Fig. 4 shows the distribution of the papers published between January 2005 and March 2015 (the cut-off date of the survey). To the best of our knowledge, the first research into influential factors for the adoption of GSCM practices in the AEE was reported by Zhu et al. (2005), who demonstrated that manufacturers in China have increased their environmental awareness due to regulatory, competitive, and marketing drivers. However, this awareness had not been translated into the

¹ <http://charteredabs.org/academic-journal-guide-2015/>.

Table 2
Number of papers and CABS ranking of the journals.

Journal name	Number of papers	CABS ranking (2015)	Journal name	Number of papers	CABS ranking (2015)
International Journal of Production Economics	8	3	Production and Operations Management	2	4
International Journal of Operations and Production Management	5	4	Supply Chain Management: An International Journal	3	3
Production Planning and Control	3	3	Ecological Economics	1	3
Transportation Research, Part E: Logistics and Transportation Review	3	3	Industrial Marketing Management	1	3
Business Strategy and the Environment	2	2	Journal of Business Ethics	1	3
Corporate Social Responsibility and Environmental Management	2	1	Journal of Business Research	1	3
International Journal of Production Research	2	3	Journal of Purchasing and Supply Management	1	3
Journal of Environmental Management	1	2	Technological Forecasting and Social Change	1	3
Journal of Manufacturing Technology Management	2	1	Technology Analysis and Strategic Management	1	2
Omega	2	3	Journal of Supply Chain Management	1	3

adoption of GSCM practices because of the high initial costs of adoption and lack of relevant knowledge (Zhu et al., 2005).

Fig. 5 presents the profiles of the countries studied in the papers in our survey. The majority of the publications about AEE have focused on China (21 papers) and Taiwan (9 papers), and we found no papers focused specifically on Thailand or Indonesia. Unsurprisingly, given its role as the world's new factory (Zhu, Tian, & Sarkis, 2012), the manufacturing sector in China has received the most attention (50%). This is probably due to the Chinese government's adoption of innovative industrial development approaches, such as the circular economy strategy in 2008, to balance economic development and the environmental burden caused by its burgeoning manufacturing sector (Huang, Tan & Ding, 2012). In addition, these studies focused mainly on investigations of large, foreign or state-owned manufacturing firms in China as the manufacturing sector in China is under pressure from both international and domestic forces to conserve resources and reduce their environmental impact (Lai & Wong, 2012; Zhu, Geng, & Lai, 2010).

Regarding the theoretical perspectives of the reviewed papers shown in Table 4, it is important to note that most papers did not explicitly specify a theory underpinning their research. Among those that specified their theoretical stances, institutional theory (11 papers) and social capital theory (three papers) were the most commonly used theories. Those that used institutional theory did so primarily to identify external drivers such as suppliers, customers, communities and competitors.

Fig. 6 illustrates the growing trend of publications that focus on at least one of the three areas of drivers, barriers, and Guanxi for the adoption of GSCM practices in the AEE (Table 3). The number of studies that examined drivers for the adoption of GSCM practices showed the largest increase, growing steadily from 2005 to 2009 and even more rapidly from 2010 to 2015. The role of drivers in the adoption of GSCM practices was studied in six papers in the earlier period, perhaps because only a few manufacturing companies in the AEE had implemented the GSCM practices by then (Zhu et al., 2005). Researchers in that period might have wanted to identify which practices were worth adopting rather than what drove to their adoption.

Drivers related to the adoption of GSCM practices showed a clear increase recently, with 33 papers published since 2010. Meanwhile, the literature studying barriers to GSCM adoption began to emerge in 2013, without overlapping with the research studying the role of drivers. Finally, the influence of Guanxi on the adoption of GSCM practices was only discussed in two papers published after 2010, showing a lack of research attention compared to the drivers and the barriers. The overlap between Guanxi and drivers in two periods (2010–2012 and 2013–2015) suggests an inclusive relationship between Guanxi and GSCM drivers. However, while it is not clear how Guanxi is associated with the drivers of GSCM practices, further research is needed on the intersection of drivers, barriers, and Guanxi in relation to the adoption of GSCM practices in the AEE.

4. Discussion

4.1. GSCM practices

As Table 2 shows, most of the reviewed papers discussed GSCM practices as a set of managerial tactics, which integrate environmental issues into SCM. These practices include internal environmental management, green purchasing, supplier selection, eco-design, customer cooperation, and investment recovery. As a pioneer in the field, Zhu et al. (2005) investigated five practices including internal environmental management, eco-design, green purchasing, cooperation with customers, and investment recovery in the Chinese textile, automobile, power generation, chemical, electrical, and electronics industries. These practices have been widely used by other researchers to measure the adoption of GSCM practices in manufacturing sectors in Malaysia (ElTayeb, Zailani, & Jayaraman, 2010; Hsu et al., 2013; Zailani, Eltayeb, Hsu, & Tan, 2012), India (Mitra & Datta, 2014; Mohanty & Prakash, 2013), and Taiwan (Chan, He, Chan, & Wang, 2012; Wu, Ding, & Chen, 2012).

Only four of the reviewed papers classified GSCM practices into specific categories (Lee & Klassen, 2008; Guoyou et al., 2013; Wu, 2013; Zhu, Cordeiro, & Sarkis, 2013). Lee and Klassen (2008) and Zhu, Cordeiro, et al. (2013) classified them based on company boundaries. Lee and Klassen (2008) grouped intra-organizational green activities into internal GSCM practices and green activities relating to direct collaboration with stakeholders into external GSCM practices. Similarly, Zhu, Cordeiro, et al. (2013) assigned each of the five GSCM practices to one of two types: internal practices that can be managed and implemented by individual manufacturers and external practices that require the cooperation of external stakeholders.

Two of the reviewed papers highlighted the positive relationship between internal practices and external practices (Huo et al., 2014; Zhu, Sarkis, & Lai, 2013b). Zhu, Sarkis, et al. (2013) collected data from Chinese manufacturing companies and found that implementing practices independently increased the adoption of collaborative GSCM practices. Huo et al. (2014) used data from 617 Chinese manufacturing firms to report that internal information sharing was positively related to external information sharing with suppliers and customers. This result can be explained by stage theory (Zhao, Huo, Selen, & Yeung, 2011), which holds that internal practices are a prerequisite for external collaborations. From this perspective, external collaboration demands coordination with internal environmental management through the support of key leaders, a commitment to the environment, and cross-functional cooperation (Zhu, Sarkis, et al., 2013). This relationship was also found in the automotive industry in Spain, where the adoption of ISO 14001 certification encouraged further adoption of external environmental practices involving both suppliers and customers (González-Benito & González-Benito, 2008). These authors indicated that because the adoption of ISO 14001 standards requires proper identification of environmental configuration, it effectively requires obtaining the involvement and

Table 3

List of reviewed papers.

Paper	Type of factor (dependent variables)	GSCM practices (independent variables)	Other variables	Theoretical approach	Method	Data	Region
1 Zhu et al. (2005)	Regulation, Export Stakeholders, Internal	Internal environment management, Green purchasing Customer cooperation Investment recovery Eco-design	None	Not specified	Factor analysis	Mail survey with 314 companies	China
2 Lee (2008)	Buyer, Government Supplier	Willingness	Control variables (CV): Firm size Age of the firm	Not specified	Factor analysis	Mail survey with 142 SMEs companies	South Korea
3 Lee and Klassen (2008)	Buyer monitoring Internal championing Regulation	Internal: product, process, organization External: purchasing, supplier	None	Not specified	Content analysis	Case study with 2 large buying companies	South Korea
4 Zhu, Sarkis, Cordeiro & Lai (2008)	Organization learning Management support	External activities Investment recovery Eco-design	CV: Firm size, industry level, regulatory pressures, market, cost, suppliers	Resource Based View and Institutional Theory	Hierarchical regression	Mail survey with 314 companies	China
5 Birkin, Cashman, Koh and Liu (2009)	Regulation, Stakeholders Social response Competitive benefits	Employee relation Environment awareness	None	Not specified	Content analysis	Survey and interview with 20 companies	China
6 Cheung, Welford and Hills (2009)	Internal External	Green supplier	None	Not specified	Content analysis	Interview with 9 companies	China
7 ElTayeb, Zailani and Jayaraman (2010)	Regulation, Customer Social Expected benefit	Green purchasing	CV: Type of industry, Number of employees and suppliers, ownership, Participation in green associations	Not specified	Factor analysis	Mail survey with 132 ISO-certified companies	Malaysia
8 Cheng (2011)	Relationship risk	Sharing knowledge	Moderator variables (MV): Relational benefit Guanxi	Not specified	Structural Equation Modeling	Mail survey with 436 companies	Taiwan
9 Lin and Ho (2011)	Technology Organizational Environment	Green logistics	None	Not specified	Factor analysis	Mail survey with 332 companies	China
10 Zhu, Geng, Sarkis et al. (2011)	International regulation Domestic regulation	Customer cooperation Green purchasing Investment recovery	None	Not specified	Structural Equation Modeling	Mail survey with 379 companies	China
11 Chan, He, Chan and Wang (2012)	Internal External	Customer cooperation Green purchasing Investment recovery	CV: Social desirability bias Employee size Operating experience Industry type MV: Competition intensity	Resource Based View	Path analysis	Mail survey with 194 companies	Taiwan
12 Huang, Jim Wu and Rahman (2012)	Task environment	Reverse logistics	None	Not specified	Structural Equation Modeling	Mail Survey with 349 companies	Taiwan
13 Lai and Wong (2012)	Customer, Economic	Green logistics	CV: Type of ownership MV: Environment regulation	Not specified	Structural Equation Modeling	Mail Survey with 134 companies	China
14 Lai, Wong and Cheng (2012)	Customer, Economic Environment	Green logistics	None	Not specified	Structural Equation Modeling	Mail Survey 134 companies	China
15 Liu, Yang, Qu, Wang, Shishime and Bao (2012)	Internal External	Internal Green purchasing Eco-design Investment recovery	CV: Firm size Industry sector	Stakeholder Theory Institutional Theory	Factor analysis	Mail survey with 165 companies	China
16 Miao et al. (2012)	Regulation, Stakeholders Business ethics, Clan culture	Supplier selection Delivery to customers Environmental protection Humanity employees	None	Not specified	Factor analysis	Mail survey with 167 companies	China

17	Wu et al. (2012)	Organization, Social capital, Government involvement	Philanthropy Green purchasing Eco-design Customer cooperation Investment recovery	CV: Firm size, Industry position MV: Market pressure Regulation pressure Competitive pressure	Social Capital Theory Institutional Theory	Hierarchical regression	Web-Survey with 104 companies	Taiwan
18	Yen and Yen (2012)	Supplier, customer, regulation, environment, internal	Supplier collaboration Green purchasing	None	Not specified	Factor analysis	Mail survey with 239 companies	Taiwan
19	Zailani et al. (2012)	Regulation, Customer	Eco-design	None	Institutional Theory	Structural Equation Modeling	Mail survey with 132 ISO-certified companies	Malaysia
20	Zhu, Cordeiro and Sarkis (2012)	International Domestic Foreign-owned Stakeholder	ISO14001, TQEM, eco-auditing respectively	CV: ISO 9000 Firm size, state owned, industry control	Institutional theory	Logistic regression analysis	Survey with 377 companies	China
21	Zhu, Tian, et al. (2012)		Eco-labeling	None	Utilizing Innovation Theory	Modeling with the bass model	Companies listed of Certification Center of the Ministry of Environmental Protection	China
22	Guoyou, Saixing, Chiming, Haitao and Hailiang (2013)	Foreign customer, Foreign investor Stockholder Regulation, community	Green product innovation Green process innovation	CV: Industry Firm size	Stakeholder Theory	Regression analysis	Survey with 4156 companies	China
23	Hsu, Tan, Zailani and Jayaraman (2013)	Regulation Customer, Competitor Social-culture	Green purchasing Eco-design Investment recovery	None	Institutional Theory	Structural Equation Modeling	Mail survey with 132 companies	Malaysia
24	Mohanty and Prakash (2013)	External Internal	Inbound, outbound Compliance, ecological, technology greening Reverse logistics	CV: Firm size Firm type Natural of industry	Not specified	Multiple regression analysis	Survey with 114 companies	India
25	Wu (2013)	Internal Supplier Customer	Green product innovation Green process innovation	CV: Firm size MV: Demand uncertainty Technology uncertainty	Contingency Theory	Hierarchical regression	Mail survey with 211 companies	Taiwan
26	Ye, Zhao, Prahinski and Li (2013)	Top manager posture	Reverse logistics	None	Institutional Theory	Structural Equation Modeling	Mail survey with 209 companies	China
27	Zhu, Cordeiro, et al. (2013)	Domestic Institutional	ISO14001, TQEM,	CV: Firm size Foreign-owned ISO 9000	Institutional Theory	Path analysis	Survey with 396 companies	China
28	Zhu, Sarkis, et al. (2013)	Institutional	Internal EM, Green purchasing Customer cooperation Investment recovery Eco-design	None	Institutional Theory	Logistic regression analysis	E-mail Survey with 377 companies	China
29	Abdulrahman, Gunasekaran and Subramanian (2014)	Management, financial policy, infrastructure	Reverse logistics	CV: Foreign-owned Domestic company	Not specified	Structural Equation Modeling	E-mail Survey with 239 companies	China
30	Govindan et al. (2014)	Financial, involvement and support, technological, knowledge, outsourcing	Green purchasing	None	Not specified	Analytic Hierarchy Process	Mail Survey with 103 companies	Indian
31	Hung, Chen and Chung (2014)	Structural capital Relation capital Cognitive capital	Sharing information of green practice	None	Social Capital Theory	Partial Least Square	Mail Survey with 160 companies	Taiwan
32	Huo, Zhao and Zhou (2014)	Local competitors International competitors	Internal information sharing Sharing with suppliers Sharing with customers	Firm size	Stage Theory	Structural Equation Modeling	Mail Survey with 617 companies	China
33	Lee, Klassen, Furlan and Vinelli (2014)	Green bullwhip	Replace, Accommodate, Negotiate and Collaborate	None	Agency Theory	Content analysis	Case study with 3 companies	South Korea
34	Lo (2014)	Internal, external	Intern environment management, Green purchasing, eco-design, green manufacturing, green logistics	Mediator variables (MEV): Supply chain position	Not specified	Content analysis	Case study with 12 companies	Taiwan

Table 3 (continued)

Paper	Type of factor (dependent variables)	GSCM practices (independent variables)	Other variables	Theoretical approach	Method	Data	Region
35 Luo et al. (2014)	Buyer-seller relationship	Green Collaboration practices	MEV: Guanxi CV: Firm type and age, Number of employees	Transaction Cost Theory	Partial Least Square	Mail Survey with 222 companies	China
36 Mathiyazhagan, Govindan and Noorul Haq (2014)	Regulation, competition, customer, social, financial, production and operation	Green supply chain practices	None	Not specified	Analytic Hierarchy Process	Mail Survey with 53 companies	India
37 Mitra and Datta (2014)	Collaboration with supplier and customer	Eco-design Green logistics	None	Transaction Cost Theory	Structural Equation Modeling	E-mail Survey with 82 companies	India
38 Rauer and Kaufmann (2014)	Supply chain structure-related barriers Environmental standards-related barriers Dynamic Capabilities	GSCM	None	Grounded Theory	Grounded theory	27 interviews with experts from 10 companies	China
39 Wu, Jim Wu, Chen and Goh (2014)	Attribute of strategy	Green strategy	None	Not specified	Hierarchical regression	E-mail Survey with 172 companies	Taiwan
40 Dubey, Gunasekaran and Samar Ali (2015)	Leadership	Supplier relationship management, total quality management	MV: Institutional pressure	Institutional Theory	Hierarchical regression	E-mail Survey with 187 and 174 companies	Indian
41 Huang, Leing, Xiaoming, Management, Lee, Green, Zelbst, Meacham, Bhadauria, Drohomerski and Lima (2015)	Internal driver External pressure	Green supply chain management	CV: SMEs	Institutional Theory	ANOVA	Mail Survey with 202 MSEs companies	China
42 Lee (2015)	Social capital: structural and relation	GSCM	None	Social Capital Theory	Structural Equation Modeling	Mail survey with 207 companies	South Korea

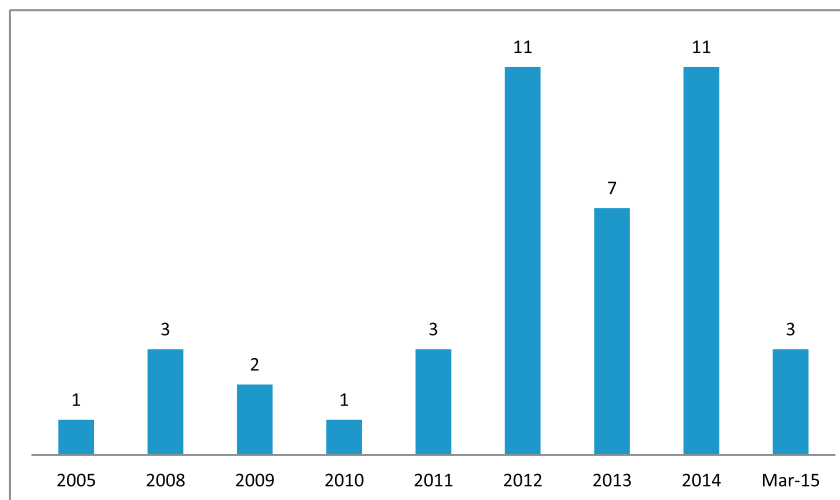


Fig. 4. The distribution of reviewed papers between January 2005 and March 2015.

commitment of different players along the full range of operational activities. Therefore, to ensure the successful adoption of collaborative practices, the commitment and support of managers and the coordination of cross-functional departments are both essential (González-Benito & González-Benito, 2008). Along the same lines, Zhu et al. (2010) carried out a case study in Japan and found that manufacturing companies there adopted independent practices before they even began considering collaborative practices. It is hardly surprising that coordination with suppliers and customers on collaborative practices requires more effort than independent practices, but the real insight appears to be more fundamental than the mere amount of effort. Companies clearly find that beginning with internal practices can lead to valuable discoveries and demonstrate a commitment that makes it easier and more successful to take on the external practices.

To investigate a focal firm's direct involvement in the adoption of GSCM practices under the impact of antecedents and relationship governance, we classified GSCM practices into three categories: intra-organizational environmental management (IEM), customer green cooperation (CGC), and supplier green integration (SGI). According to the Supply Chain Council's SCOR framework (2015), these three practices are necessary to the effective management of the supply chain. IEM practices such as management support, organizational commitment, adoption of environment certifications and programs, employee training, green design, and recycling can all be exercised independently by the focal company (Lee & Klassen, 2008; Zhu et al., 2005). CGC practices are those that demand the direct involvement of customers, including collaboration on eco-design, packaging, transportation, reverse

logistics, and information sharing (Hung et al., 2014; Luo et al., 2014). SGI practices, analogously, are concerned with the direct involvement of suppliers in jointly developing environmental solutions like green purchasing and green design (Cheung, Welford, & Hills, 2009; Dubey et al., 2015).

4.2. Guanxi and GSCM

Guanxi has been identified as an effective marketing tool that is deeply embedded in the AEE (Peng & Luo, 2000) and as a vital source of sustainable competitive advantage for doing business in China (Fock & Woo, 1998; Tsang, 1998). In the SCM context, Lee and Humphreys (2007) found that Guanxi had a positive effect on supplier development, strategic purchasing, and the growth of integrated supplier relationships. Moreover, Liu, Messner, Zhang, and Zhuo (2009) indicated that Guanxi between buyers and sellers contributed to dyadic relationships. However, research on the relationship between Guanxi and GSCM practices in the AEE is sparse. As noted above, we only found two papers that discussed Guanxi in the GSCM context. The first study, by Cheng et al. (2012), demonstrated that Guanxi contributes to increasing the effectiveness of communication in relation to GSCM practices. With data collected from 436 Taiwanese manufacturing firms, they showed that Guanxi positively affected the interaction between relational risk and environmental knowledge-sharing with supply chain partners. Later, Luo et al. (2014) demonstrated that Guanxi mediated the buyer-seller relationship and GSCM implementation. However, they also found that higher levels of Guanxi among supply

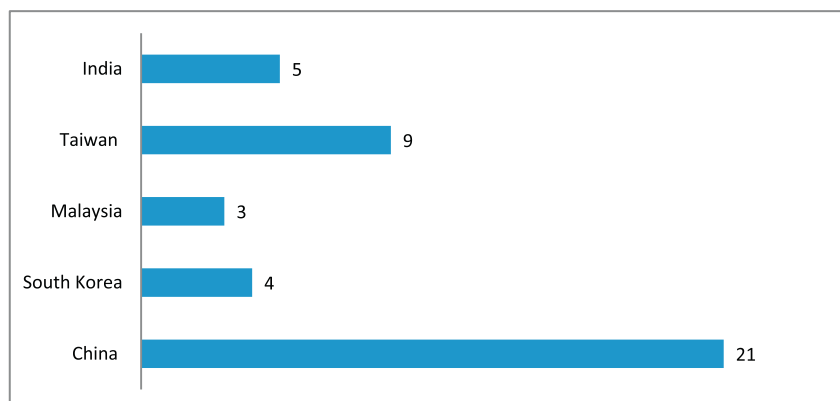


Fig. 5. Geographic distributions of the countries studied in the reviewed papers.

Table 4
Distribution of underlying theories.

Theory	Number of papers
Not specified	20
Institutional theory	11
Resource based view	2
Stakeholder theory	2
Social capital theory	3
Transaction cost theory	2
Innovation theory	1
Contingency theory	1
Stage theory	1
Agency theory	1

chain partners reduced the buyers' willingness to implement GSCM practices. The reason may be that companies that spend more time and money on Guanxi development and maintenance with their supply chain partners tended to have fewer resources remaining to invest on environment practices (Luo et al., 2012; Peng & Luo, 2000).

To achieve a competitive advantage, GSCM adoption requires the involvement of all relevant parties (Zhu & Sarkis, 2004). Scholars have demonstrated that Guanxi plays a significant role in maintaining business relationships in East Asia (Lovett, Simmons, & Kali, 1999; Gao, Knight and Ballantyne, 2012). However, the term Guanxi carries several connotations. Some studies considered Guanxi at the firm level, e.g. between companies as buyers and suppliers (Park & Luo, 2001; Wiegel & Bamford, 2014), while others discussed Guanxi at the interpersonal level between procurement managers and sales representatives (e.g. Yen & Abosag, 2016; Yen, Barnes, & Wang, 2011). To explore in greater depth how these two types influence focal companies' adoption of GSCM in the AEE region, we use the social exchange theory and discuss *relational Guanxi* at the individual level while we build on the social capital theory and explore *aggregated Guanxi* at the firm level.

4.2.1. Relational Guanxi

Relational Guanxi refers to the cultural characteristic of interpersonal linkages between two people that exist within a society (Zhao et al., 2006). In the supply chain context, relational Guanxi between a supplier's sales representatives and a buyer's procurement managers is often considered of great importance in determining the performance of the business relationship (Barnes et al., 2011; Yen & Abosag, 2016).

The concept of relational Guanxi is very much embedded within the social exchange theory (Blau, 1964), which refers to the exchange of favors by using one's personal networks. However, the practices of

developing and maintaining Guanxi differ from social exchanges in Western cultures. For example, rather than returning favors more or less immediately, Guanxi encourages participants to bank favors as savings and only requires returns when necessary (Yen et al., 2011). Furthermore, while people often separate social and business networks in the West, so that favor exchange within one's personal network is often unrelated to business (Cai, Jun, & Yang, 2010), people in many East Asian countries often consider their work to be part of the "extended self" (Guo and Miller, 2010). Therefore, the exchange of favors is often practiced in one's business and personal networks, resulting in a substantial blurring of any ostensible line between the two. Consequently, the concept of Guanxi in the AEE countries tends to have a meaningfully stronger effect on business transactions than social exchange theory does in the West.

Manufacturers have paid substantial attention to the anticipated reaction of their customers due to the sensitive nature of exchanging favors with supply chain partners in the AEE region (Zhao et al., 2008). For instance, if a customer's procurement manager places an order with a focal company, the sales representative of the focal company will be expected to respond with a gift, favor, or concession to that customer. If such reciprocity is not honored over time, the Guanxi dyad established between the company's sales representative and the customer's procurement manager will become strained, damaging the business relationship between the focal firm and the customer (Lee et al., 2001) and leading to poor financial performance (Yen & Abosag, 2016).

4.2.2. Aggregated Guanxi

We conceptualize aggregated Guanxi as the combined relational Guanxi of all employees. A firm's aggregated Guanxi reveals how well-connected a given organization is from the perspective of the Guanxi network. Following basic aggregation principles, the more employees a company has, the more relational Guanxi it possesses and the higher its aggregated Guanxi. On the other hand, the more relational Guanxi an employee has, the more this individual contributes to his or her organization's aggregated Guanxi. Because social relations are considered valuable capital based on the social capital theory (Granovetter, 1992), firms with more employees and better-connected employees are therefore considered to have more social capital (Lee, 2015). Since Guanxi is a critical firm resource in the AEE (Wiegel & Bamford, 2014; Cheng et al., 2012) and an important governance mechanism that facilitates trust and favor exchanges of benefit to organizations (Park & Luo, 2001), it is hypothesized that the aggregated Guanxi is directly associated with a firm's overall resources.

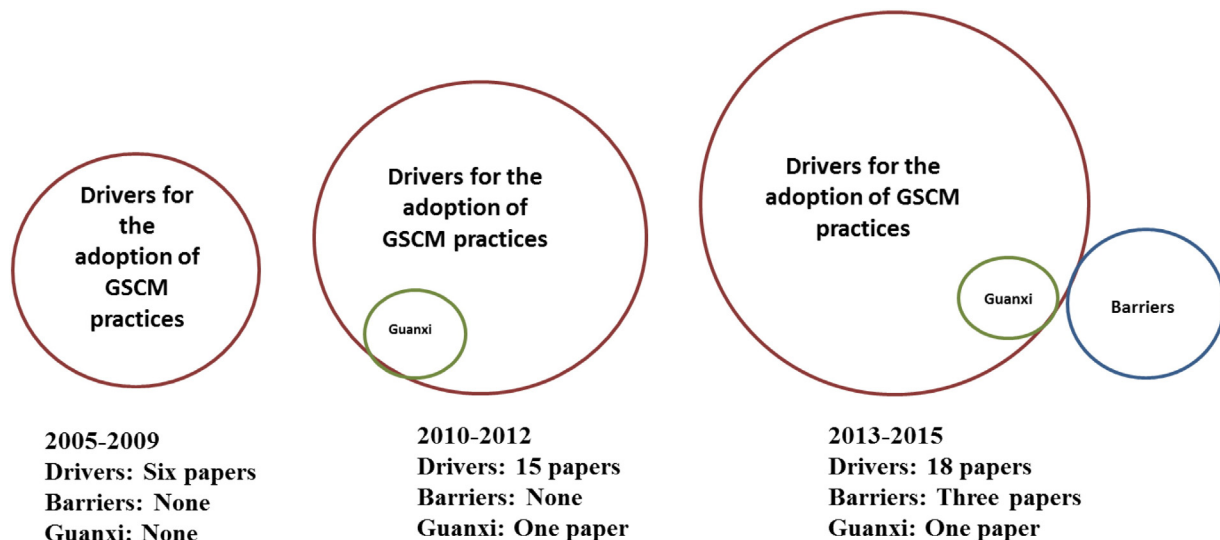


Fig. 6. Trend of publications on the GSCM in three areas.

Table 5
Comparison of relational Guanxi and aggregated Guanxi.

Name	Relational Guanxi	Aggregated Guanxi
Basis	Between individuals	At the Firm level
Definition	A relationship dyad that is established based on trust and carries obligations to facilitate the exchange of favors and affection among individuals	An accumulation of all the employees' interpersonal Guanxi ties as aggregated social capital
Purpose	To gain personal benefits through reciprocal exchanges of favors	To gain broader access and reputation for the benefit of the focal firm
Related theories	Social exchange theory, Institutional theory, Transaction cost theory, Relationship commitment theory, Contingency theory, Confirmation/disconfirmation theory, Confucius philosophy	Social capital theory, Resource based view, Multicriteria decision analysis
Measurement	The quality of relational Guanxi is measured on the levels of affection, interpersonal trust, and reciprocal favor exchange between dyads. See Yen et al. (2011) for further details.	A group of people: A focal firm's employees and their Guanxi connections, as proposed by Eq. (1).

Studies have attempted to explain aggregated Guanxi as firm resources that enhance a firm's competitive advantage (Chen, Ellinger & Tian, 2011). While relational Guanxi helps individual sales representatives strengthen the business relationships with their respective buyers at a personal level, aggregated Guanxi can also assist the sales director in leveraging all other subordinates' interpersonal networks more effectively and establish a pattern that enables the firm to gain a broader access to business transactions (Zhao et al., 2006). In this regard, aggregated Guanxi helps firms open dialogues, build trust, and facilitate exchanges of favors for organizational purposes.

There is an argument as to whether relational Guanxi ties established between two individuals can be transferred to and utilized at the firm level. For instance, Fan (2002) insisted that Guanxi is solely personal in nature thus cannot be sustained at the organizational level. However, Park and Luo (2001) and Standifird (2006) both claimed that key executives' personal Guanxi ties could be utilized as organizational resources for business solutions by the focal company when approaching customers and suppliers. Through interviews with supply chain managers in China, Wiegel and Bamford (2014) showed that it was common practice for Chinese companies to provide financial support to their employees to establish and advance their personal Guanxi connections because companies believe that such relational Guanxi could later be utilized at the firm level. In this regard, employees' relational Guanxi can increase the chances of business information exchange, thus improving the value of social connections of the company through the concept of aggregated Guanxi.

Since relational Guanxi plays an important role in identifying and approaching potential customers (Park & Luo, 2001), it is unsurprising for firms to perceive their employees' Guanxi connections as their own social capital that are of benefit to the firm. For example, one marketing employee may be able to introduce a new raw material supplier that provides greener materials at a more competitive price, while an HR employee may know a potential buyer who is interested in the focal firm's products. In this situation, employees' personal connections appear to be relational Guanxi that can be utilized as valuable resources by their employer in the form of aggregated Guanxi. While Guanxi established at the individual level is difficult to transfer directly, the more resourceful employees a firm employs, the better is its aggregated Guanxi. In summary, relational Guanxi ties do serve as building blocks of the aggregated Guanxi. However, not all relational Guanxi ties may be of the same importance to a focal firm. Hence, it is essential for firms to identify the useful relational Guanxi ties of their employees, since the

number of resourceful relational Guanxi indicates the degree of building and sustaining competitive advantages for the company.

To calculate the aggregated Guanxi at the focal firm level, we first define the following variables:

j, k :	Index for employees
\downarrow :	Index for firms with Guanxi ties
f :	Index for the focal firm
n :	Number of firms with whom the focal company has (relational) Guanxi ties
n_{\downarrow} :	Number of employees in firm $\downarrow; \downarrow=1, \dots, n$
n_f :	Number of employees in the focal firm
$F = \{f_1, \dots, f_n\}$:	Set of firms with whom the focal company has Guanxi ties
w_{\downarrow} :	Importance of firm $\downarrow; \downarrow=1, \dots, n$
$E_{\downarrow} = \{e_1, \dots, e_{n_{\downarrow}}\}$:	Set of employees in firm $\downarrow; \downarrow=1, \dots, n$
$E_f = \{e_1, \dots, e_{n_f}\}$:	Set of employees in the focal firm
$Guanxi_{jkl}$:	Magnitude of relational Guanxi (for instance in a scale of 1 to 7) between employee j from the focal company f and employee k from firm \downarrow

Using the above notations, the aggregated Guanxi for the focal firm f can be calculated as the weighted sum of relational Guanxi ties between its employees and other actors in the supply chain including all other firms using the Equation (1):

$$Aggregated\ Guanxi_f = \sum_{l=1}^n w_l \sum_{j=1}^{n_f} \sum_{k=1}^{n_l} Guanxi_{jkl} \quad (1)$$

Table 5 provides a summary of main differences between the relational Guanxi and the aggregated Guanxi.

4.3. Stakeholder drivers

Using stakeholder theory, we identified four types of stakeholders whose behaviors can drive the adoption of GSCM. These include customers' requirements, suppliers' advances in GSCM practices, communities' attitudes, and competitors' actions.

As one of the major stakeholders, customers can exert significant pressure for sustainability and environmental performance from suppliers (Eltayeb & Zailani, 2009). The reviewed articles showed that the manufacturers in the AEE that deal with customers from Western countries have a higher willingness to meet consumers' social expectations and norms (Lin & Ho, 2011; Miao, Cai, & Xu, 2012). This may be due to the fact that many manufacturing companies in the AEE are suppliers to large multinational corporations (MNCs) based in Western countries; the pressure from these MNCs could be the most effective way to improve GSCM practices in the AEE (Anbumozhi & Kanda, 2005). For example, shoes produced in Fujian from the southeast China could not be exported to Japan and European countries if the glue used when manufacturing those shoes did not meet these countries' environmental requirements (Zhu et al., 2010). Furthermore, domestic customers in China, especially younger generations, have more awareness about the environmental impact of products, production processes, and raw materials; and they have begun to exhibit a purchasing preference for green products (Zhu, Geng and Lai, 2011). Similarly, Hsu et al. (2013) indicated that although Malaysian consumers generally lag behind European and Japanese consumers in terms of environmental awareness, younger consumers in that country are also developing a heightened environmental awareness and often prefer products with green components. These kinds of purchasing behaviors from young customers may motivate domestic companies to adopt GSCM practices for their long-term benefit.

In the literature reviewed, eight papers noted the impact of supplier advances on the adoption of GSCM practices, with contradictory results. Seven of these papers found that supplier advances in adopting GSCM

practices themselves and close relationships with those suppliers had a positive effect on the adoption of GSCM practices by the focal firm (Huang et al., 2015; Huang et al., 2012; Hung et al., 2014; Wu et al., 2012; Yen & Yen, 2012; Zhu et al., 2005; Zhu, Tian, et al., 2012). For instance, Huang et al. (2012), Wu et al. (2012), and Yen and Yen (2012) demonstrated that closer relationships with suppliers provide more opportunities for knowledge-sharing and assisting companies in recombining and utilizing their required resources. Thus, Zhu et al. (2005) argued that the adoption of GSCM practices for focal companies can be promoted by suppliers' advances in those practices. However, Miao et al. (2012) found that supplier drivers did not significantly affect the green logistics practices in Chinese manufacturing companies. More specifically, they found that supplier drivers were related solely to corporate philanthropy. One of the possible explanations is that most of the firms surveyed in their study were relatively large in terms of size and domestic sales. Another reason may be that suppliers are significantly upstream in the supply chain and could not really be defined as drivers (Huang et al., 2015). Focal companies are more likely to collaborate with customers to achieve more effective GSCM practices (Walker, Di Sisto, & McBain, 2008). Nevertheless, we consider supplier advances to be a driver because they have the power to encourage the idea of adopting GSCM practices (Carter & Dresner, 2001).

In the AEE, communities are becoming increasingly important in encouraging the adoption of GSCM practices (Birkin et al., 2009). The term "communities" here refers to the organizations or persons not directly involved in the firm's operations but with the knowledge of the firm such as industrial association and environment NGOs (Nelson, Rashid, Galvin, Essien, & Levine, 1999). Notwithstanding this growing importance, the studies reviewed indicated a limited focus on communities as GSCM drivers. Only four papers mentioned that communities may influence decision making regarding the adoption of GSCM practices (Guoyou et al., 2013; Liu et al., 2012; Mohanty & Prakash, 2013; Zhu, Sarkis, et al., 2013). Mohanty and Prakash (2013) carried out a study in India, reporting that community stakeholders such as industry associations are the biggest single driver for companies to adopt GSCM practices. However, Guoyou et al. (2013), Liu et al. (2012), and Zhu, Sarkis, et al. (2013) found that community pressure alone could not drive a company to adopt the GSCM practices in China. This may be due to the fact that the most common role for communities is to complain about illegal activities related to environmental issues rather than to lobby for proactive efforts like GSCM practices (Guoyou et al., 2013). Another reason may be that environmentally-oriented communities such as NGOs remain in their infancy in the AEE and lack the social, legal, and political support that they generally have in many Western nations (Liu et al., 2012).

The literature also showed that the AEE's manufacturing sector often learn from successful competitors in the same industry (Lee, Rha, Choi, & Noh, 2013) to gain a competitive advantage in the global market (Birkin et al., 2009; Huang et al., 2012; Liu et al., 2012). For example, joint ventures in the AEE can implement GSCM practices to save energy and improve supply chain performance by learning from their developed-country parent companies, and then diffuse their experiences to other manufacturers (Zhu, Cordeiro, et al., 2013). Huo et al. (2014) demonstrated that most large and successful enterprises in Taiwan are facing intense environmental pressure from their competitors' actions. Similarly, Hsu et al. (2013) found environmental pressures from competitors were also intense in Malaysia, especially among large companies who have learned how to evaluate their immediate, second-tier, and third-tier suppliers from leading multinational firms operating in the same industry. By contrast, Miao et al. (2012) observed that competitors' pressures did not affect the adoption of GSCM practices in China. The reason for this difference might be that the relatively large size and sales of the Chinese firms make them less susceptible to influence by their competitors (Wu et al., 2012).

In line with the above arguments, we develop the following proposition:

P1. Stakeholders' drivers have a positive impact on the adoption of GSCM practices.

4.3.1. The moderating role of aggregated Guanxi in the driver-practices relationship

As discussed in Section 4.2.2, the aggregated Guanxi is a crucial company resource. Therefore, it is worthwhile for senior management to audit a company's aggregated Guanxi with external stakeholders like customers, suppliers, communities, and competitors (Tsang, 1998). In a supply chain, firms tend to adopt environmental practices under pressure from stakeholders. Firms perceive that adopting environmentally friendly practices would add value to Guanxi ties and improve their collaborative business performance (Luo et al., 2012). Regardless, it would be difficult for a company to ignore pressure from stakeholders who are perceived to be significant to the company's aggregated Guanxi (Cheng, 2011), as Guanxi inevitably affects the company's willingness to maintain long and positive relationships with its stakeholders (Gwinner, Gremler, & Bitner, 1998).

Due to the underdeveloped market structures, poorly clarified property rights, and unstable formal institutions, a focal firm's aggregated Guanxi often governs business transactions in emerging economies (Cai and Yang, 2014). Therefore, even as stakeholders' behaviors may facilitate a focal firm's adoption of GSCM practices (Hsu et al., 2013), aggregated Guanxi may further strengthen the effect of stakeholders' behavior on the adoption of GSCM practices. In particular, a focal firm with a higher level of aggregated Guanxi is more likely to adopt GSCM practices out of fear of risking its multiple Guanxi ties or damaging its established long-term relationships due to non-compliance.

Based on the above argument, the higher the aggregated Guanxi that a company enjoys, the stronger is the effect of stakeholder drivers on the adoption of GSCM practices. We thus hypothesize that:

P2. The association of stakeholder drivers with the adoption of GSCM practices will be moderated by aggregated Guanxi such that the association will be significantly stronger when a higher level of aggregated Guanxi is present.

4.4. Supply chain barriers

According to González-Torre et al. (2010), barriers are the factors that hinder the adoption of GSCM. Based on the reviewed papers, we grouped supply chain barriers into three categories: lack of influence on sub-suppliers, the costs of adoption, and complexity of regulations.

The lack of influence on sub-suppliers is a key barrier during the adoption of GSCM practices. Most companies have undertaken supplier audit programs with only their first-tier suppliers (Gimenez & Tachizawa, 2012; Krause, Handfield, & Tyler, 2007; Sancha, Wong, & Thomsen, 2014). However, in the AEE, most manufacturing companies have suppliers in several tiers (Lee et al., 2014). Some scholars pointed out that extending the adoption of GSCM practices to second- and third-tier suppliers, let alone beyond, is challenging. For instance, Rauer and Kaufmann (2014) found that some companies have as many as 10 tiers of suppliers, which makes it daunting if not impossible to assess environmental behavior along all stages of the supply chain. Govindan et al. (2014) demonstrated that most companies do not know how to measure and monitor green practices among their lower-tier suppliers. Similarly, Rauer and Kaufmann (2014) reported that the companies they interviewed in China could not monitor and compel sub-suppliers to follow their environmental code of conduct. By and large, the assessment and collaboration occur only between the focal company and its first-tier suppliers.

According to Govindan et al. (2014) and Abdulrahman et al. (2014), the perceived high costs of environmental adoption is another key barrier that hinders GSCM adoption. Govindan et al. (2014) studied the Indian manufacturing industry and found that this industry was unable to fulfill its economic needs and hence did not spend enough to implement GSCM principles. Similarly, Abdulrahman et al. (2014) argued that the high costs and the lack of financial return were the major barriers for green reverse logistics in the Chinese manufacturing industry. GSCM practices may be regarded by managers as difficult to implement and of lower priority than other initiatives that offer more tangible financial returns on investment (Zilahy, 2004). Moreover, as GSCM practices can easily be imitated, it is often questioned whether these practices actually create value for customers and contribute to either competitive advantage or financial performance (González-Torre et al., 2010).

Several studies also claimed that the complexity of regulations can hinder the adoption of GSCM. For example, Rauer and Kaufmann (2014) indicated that companies buying from developed countries often have stringent environmental requirements for their upstream suppliers in emerging economies that have less advanced environmental regulations. Abdulrahman et al. (2014) found that, unlike foreign-owned companies in China, locally owned firms consider the lack of enforceable laws a major barrier that hinders the adoption of GSCM principles. In line with this argument, bureaucracy has also been cited as a barrier to adopting GSCM (González-Torre et al., 2010; Zilahy, 2004). Bureaucratic barriers include situations in which special permissions and rezoning are needed to develop GSCM infrastructures.

Given these arguments, we develop the following proposition:

P3. Supply chain barriers have a negative impact on the adoption of GSCM practices.

4.4.1. The moderating role of relational Guanxi in the barrier-practices relationship

The lack of influence on sub-suppliers could cause a dysfunctional conflict, including distorting information that harms other decision makers and leads to interactions filled with hostility and distrust (Ruekert & Walker, 1987). These dysfunctional conflict can reduce the level of cooperation and coordination and the quality of Guanxi between a focal company and its business partners (Cheng, 2011b). However, if a focal firm's employee, e.g. a factory manager can establish a better relational Guanxi with key actors from its many lower-tier suppliers, the focal firm may be able to influence and control the suppliers' behaviors more effectively (Barnes et al., 2011; Yen & Abosag, 2016). Therefore, we propose that relational Guanxi can lower the negative impact of a focal firm's lack of influence on the GSCM adoption by suppliers at all tiers.

Moreover, since the AEE suffer from a lack of stable and reliable regulatory systems, company owners in the AEE tend to utilize their own political Guanxi ties with government officers to deal with these often unpredictable regulatory challenges (Chen et al., 2011). In a way, the negative impact of complex regulations on the adoption of GSCM practices will be lessened if the owners of the firm have relatively higher level of relational Guanxi with the governments.

GSCM often requires high costs of adoption, especially at the initial stage. While Guanxi underpins one's reputation that provides social control in the AEE, good relational Guanxi ties between for example a sales representative and a procurement buyer could also increase the buyer's confidence in such collaborations (Park & Luo, 2001). A strong relational Guanxi tie between a procurement manager and a sales manager in the AEE can function as a safeguard that provides an element of assurance to business collaborations (Yen & Abosag, 2016; Zhao et al., 2008). Relational Guanxi therefore helps promote better understanding of the benefits of adopting GSCM practices. Therefore, although the

initial costs for adoption may appear to be high, good relational Guanxi ties are more likely to help a focal firm persuade its supply chain partners to work together by sacrificing some of their short-term benefits to better achieve long-term gains (Zhao et al., 2006, 2008).

Based on the discussion above, we offer the following proposition:

P4. The link between supply chain barriers and the adoption of GSCM practices will be moderated by relational Guanxi such that the negative association will become significantly weaker when a high level of relational Guanxi is present.

4.5. The conceptual framework

The above propositions are integrated into a conceptual framework shown in Fig. 7, which outlines the critical relationships among significant GSCM dimensions in the AEE. Moreover, a measurement guide is also provided in Appendix A to help future research to conduct empirical studies to test this conceptual framework.

5. Concluding remarks

Based on a systematic literature review that identifies the trends and the gaps in the adoption of GSCM practices in the AEE, we developed a conceptual framework that elaborates the drivers and the barriers of GSCM adoption in the AEE, under the moderating effect of Guanxi.

We proposed Guanxi as a moderator for GSCM adoption because our systematic literature review suggests that Guanxi affects the strength and the direction of the relation between an independent predictor variable (such as a driver) and the dependent variable (GSCM adoption). Guanxi is a third variable affecting the correlation between other drivers, barriers, and GSCM adoption. On the other hand, there are significant consequences to wrongly assessing a concept as a mediator when it should be a moderator. A mediator implicates a cause-and-effect relationship; given an independent variable, a mediator, and a dependent variable, there must be a cause-and-effect relationship from the independent variable to the mediator and from the mediator to the dependent variable (Baron & Kenny, 1986). In our literature review, we found no such causal relationships from either drivers or barriers to Guanxi. In this particular research setting, it would simply be incorrect to categorize Guanxi as a mediator.

The four types of stakeholders who drive GSCM adoption based on the stakeholder theory include suppliers, customers, communities, and competitors. The three barriers that could hinder GSCM implementation are identified as the lack of influence on sub-suppliers, the perceived high costs of adoption, and complexity of regulations. Then, we discussed the important role of Guanxi on the adoption of GSCM practices in the AEE by proposing that aggregated Guanxi moderates the relationship between drivers and practices. We argued that intra-organizational practices will enhance CGC practices and SGI practices. IEM practices are often the first step in the adoption of GSCM practices. Through a systematic review of Guanxi in the GSCM literature, we articulated the difference between relational Guanxi between individuals and aggregated Guanxi at the firm level. Subsequently we devised a method to calculate aggregated Guanxi based on the relational Guanxi ties of the focal company's employees, considering the number and the relative importance of individual Guanxi ties. Finally, we developed a new conceptual framework that includes three groups of constructs related to the adoption of GSCM: drivers, barriers, and Guanxi.

5.1. Research implications

This study has important implications for research on sustainability, especially the adoption of GSCM practices in emerging economies. It offers a conceptual framework based on a systematic literature review so that future research can test this framework with empirical

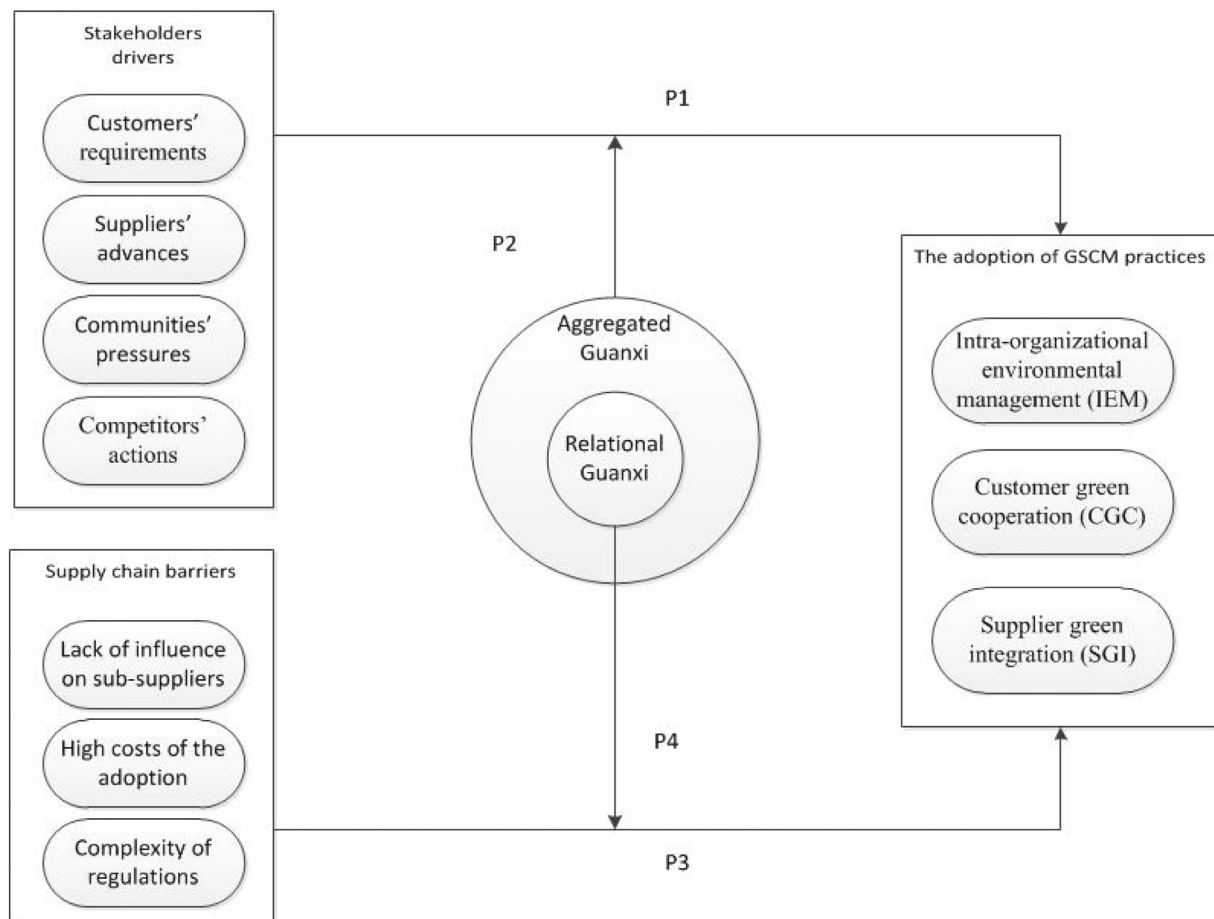


Fig. 7. The conceptual framework.

data. The study has paved the way for more empirical research to test the validity of the conceptual framework and its components, in whole or in part, in the AEE. Future research can also investigate how institutional differences influence the relationships among the adoption of GSCM, Guanxi, and stakeholder forces. Furthermore, future studies may consider evaluating a focal firm's comparative Guanxi by measuring the degree of centrality using its network position index, a concept drawn from the social network theory (Sparrowe, Liden, Wayne, & Kraimer, 2001) in which the degree of centrality denotes the degree of being at the core of a network by comparing the distance of the position of an individual's linkage to others in the network at the firm level.

In addition, this research provides insights into the current status of studies in the AEE such as the key research methodologies and the gaps in adopting major theoretical approaches. As most of the reviewed papers did not explicitly specify an underlying theory, future studies are encouraged to develop research based on strong theoretical foundations for better understanding and expanding the body of knowledge in the GSCM domain. Moreover, future studies can be conducted across different industrial sectors such as construction, power, and textiles, in which only a very few studies were found in the systematic literature review. It would also be stimulating to apply this framework by examining companies that are not located in the AEE but do conduct business with manufacturers in the AEE to determine whether the propositions in this framework can be generalized to this related but nevertheless distinct context. Given the similarities among emerging economies, comparable research with slight amendments to the framework and propositions could be carried out in other parts of the world, such as South America and Africa.

Furthermore, this review found a major gap in explaining the relationship between GSCM and Guanxi. Only two papers, to the best of our knowledge, had touched on this issue in any depth. Further research is sorely needed to explore the impact of Guanxi on the adoption of GSCM practices and to test the notions and impact of relational Guanxi and aggregated Guanxi. Investigating the role of Guanxi in the adoption of GSCM practices, as well as other management practices such as process improvement, lean operations, and corporate social responsibility in the AEE is worth further exploration.

5.2. Managerial implications

Due to the widespread awareness of environmental sustainability in developed markets, companies in the AEE are under pressure to recognize and implement GSCM practices. The outcomes of this study can help guide the manufacturers in the AEE to enhance the sustainability of their operations and to green their supply chain through recognizing the drivers of, barriers to, and moderating effect of Guanxi on GSCM practices. This could inform policymakers and key members of manufacturing supply chains in this region to revise their environmental policies and strategies based on factors that most influence the GSCM adoption. For instance, our research reveals that stakeholders such as suppliers, customers, communities, and competitors can facilitate the adoption of GSCM practices.

Our research focused on the manufacturing industry in AEE. Unlike developed countries in which green awareness in business operations is high, many emerging economies are still in the early stages of implementing GSCM practices. Many manufacturing companies in other emerging economies like Turkey and Brazil can develop GSCM strategies based on the framework developed in this study. Our study

has illuminated the influential role of Guanxi on the adoption of GSCM in the AEE, and has major implications for MNCs who want to promote the adoption of GSCM in this part of the world. Understanding

the role of Guanxi will help these firms develop closer relationships with manufacturers in the AEE before seeking to adopting GSCM practices.

Appendix A. Measurement guide for the conceptual framework

Variables	Dimension	Definition	Measurement
The adoption of GSCM practices	Intra-organizational practices	GSCM practices that can be exercised independently by the focal company.	Management support, organizational commitment, adoption of environment certifications and programs, employee training, green design and recycling (Lee & Klassen, 2008; Zhu et al., 2005).
	Customer cooperation	GSCM practices that direct cooperation with customers.	Collaboration with customers for eco-design, packaging, transportation, reverse logistics and information sharing (Hung et al., 2014; Luo et al., 2014).
	Supplier integration	GSCM practices that are related to direct involvement with suppliers.	Green purchasing, green training (Cheung et al., 2009; Dubey et al., 2015).
Stakeholders drivers	Customers' demand	Environmental demand from both international and domestic customers.	Customers' requirements on being a more environmentally conscious firm (Anbumozhi & Kanda, 2005; Zhu, Geng and Lai, 2011).
	Suppliers' advances	Supplier's advances on the adoption of GSCM practices.	Supplier's advances in developing environmentally friendly goods/ production/packaging (Lee & Klassen, 2008; Zhu et al., 2005).
	Communities' pressure	The pressure from communities on the adoption of GSCM practices.	Neighboring communities/media/industry follow closely about the environmental issues (Birkin et al., 2009; Liu et al., 2012).
	Competitors' actions	Competitors' successful adoption of GSCM practices in the same industry.	The benchmark and guidance from competitors' earlier adoption of GSCM practices (Hsu et al., 2013).
Supply chain barriers	Lack of influence on sub-suppliers	Extending the green behavior to the second- and higher-tier suppliers is a challenging issue.	Lack of influence on second- and higher-tier suppliers on green behavior (Abdulrahman et al., 2014).
	High costs of the adoption	The perceived high costs of GSCM adoption.	Costs of initial capital/dealing with hazardous waste disposal/recruitment of extra human resources Govindan et al., 2014).
	Complexity of regulations	Complexity and enforceable environmental regulations hinders the GSCM practices.	The complexity of laws, regulations, and directives on environment (Liu, 2014).
Guanxi	Relational Guanxi	The relationship networks that carry obligations to facilitate the exchange of favors among individuals.	Levels of affection, interpersonal trust, and reciprocal favor exchange (Yen et al., 2011).
	Aggregated Guanxi	The accumulated total relational Guanxi connections of senior employees who represent and lead the business.	Using Eq. (1)

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