# Examining the cultural differences in disseminating green supply chain in global subsidiaries

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**Abstract**

Multinational corporations (MNCs) are composed of subsidiaries with different cultures, and such culture differences between headquarters and subsidiaries have been conceptually proposed to negatively affect headquarters disseminating green initiatives to their subsidiaries. Despite MNCs vast size and cross-national-border influence on green innovation, very few empirical efforts have been devoted to examine the culture distance challenge. Drawing on Cultural Contingency Theory (CCT) and Natural Resource-Based View (NRBV), this research collected data from 141 senior managers in charge of green initiatives from subsidiaries in 39 countries of an MNC. We empirically investigate how national cultural distance influences subsidiaries' green supply chain (GSCM) adoption levels, and how headquarters can alleviate such cultural influence. Our results show that, though cultural distance has a negative influence on headquarters-subsidiary green compatibility, we empirically validate that headquarters can overcome this cultural-distance problem by strategically using cultural similarity in response to each distinctive culture embedded in subsidiaries to strengthen a shared vision. Specifically, four cultural characteristics can strengthen the shared vision, including low individualism, low uncertainty avoidance, masculinity, and a long-term orientation. MNCs can eventually benefit from the cross-culture cooperation in disseminating GSCM if headquarters can choose a cultural mechanism that best suits local subsidiary.

# 1. INTRODUCTION

During the past few decades, there has been growing pressure on enterprises to pay more attention to environmental issues. Society expects firms to not only generate profits, but also to disclose their triple bottom line (3BL): how firms' operations affect *profits, people*, and the *planet* (Kleindorfer et al., 2005). Green supply chain management (GSCM) has gained rising importance since sustainable competitive advantages have a foundation in enterprises' capabilities of implementing green practices into their traditional supply chains (Linton et al., 2007). However, GSCM is complicated because it involves strategy optimizations throughout the supply chain, from upstream green materials purchasing, supplier management, through environmentally friendly manufacturing, operating, and retailing, to downstream product reusing and recycling (Linton et al., 2007; Vachon and Klassen, 2006).

While green supply chain management is an inherently complex task, implementing GSCM into a multinational corporation (MNC) is even more challenging because it involves coherent cooperation among subsidiaries across the world (Peng and Lin, 2008). In the context of MNCs, subsidiaries get resources from headquarters so subsidiaries have to follow headquarters' policy. Headquarters also audits and mandates its worldwide subsidiaries to show the same green image. In this regard, the attitude of headquarters toward green management affect whether the green management matches with the subsidiary's operation. However, though subsidiaries are under the same corporate headquarters, each has its sub-goals, local values, domestic-constraints, and diverse national cultures, which may not be aligned with headquarters' green mission. Most extant studies, however, investigate green practices at the independent firm level, with small- and medium-sized enterprises (SMEs) as main research targets, and their investigated samples are mostly within a specific country (see Table 1 in the literature review for details). Very few studies empirically investigate green supply chain management across national borders, and even fewer efforts are spent on how to implement GSCM in large MNCs, which is conceivably more complicated than similar implementation by a small-sized independent firm (Hsu et al., 2014).

This study aims to address this research gap by investigating how MNCs can implement GSCM effectively in their worldwide subsidiaries with a *national culture* perspective. We emphasize national culture because MNC subsidiaries locate in culturally different nations. Many previous MNC studies indicate that, beyond corporate boundaries, national culture is a crucial factor affecting MNC innovation adoption level and subsequent performance (Taras et al., 2010). On the one hand, embedded national cultural differences may cause conflicts between subsidiaries and headquarters, and such conflict may result in difficulties in reaching an agreement. On the other hand, subsidiaries that have different national cultural backgrounds could lead to diversified viewpoints and stimulate brilliant green initiatives. National culture, thereby, could be a double-edged sword for MNCs to exert green supply chain management, contingent upon how MNCs execute the culture tool.

Yet, the double-edged impact of national culture has limited understanding and investigation in business literature. Researchers are called to explore how the critical role of cross-cultural plays in business areas (e.g. Wang et al., 2021; Gupta and Gupta, 2019; Cannon et al., 2010). However, as stated in Gupta and Gupta (2019, p. 2681), "*the role of national culture interactions is important in operations management and supply chain management decisions. Yet, cross-cultural research in this field is limited.*" Drawing on cultural contingency theory (CCT) and Natural Resource-Based View (NRBV), this study aims to investigate how MNCs can conquer national cultural differences in disseminating green supply chain management among their global subsidiaries. We focus on the following research questions:

- To what extent, does *National Cultural Distance* affect subsidiaries' GSCM implementation advocated by headquarters?
- How can headquarters conquer national cultural distance by leveraging subsidiaries' different cultural characteristics to foster GSCM practices among subsidiaries around the world?

Our study positions in the intersection between Business Green Operations, Multinational Operations, Business Ethics, and National Culture. There is no single academic discipline that can tackle the difficult GSCM implementation issue in MNCs through a cultural perspective. Thus, we brought relevant domains

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together to enable new narratives. In particular, our study addresses two business operation depths:

*Organizational Paradoxes.* While company headquarters favor consistent green operations across the enterprise (Sarkis et al., 2011), subsidiaries differ in their compliance with such operations, depending on their local norms, institutions, and values. This fact implies the hidden organizational paradoxes that are specific in the MNC context. It might be true that all subsidiaries aim to maximize the key business performance as members of an MNC, but they also target to balance the economic sense with their local people's principles. These principles or culture are rooted in the local people's beliefs and thoughts as well as the local regulations. Our study suggests that understanding the cultural differences and establishing a shared vision among company divisions are two powerful weapons that help MNCs overcome the differences in norms, values, and institutions to better protect the well-being of all the stakeholders within the company and the external communities. For instance, defining how to purchase nontoxic materials for production might be unable to standardize for all locations, MNCs need to "liquefy" the company regulations with subsidiaries' local culture and regulations. To do so, the headquarters need to build a company-wide vision in which supply chain activities are ensured to serve humanity, inside and outside of the company. A shared vision, in this case, becomes a means of vehicle that carry the company's business guidelines throughout operational differences.

*Theoretical shifts*. Departing from using a typical business theory at firm level, our study integrates diverse theoretical lenses including Cultural Distance (Hofstede, 1980), Cultural Contingency Theory (Newman and Nollen, 1996), and Natural Resource-based view (Barney, 1991), which are commonly used in marketing, general management, and information systems research to form a theoretical triangle that helps solve green supply chain management in MNC subsidiaries. Through this theoretical triangle, our study advances our understanding on green innovation and operation in a multinational cooperation context.

## 2. LITERATURE REVIEW

We review two streams of extant studies related to our study, GSCM and national culture, to identify two

research gaps that motivate our study.

**2.1 Green Supply Chain Management (GSCM)**

Our literature review of GSCM reveals that most extant studies examine green practices at the *firm* level, and their samplings of firms are usually SMEs in one country. Little attention has been devoted to green supply chain management at the MNC level, despite their vast size and huge influence across national borders and cultures (Table 1). Moreover, since many existing firm-level studies investigate green practices among SMEs, the drivers and barriers found in these prior studies though may still influence MNC subsidiaries (e.g. regulatory, market pressure etc.), their impacts may change in the presence of duality stemming from globalization pressure pertaining to headquarters and localization forces relating to domestic environment (e.g. national culture) (Hsu et al., 2014). For example, regulation and market pressure are identified as critical factors to influence green practices adoption in traditional firm-level green studies. However, different from an independent firm, subsidiaries of MNCs are obligated to comply with headquarters' guidelines, but they also operate in a domestic environment endowed with different settings. This unique duality faced by MNC subsidiaries makes traditionally validated determinants of green adoption (e.g., regulation, market pressure etc.) change their importance in the MNC context. Thus, MNCs face more complexity in integrating suppliers, customers, and subsidiaries that are beyond home-country boundaries. Such complexity and duality uniquely faced by MNC headquarters and subsidiaries warrant further investigation, indicating the ***first research gap*** that we aim to bridge.

Table 1: Green SCM studies at different levels

| Levels | Sampling firms | Studies |
|---|---|---|
| Firm- level | Firms in a single country | Min & Galle (2001); Zhu & Sarkis (2006); Samaddar and Kadiyala (2006); Zhao et al. (2008); Chen (2008, 2010) Holt & Ghobadian (2009); Lin & Ho (2010); Li et al. (2019); Xie et al. (2019); AlNuaimi et al. (2021) |
| | Small and medium enterprises (SMEs) | Gadenne et al. (2009); Lee and Klassen (2008); Lee (2009); Brammer et al. (2012); Raghavendran et al. (2012); Achi et al (2022); Bag et al. (2022) |
| **Multinational Corporations** (MNCs) or firms cross-countries | | Peng & Lin (2008); Cruz & Pedrozo (2009); Canon et al. (2010); Mathiyazhagan et al. (2013); Power et al. (2015); Wang et al. (2021); Ha (2021) |

Factors specific in the MNC context, such as headquarters-subsidiary relationships, need to be carefully considered but are overlooked in existing studies. For instance, at the bottom of Table 1, only a handful of prior studies examine the fact that subsidiary resources (Peng and Lin, 2008), subsidiary learning (Cruz and Pedrozo, 2009), and supplier cooperation (Mathiyazhagan et al., 2013) impact MNC subsidiaries' green adoption levels, while Ha (2021) investigate how foreign MNCs conducting green activities affect local firms. Despite these earlier efforts, incorporating *national culture* as an important perspective to examine GSCM diffusion in MNCs is still limited. For instance, Canon et al. (2010) show empirical evidence that buyer-supplier relationships are moderated by culture, while Samaddar and Kadiyala (2006) found that culture affects outsourcing decisions. More recently, Power et al. (2015) investigate how national culture affects green investments at plants in twenty-four counties, while Wang et al (2021) examine national culture on corporate green proactivity in seventeen countries. Although many scholars advocate cross-cultural supply chain research is greatly needed (e.g., Gupta and Gupta, 2019; Cannon et al., 2010; Zhao et al., 2006; Pagell et al., 2005), a recent study by Gupta and Gupta (2019, p. 2682) concludes that cross-cultural research in business discipline remains scarce, thus showing the ***second research gap*** that our study aims to address.

Specifically, though the prior studies advance our understanding of GSCM implementation from a cultural perspective, our study is different in that it examines subsidiaries located in different countries with different national cultures, but still under the same pressure from an MNC's headquarters. Our investigation is intriguing because headquarters favor consistent green operations that enrich a holistic image across enterprise (Sarkis et al. 2011), yet subsidiaries differ in their compliance with such forces, depending on the local (national) culture they experience simultaneously. Together, these two forces (standard green practices from headquarters and local culture) generate dilemmas for subsidiaries that might struggle between fully obeying headquarters' green requirements and exploiting favorable activities in domestic environments (Hsu et al., 2014). The resulting duality from the two forces may mitigate the impact of critical factors identified in firm-level green research when considering MNC subsidiaries' GSCM adoption.

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**Research gaps.** In summary, this literature review reveals two research gaps. First, there are very few prior studies investigating the adoption of GSCM at MNCs, despite their vast size and a huge influence in initiating and fostering green practices. Second, how national culture affects headquarters-subsidiary cooperation on green supply chain management has not been thoroughly examined. Our study addresses the two research gaps.

### 2.2. National Culture Distance

**National Culture.** Hofstede's cultural dimensions (Hofstede, 1980) are most often used in earlier culture studies. According to Hofstede (1980, p. 21), the definition of culture is "*the collective programming of the mind which distinguishes the members of one group or category of people from others.*" National cultural dimensions, or generalized features of countries, explain the embedded values in each country to determine people's thoughts and actions (Hofstede, 1980). These dimensions could effectively help scholars understand workplace behavior under specific cultural circumstances. This study adopts Hofstede's classic taxonomy of culture, which includes six dimensions.

*(1) Power Distance Index (PDI)* - is the extent to which less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally. Enterprises in a low-power-distance country have a tendency toward decentralization; in a high-power-distance country, hierarchy is often seen and there is a strong dependence relationship between boss and subordinate. *(2) Individualism versus Collectivism (IDV)* - is the degree to which individuals are integrated into groups and derive identity from the self versus the collective. In an individualistic country, people tend to pursue self-achievements and decision-making power; in a collectivistic country, people have strong ties within groups, and they value relationships with the community to which they belong, seeing common goals and interests as a top priority. *(3) Masculinity versus Femininity (MAS)* - Masculine cultures value competitiveness, assertiveness, and materialism; on the other hand, feminine cultures emphasize interpersonal relationships

and quality of life[1]. *(4) Uncertainty Avoidance (UAI)* - is the degree to which members of a culture feel uneasy about ambiguous and unknown situations. People in a high uncertainty avoidance country need precision and formalization from their superiors and feel more comfortable with written rules; people in a low uncertainty avoidance culture have more tolerance for ambiguity, thus are more willing to adopt innovation. *(5) Long-term vs. Short-term Orientation (LTO)* - Long-term orientation indicates the fostering of virtues oriented toward future rewards, especially perseverance; for short-term orientation, it represents virtues related to the present and past, fulfilling social obligations, and respect for tradition. (6) *Indulgence versus Restraint (IVR)* - Indulgence stands for a tendency to allow relatively free gratification of natural and basic human desires related to having fun and enjoying life; restraint reflects a conviction that such gratification needs to be curbed and regulated by strict social norms.

**Cultural Distance.** While *culture* is the collective programming of the mind that represents a group of people's values, thus illustrating how they think and react (Hofstede, 1980), *culture distance* represents a general concept of the inherent differences between two nations (Kogut and Singh, 1988). *Culture distance* is a widely used method of quantifying the abstract notion and objectively stands for the differences in ways of doing things between host and home country. Based on Hofstede's six cultural dimensions, Kogut and Singh (1988) provide a quantitative method to calculate the difference between two countries, which is widely used in previous culture studies. It is a general method with the assumption of zero covariance between the different dimensions of culture, and can be calculated with Formula (1):

$$KS_{ij} = \frac{1}{n}\sum_{d=1}^{n} \frac{(I_i^d - I_j^d)}{V^d} \quad ............................................................................... \ (1)$$

$KS_{ij}$ is the cultural distance between countries i and j, $I_x^d$ is the index of country x in dimension d, $V^d$ is the variance of the index for dimension d, and **n** is the number of cultural dimensions. In the case of MNCs, the

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[1] Please note that when Hofstede's dimensions are used, some studies use a less offensive label, task-orientation vs. person-orientation, to replace the masculine-feminine terminology. In our study, we follow Hofstede's original terminology for consistency.

method provides a simple approach to show the cultural distance between host and home countries, thus providing a general idea of how differently headquarters and its subsidiaries think and make decisions based on their inherent culture.

Culturally dissimilar managers from different countries cause internal friction (Killing, 1983), which further reveals that MNC members with a large *cultural distance* may have a hard time coordinating within a partnership. Large cultural distance increases conflicts and misunderstandings and, therefore, constitutes an obstacle to green innovation transfer between MNC headquarters and their local subsidiaries. If subsidiary employees are asked to carry out tasks that are not compatible with their national cultural values, it would be costly for the MNCs to extend new operations (Shane, 1993). The larger the distance, the more efforts both headquarters and subsidiaries need to exert to mitigate collaboration difficulties in achieving a common goal (Beugelsdijk et al., 2018). Culture distance is a predisposing factor that companies should carefully consider before choosing the location of subsidiaries and before diffusing innovations, such as green across enterprises (Vaaland et al., 2004).

Since this study posits national culture as a crucial factor influencing GSCM diffusion in MNCs, we further review MNC and culture literature. We found that, indeed, national culture is frequently identified as a key determinant affecting innovation and knowledge transfer in MNCs. Table 2 shows representative studies that empirically examine how national cultural differences critically affect MNCs' innovation adoption decisions and subsequent performance. For example, Jones and Davis (2000) and Ambos and Schlegelmilch (2008) found that some types of national culture are more supportive of innovation, and suggest MNCs locate their R&D labs in such countries. Williams and van Triest (2009) report that both external national culture and internal firm culture affect MNCs' decisions to decentralize, with individualism in the home country and uncertainty avoidance in the host country having significant influence. Furthermore, some studies focus on specific cultural dimensions, such as power distance and uncertainty avoidance to examine how culture influences IT transfer processes in MNCs (Shore and Venkatachalam, 1996).

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In other perspectives, some studies focus on how *cultural distance* between headquarters and subsidiaries affects MNC innovation implementation or performance, though mixed results are reported. For instance, some studies claim that culture distance significantly influences technology transfer between headquarters and subsidiaries of MNCs (Cui et al., 2006; Holtbrügge and Berg, 2004; Lucas, 2006), whereas other studies, such as Gomez-Mejia & Palich (1997) and Williams & van Triest (2009), claim that cultural distance does not affect MNCs decisions or firm performance. Therefore, while earlier MNC innovation adoption studies propose national culture as a key factor that needs to be considered when investigating MNC behaviors, the inconsistent results related to culture distance's impact on MNCs should be further explored. To the best of our knowledge, no existing studies have ever empirically included *culture distance* into GSCM diffusion in the MNC context with an emphasis on the *headquarter-subsidiary* culture distance perspective. Our study aims to address this void.

Table 2: Prior research of national culture on MNC innovation adoption or performance

| Culture | Studies | Application | Findings |
|---|---|---|---|
| **Cultural dimensions** | Jones & Davis (2000) | R&D location | Different foreign R&D has its suitable cultural profile. |
| | Jung et al. (2008) | TQM performance | TQM practices are significantly influenced by national culture. |
| | Ambos & Schlegelmilch (2008) | R&D laboratory performance | Laboratories perform much better in culturally fit locations. |
| | Lucas (2006) | Knowledge transfer | Knowledge transfer is more likely to be successful in two culturally-aligned MNC subsidiaries. |
| | Shore & Venkatachalam (1996) | IT transfer | High/low power distance and uncertainty avoidance have a different effect on new application transfer. |
| | Williams & van Triest (2009) | Decentralization | Internal firm culture and external national culture affect MNC's decision to decentralize, with individualism and uncertainty avoidance having significant influence. |
| **Cultural distance** (between headquarters and subsidiaries) | Gomez-Mejia & Palich (1997) | Firm performance | Cultural diversity shows no significant effects on firm performance. |
| | Holtbrügge & Berg (2004) | Knowledge transfer | Knowledge is hard to transfer across large cultural distance. |
| | Cui et al. (2006) | Technology Transfer | Organizational cultural distance has a negative influence on technology transfer. |
| | Björkman et al. (2007) | Capability transfer | Cultural differences have a negative effect on post-acquisition capacity transfer through social integration and absorptive capacity. |

### 3. Theoretical Foundation

### 3.1 Cultural Contingency Theory

To understand culture distance in our research context, cultural contingency theory (CCT) is a legitimate premise that views culture as a contingency factor in achieving successful organization outcomes (Newman and Nollen, 1996). The theory states that if organizational structures (e.g., centralized vs. decentralized decisions, work procedures, collective behaviors, clearly defined goals, etc.) are congruent with the culture of employees or subsidiaries in a nation, those organizational structures can greatly assist the achievement of organizational goals, such as better organizational performance or innovation adoption levels. In contrast, employees or subsidiaries may show a lack of commitment to culture incongruent initiatives.

**Compatibility.** Cultural contingency theory (CCT) emphasizes the concept of *compatibility (congruence)* between a specific local culture and an innovation proposed by headquarters in achieving final innovation success (Newman and Nollen, 1996). Such *compatibility*, if manifested in the deployment of suitable organization structure or mitigation processes that suit a specific national culture, could play an important role in affecting innovation acceptance, such as green practices (Newman and Nollen, 1996). For instance, subsidiaries located in countries with a national culture of low power distance tend to perform better or accept innovation more easily if a decentralized organizational structure is used, than subsidiaries in high power distance countries (Williams and van Triest, 2009). Likewise, a subsidiary that emphasizes individual rewards can be an effective incentive for employees in an individualistic national culture, while group-based rewards may be more effective for employees in a collectivistic national culture. In line with CCT, this study highlights such compatibility in our proposed model as shown in Figure 1.

**Green Compatibility.** Following CCT and innovation adoption literature (Rogers, 2003; Lin and Ho, 2011), we define *green compatibility* as the degree to which an innovation (such as green practices) is perceived as consistent with existing values, experiences, work procedures, and needs of potential green adopters (i.e., subsidiaries). In this regard, when headquarters advocates a green initiative, subsidiaries that are culturally

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different from headquarters may be more likely to feel such a green practice is incompatible with their current operations (Hsu et al. 2014; Lin and Ho, 2011). Veltri and Elgarah (2009) also state that cultural differences between two countries (e.g. headquarters vs. subsidiaries) significantly affect innovation compatibility. In contrast, subsidiaries locate in countries that are culturally similar to the headquarters would better perceive the compatibility (Lin and Ho, 2011). For example, Ha (2021) mentions that because of cultural similarity, South Korea's subsidiaries experience less distance from Japan than from other major countries of origin of inward innovation in South Korea, such as the United States and EU countries. Accordingly, we hypothesize large cultural distance negatively affects how compatible subsidiaries feel to adopt green practices in their local environment.

*H1: Large national cultural distance has a negative effect on green compatibility.*

**Green Supply Chain Management Level.** A lack of compatibility with subsidiaries' cultures, beliefs, values, and needs may negatively affect their innovation adoption level (Lin and Ho, 2011). A green practice advocated by headquarters may not appear attractive to subsidiaries located in culturally incompatible countries that do not offer cognitive pressures or incentives in favor of that practice (Westney, 1993). In contrast, if green innovation is compatible with an individual's (employee's) or organization's (subsidiary's) beliefs and needs, the extent of adopting such innovation will increase (Rogers; 2003, Peng, 2001). Ma (2021) reports that foreign MNCs whose country-of-origin has a close culture to the host country, a larger compatibility improves the likelihood of local subsidiaries successfully implementing eco-innovation. This is because high compatibility lessens switching costs and narrows the gap between subsidiaries' existing operations and the new implementation of long-term sustainable GSCM practices (Frambach and Schillewaert, 2002). Cultural contingency theory (CCT) posits that the concept of compatibility between a specific national culture and an innovation proposed by headquarters is critical and can facilitate the acceptance of an innovation (Frambach and Schillewaert, 2002). Accordingly, we hypothesize:

*H2: High green compatibility between headquarters and subsidiaries is positively associated with subsidiaries' GSCM levels.*

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**3.2 Natural resource-based view (NRBV): Shared Vision**

To alleviate the negative impact of cultural distance on compatibility and, consequently, GSCM adoption level, this study further draws on the natural resource-based view (NRBV) and proposes a *shared vision* perspective (Hart, 1995). The well-regarded resource-based view (RBV) suggests that to achieve sustainable competitive advantages, firms must own internal *resources* and *capabilities* that are valuable, rare, imperfectly imitable, and non-substitutable (Barney, 1991; Gold et al., 2009). However, the RBV perspective overlooks the fact that the environment could be a valuable resource as well as a constraint, which affects firms' sustainable competitive advantages (Corbett, 2010). This is because increasing concern about the deteriorating natural environment (e.g., serious pollution, global warming) threatens firms' sustainable competitive advantages while firms' existing capabilities and resources may not be ecologically sustainable when facing new challenges from a rapidly changing natural environment.

NRBV proposes that firm resources, capabilities, and environment should be interactively linked, and suggests three firm-specific capabilities related to environment to achieve sustainable competitive advantages when considering natural environmental challenges: (1) pollution prevention (a capability to prevent emissions and waste), (2) product stewardship (a capability to deliver environmentally friendly products/services), and (3) sustainable development, which is the most critical capability, referring to long-term environmental and social focus to create sustained competitive advantage. Such sustainable development is through "*accumulation of rare and firm-specific resources, involving a shared vision of the future*" (Hart, 1995, p. 1003). In this sense, a shared vision is the key to generating innovation enthusiasm for green (Dyer and Singh, 1998), and is considered a rare firm-specific capability that very few companies can establish or maintain (Fiegenbaum et al., 1996; Hamel and Prahalad, 1989). NRBV states, "*firms that have a demonstrated capability in establishing shared vision will be able to accumulate the resources necessary for sustainable development more quickly than firms without such prior capability*" (Proposition 3a in NRBV, Hart, 1995, p. 1003). Based on the NRBV, Alt et al. (2015, p. 1) "shared vision represents a key condition for advancing the corporate greening agenda through proactive environmental strategies" In

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line with NRBV and prior studies (Alt et al. 2015), this study proposes that, to alleviate the negative impact of cultural distance on green compatibility and consequently the GSCM adoption level, a firm can establish a *shared vision*.

According to Burgers and Covin (2016), a shared vision is composed of two facets, a common goal (e.g., a green firm image) and a set of rationales why such a goal is beneficial, achievable, and parallel to subsidiaries' sub-goals. In line with this view, a *shared vision* entails two dimensions in this study: (1) a shared vision of the corporate green image that the MNC aims to build (Chen 2008; 2010), and (2) a shared vision of why the MNC can become sustainably competitive if it adopts green. With the two facets, a *shared vision* helps bring headquarters and subsidiaries closer, facilitates subsidiaries perceived compatibility with GSCM practices (Beugelsdijk et al., 2018; Hart, 1995), and enables MNCs to turn their green mission into practice (Berson et al., 2016; Tsai and Ghoshal, 1998). Likewise, Alt et al. (2015) argued that "*a shared vision capability can provide goal clarity by mitigating ambiguities and conflicting interests, giving meaning to new tasks and coordinating the focus of departments and teams. Thus, a shared vision capability can be crucial in generating both internal pressure and the enthusiasm necessary for the successful implementation of green management*" (Alt et al., 2015, p.170). Accordingly, we hypothesize

   *H3: A shared vision can enhance green compatibility between headquarters and subsidiaries.*

This study further posits that with a shared vision, not only can green compatibility be successfully enhanced but such shared vision may even offset the negative effect of *external* cultural distance among headquarters and subsidiaries, such that the inherent differences in values and attitudes can be alleviated. The rationale is that the concept of shared vision, as discussed by Nohria and Ghoshal (1994), represents an *internally* developed firm culture, which is particularly prevailing in the context of MNC, and could counteract the external national culture effect. Therefore, we also examine whether a shared vision may offset the negative impacts of cultural distance on green compatibility in our data analysis section.

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### 3.3. External drivers of green initiatives:

GSCM is also affected by several external factors that could influence subsidiaries' reactions to headquarters' GSCM policy (Walker et al., 2008). Reviewing literature, we identify two essential external drivers of green initiatives—*societal regulations and shareholder pressure*. How these determinants of green adoption, identified in firm-level studies, may change their magnitude and significance on MNC green adoption at the subsidiary-level warrants further scrutiny.

*Societal regulations***.** Government regulations can foster environmental-friendly initiatives by forcing subsidiaries responsible for environment sustainability (Zhu and Sarkis, 2006; Gadenne et al, 2009), such authoritative rules can coerce subsidiaries to modify their current operations, processes, or structures (Min and Galle, 2001; Zhu and Sarkis, 2006). Governments may also levy environmental taxes or provide subsidies to promote green initiatives (Zhu et al. 2005). Additionally, subsidiaries' GSCM levels can be affected by societal pressure from public groups that vividly convey their values and beliefs; thus, such values and beliefs may be commonly shared and recognized in local environments (Hsu et al. 2014). Every country has different tendencies toward green issues, as some countries have strict environmental protection regulations, and the public has a stronger environmental consciousness. If subsidiaries are located in such countries, the public and government will audit them to ensure they obey laws and norms, and force them to conduct environmental-friendly green behaviors to meet social and regulatory expectations (Sharma and Vredenburg, 1998). This study includes a *society regulation* variable that subsumes the two forces (governmental regulation and societal pressure from public groups) and hypothesizes:

*H4: Stronger societal regulation has a positive impact on subsidiaries' green supply chain*
*management levels.*

*Stakeholders' Pressure.* Primary stakeholders influence enterprise behavior, while coercive pressures from key stakeholders are considered influential determinants of green practices. (Gadenne et al., 2009; González-Benito and González-Benito, 2006). In this study, we follow Henriques and Sadorsky (1996)

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which proposes a critical environmental stakeholder analysis to include suppliers, customers, and competitors as key stakeholders of a subsidiary. Subsidiaries adopting green practices usually need to cooperate with key stakeholders because they share environmental responsibilities (Buysse and Verbeke, 2003; Sarkis et al., 2011). When suppliers of subsidiaries pay attention to environmental issues, they will prefer to cooperate with companies that also care about green operations as their long-term partners, while customer pressure is also reported as an important driver of green initiatives (Raman and Peir, 2006). Meanwhile, if competitors of a focal firm are mostly engaged in green implementation, it pressures the focal firm to emulate its competitors (Walton et al., 1998; Handfield et al., 1997).

*H5: Stronger stakeholder pressure has a positive impact on subsidiaries' green supply chain management levels.*
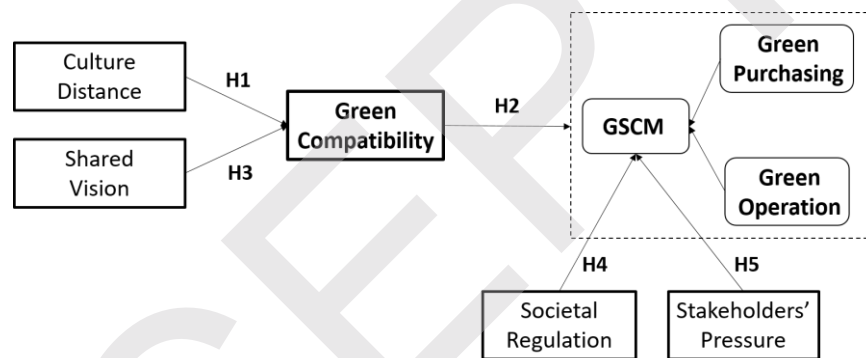


Figure 1. Research model

## 4. METHODOLOGY

**Target MNC.** We applied our green supply chain management research to subsidiaries of an MNC with a specialized field in electronics and electrical engineering. The MNC mainly operates four sectors—Transportation, Healthcare, Digital Industry, and Infrastructure [2]—in more than 190 countries with diversified national cultures, and has 380,000 employees and 705 subsidiaries worldwide. The MNC's headquarters is in Germany and has a well-regarded green image, treating sustainable development and

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2 Transportation sector includes full range of vehicles, rail traffic, logistics facilities, and signal and traffic control solutions. Healthcare sector includes medical technologies and services in diagnostics and therapeutic imagining, laboratory diagnostics etc. Digital Industry sector includes industrial automation and digitalization equipment. Infrastructure sector includes smart grid, smart building, smart energy, e-mobility charging etc.

green practices as a means to achieve profitable and long-term growth, and aligns itself with the goals of the UN's 2030 Agenda for sustainable development while also striving to balance people, environment, and profit. Its environmental portfolio includes environmental technologies, such as energy efficient and renewable energy systems, and helps customers reduce greenhouse gas emissions. The MNC emphasizes green issues by setting standards on its supply chains, working with 90,000 suppliers in 150 countries, and auditing their environmental performance. Also, environmental management systems (EMSs) were assessed to evaluate environmental implementation. The MNC is a world leader in green practices with more than 60% of electrical consumption by its sites globally provided by renewables and 40% of $CO_2$ emissions are reduced. Thus, this MNC aims to achieve green supply chain management and has subsidiaries located in more than 190 countries serves as an appropriate sample frame for our study.

**Data Collection.** To understand the MNC's green practices, we conducted an online survey, posting our questionnaire on a designated, password-protected website. We received great help by the target MNC's senior Purchasing Director to collect data from their purchasing managers/senior staffs. We promised to share our findings with the MNC, while we also promised not to share their company name. We signed a non-disclosure agreement (NDA) with the MNC. We also assured the survey participants that we will remain their answers and identity anonymously to encourage them to participate the survey voluntarily. To examine face validity of the questionnaire, we invited three academics with GSCM expertise and one practitioner with ten years of experience in the green industry to review items. A pilot study was conducted with 15 senior managers engaging in green practices. We then emailed senior managers in charge of green purchasing or green operations in each subsidiary of the target MNC, and asked for their voluntary participation in the main survey. The survey first requested a two-week period to be completed by the respondents (early respondents), and then a second email was sent as a reminder for those who had not completed the survey (late respondents). We received 141 completed surveys out of 929 emails we sent, and these respondents were from subsidiaries in 39 nations or areas (Table 3). It took about 20 minutes for a participant to answer the survey questions. We compared respondents' work experience and subsidiary size with non-respondents'. Our results show the differences were not significant, indicating less concern

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regarding nonresponse bias (Miller and Smith, 1983).

Table 3: Subsidiaries participating in our survey

| Europe | | Americas | Africa | Asia | |
|---|---|---|---|---|---|
| Austria | Netherlands | Argentina | Egypt | China | Saudi Arabia |
| Bulgaria | Norway | Brazil | South Africa | Hong Kong | South Korea |
| Croatia | Poland | Canada | | Indonesia | Taiwan |
| Finland | Portugal | Chile | | Israel | Thailand |
| France | Romania | Mexico | | Malaysia | Turkey |
| Germany | Spain | USA | | Pakistan | U. Arab Emirate |
| Greece | Sweden | | | Philippines | Vietnam |
| Ireland | Switzerland | | | | |
| | Ukraine | | | | |
| **Total nations or areas** | **39** | | | **Total Respondents** | **141** |

Table 4 further summarizes that among the participating subsidiaries, 60.3% were large (more than 1,500 employees), 16.3% medium (501–1500 employees), and 23.4% small (fewer than 500 employees). The sampled subsidiaries cover a wide range of sectors including transportation, healthcare, infrastructure, and digital industry; while most of them are involved in one sector (74.5%), some subsidiaries are involved in more than one sector. Additionally, 53.9 % of subsidiaries are engaged in trading and manufacturing, while 46.1% emphasized trading. Our respondents include approximately equal numbers of managers and senior staff members involved in green supply chain management tasks (58 % vs. 42%). On average, the respondents have 5-year working experience in their current position in each subsidiary in our surveyed MNC. Therefore, the respondents have sufficient experience and knowledge about their subsidiaries' green practices.

Table 4: Subsidiaries characteristics

| *Full-Time Employees number* | (%) | *Main Business* | (%) |
|---|---|---|---|
| ＜500 | 23.4 | Trading | 46.1 |
| 501~1500 | 16.3 | Trading and Manufacturing | 53.9 |
| ＞ 1500 | 60.3 | | |
| *Involved Sector\** | | *Number of sectors involved* | |
| Transportation | 37.6 | 1 sector | 74.5 |
| Healthcare | 24.1 | 2 sectors | 6.4 |
| Infrastructure | 50.4 | 3 sectors | 3.5 |
| Digital Industry | 48.2 | 4 sectors | 15.6 |

Note: *some subsidiaries are involved in more than one sector.

**Measurement.** Items used to measure the constructs in our model are adapted from existing scales. For

*shared vision*, we follow Burgers and Covin (2016) and include two dimensions to operationalize the variable: "*how subsidiaries perceive their corporate green image*" (Chen, 2008, 2010) and "*subsidiaries' beliefs in corporate competitiveness enhanced through green practices*". We measure *green compatibility* with four items adapted from Rogers (2003) and Lin and Ho (2011) to reflect how green practices fit with subsidiaries' current operation processes. *Societal regulations* are composed of environmental regulations and public groups' pressure to reveal the conditions of the external environment, following Zhu and Sarkis (2006) and Henriques and Sadorsky (1996). Consistent with Henriques and Sadorsky (1996) and Buysse and Verbeke (2003), we measure *stakeholder pressure* from three aspects by taking into account of customers, suppliers, and competitors. For our dependent variable, subsidiary's *green supply chain management (GSCM) level*, we follow Srivastava (2007) and Chan et al. (2016) to include two sub-dimensions—*green purchasing* practices and *green operations* practices—and cover 16 different supply chain activities including product design, manufacturing, collaboration with supply chain partners, packaging, and recycling, etc. (see Appendix A for details). Green purchasing is at the frontend of the materials flow in a firm. Thus, it is a crucial start that initiates desirable resource reuse, reduction, and recycling practices happening in the later stages of green operations. We, therefore, consider both green purchasing and green operations to measure GSCM level to comprehensively reflect how green practices are adopted throughout the whole supply chain. All the questions use seven-point Likert scales, with 1 standing for "strongly disagree" and 7 representing "strongly agree". It is worth noting that, although these subsidiaries are under one MNC structure, they are located in 39 countries with diversified local environments and national cultures; thus, our data show great variation (Appendix A shows descriptive statistics of our data).

For the six cultural dimensions of each of the 39 countries or areas (power distance, individualism, uncertainty avoidance, masculinity, long-term orientation, and indulgence), we use an open data source

provided by Hofstede (1980)[3], which is the most commonly used culture dimension at various levels of analysis. These cultural dimension data of each country surveyed is provided in Appendix B. Based on the cultural indexes, Table 5 further shows the variances of the six cultural dimensions, and we calculate the cultural distance between the MNC's headquarters and each subsidiary using the cultural distance formula (see Formula 1 in the Cultural Distance Section).

Table 5. Variances of Hofstede's cultural dimensions

| Dimensions | Variance |
|---|---|
| Power Distance (PDI) | 422.0 |
| Individualism (IDV) | 505.6 |
| Masculinity (MAS) | 260.4 |
| Uncertainty Avoidance (UAI) | 490.2 |
| Long-term Orientation (LTO) | 754.8 |
| Indulgence V.S. Restraint (IVR) | 488.9 |

We used covariance-based structural equational modeling software (AMOS 18.0) and performed a confirmatory factor analysis (CFA) to assess the measurement instruments. The results showed adequate fit indices— $\chi^2$ = 1070, df = 618; comparative fit index (CFI) = .901, incremental fit index (IFI) = .903, and root mean square error of approximation (RMSEA) = .072—that jointly reflect a good fit to data. We conducted a confirmatory factor analysis and assessed the reliability and validity of reflective constructs. As shown in Table 6 composite reliability of each reflective construct is greater than 0.70 (Hair et al., 2006), suggesting appropriate reliability. We examined convergent validity using *t*-statistic of factor loadings; all factor loadings in Table 6 exceeded the common cutoff of .70 (Hair et al., 2006), at *p* < .01.

Table 6: Constructs Reliability and Validity

| Construct | Item | Loading | T-stat | Composite Reliability |
|---|---|---|---|---|
| Green Compatibility (COM) | COM1 | 0.894*** | 43.688 | 0.927 |
| | COM2 | 0.923*** | 54.220 | |
| | COM3 | 0.870*** | 24.943 | |
| | COM4 | 0.798*** | 19.507 | |
| Societal Regulation | SR1 | 0.817*** | 9.302 | 0.893 |

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[3] https://www.hofstede-insights.com/country-comparison. We use Hofstede's culture scores rather than the perceptions of individual-level cultural measures (i.e., espoused cultural beliefs of surveyed respondents) because Hofstede's culture measures are from a large sample from each participating country, so these scores imply average cultural scores for each nation, which provide a more precise capture of the cultural impact on the national subsidiaries rather than the subjective perceptions of national subsidiaries' individual senior managers.

| | | | | |
|---|---|---|---|---|
| (SR) | SR2 | 0.724*** | 6.079 | |
| | SR3 | 0.758*** | 7.494 | |
| | SR4 | 0.721*** | 6.168 | |
| | SR5 | 0.774*** | 5.796 | |
| | SR6 | 0.779*** | 5.794 | |
| Stakeholders' Pressure (STK) | STK1 | 0.919*** | 13.782 | |
| | STK2 | 0.886*** | 8.882 | 0.923 |
| | STK3 | 0.877*** | 15.223 | |
| Green Purchasing (GP) | GA1 | 0.810*** | 21.191 | |
| | GA2 | 0.700*** | 10.831 | |
| | GA3 | 0.762*** | 12.582 | |
| | GA4 | 0.839*** | 20.088 | 0.928 |
| | GA5 | 0.845*** | 24.952 | |
| | GA6 | 0.773*** | 13.594 | |
| | GA7 | 0.795*** | 16.365 | |
| | GA8 | 0.754*** | 15.635 | |
| Green Operation (GOP) | GA9 | 0.826*** | 22.697 | |
| | GA10 | 0.827*** | 21.915 | |
| | GA11 | 0.907*** | 50.618 | |
| | GA12 | 0.895*** | 40.324 | 0.951 |
| | GA13 | 0.870*** | 37.865 | |
| | GA14 | 0.831*** | 17.434 | |
| | GA15 | 0.827*** | 22.653 | |
| | GA16 | 0.753*** | 13.080 | |
| **Shared Vision** (SV) | SV1 | 0.850*** | 23.906 | |
| | SV2 | 0.854*** | 26.763 | |
| | SV3 | 0.898*** | 35.404 | |
| | SV4 | 0.720*** | 17.037 | 0.955 |
| | SV5 | 0.841*** | 24.802 | |
| | SV6 | 0.782*** | 20.903 | |
| | SV7 | 0.826*** | 19.121 | |
| | SV8 | 0.884*** | 35.457 | |
| | SV9 | 0.866*** | 28.616 | |

*\*\*\*p < .01. \*\*p < .05. \*p < .1*

We also analyzed the average variance extracted (AVE), with the common threshold of .50 (Hair et al., 2006), and the results were satisfactory. Furthermore, we examined discriminant validity in terms of the square roots of AVEs and the pairwise correlations between constructs (Fornell and Larcker, 1981). As summarized in Table 7, the square roots of the AVE values of the respective constructs were greater than the correlations between any pair of constructs. Taken together, these results indicate that the measurement items possess adequate convergent and discriminant validity.

Table 7: Discriminant Validity of Reflective Constructs

| Construct | COM | SR | STK | GSCM | SV |
|-----------|-------|-------|-------|-------|-------|
| COM | **0.872** | | | | |
| SR | 0.323 | **0.763** | | | |
| STK | 0.380 | 0.629 | **0.894** | | |
| GSCM | 0.474 | 0.372 | 0.230 | **0.746** | |
| SV | 0.562 | 0.296 | 0.236 | 0.290 | **0.837** |

We checked common method bias by performing a post hoc marker variable analysis (Malhotra et al., 2006), which leverages smaller correlations among variables as proxies for marker variable correlations but ignores the smallest correlation because it has the greatest potential to capitalize on chance. Accordingly, we ignored the smallest correlation among the variables of interest (.004 between green compatibility and long term orientation) and chose the second-smallest correlation (.012 between shared vision and indulgence/restraint culture) as a marker variable correlation. We used this correlation to adjust the original variable correlations for potential bias removals. We detail the adjusted correlations and their differences from the originals in Appendix C; as shown, potential bias resulting from the common method appeared to range from .003 to .012. The observed differences are negligible and suggest that common method bias is not a serious threat. Finally, with a measurement separation strategy (Podsakoff et al., 2003), we separate the measures of predictor and criterion variables in the questionnaire to reduce respondents' motivation to answer questions by using their responses to the immediately prior questions as an anchor.

## 5. DATA ANALYSIS

**5.1 Hypotheses Testing Results.** A baseline model that focuses on examining the impact of *cultural difference* on MNC green adoption is shown in Figure 2, while our proposed research model that further explicates how *shared vision* could alleviate the impact of cultural difference is presented in Figure 3. The results for the baseline model reveal that cultural distance between headquarters and subsidiaries indeed has a significant negative influence on compatibility of green practices (-0.136*). Thus, headquarters and subsidiaries located in countries with huge cultural differences face conflict when implementing green initiatives, supporting H1. Consequently, despite headquarters' green policies, a subsidiary may not comply

because of its large cultural distance from headquarters, which leads it to consider the recommended green initiatives inappropriate or incompatible. Such green compatibility between headquarters and subsidiaries exerts a significant effect on subsidiaries' green supply chain management level (0.422***), supporting H2. The baseline model has an acceptable model fit ( $\chi^2$ = 681, df = 356; comparative fit index (CFI) = .902, incremental fit index (IFI) = .904, and root mean square error of approximation (RMSEA) = .080).
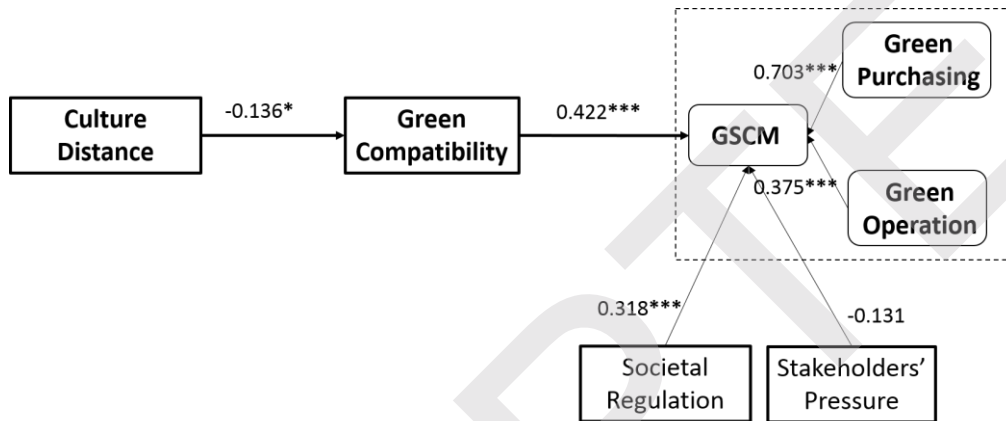


Note: *$p$ < .05; **$p$ < .01; ***$p$ < .001.
**Figure 2: Results of baseline model**

To conquer the negative effect of national culture distance, this study proposes and highlights the concept of *shared vision.* Results in Figure 3 show that a shared vision between headquarters and subsidiaries has a strong significant impact on green compatibility (0.553***), supporting H3. Interestingly, the negative effect of natural culture distance originally found to affect green compatibility seems to be offset by the shared vision once it is included in the model (-0.075). The results imply that, by establishing a strong shared vision, headquarters could enhance green compatibility so efforts on disseminating green innovation across worldwide subsidiaries in an MNC are not eroded by cultural differences. Comparing the model fit indexes between the baseline model (see above) and our proposed research model ( $\chi^2$ = 1063, df = 651; comparative fit index (CFI) = .910, incremental fit index (IFI) = .912, and root mean square error of approximation (RMSEA) = .067), both show adequate fit in general, but the proposed research model has a better fit with our data, providing more support for H3 that posit shared vision enhances green compatibility and offsets the negative impacts of culture distance, respectively.
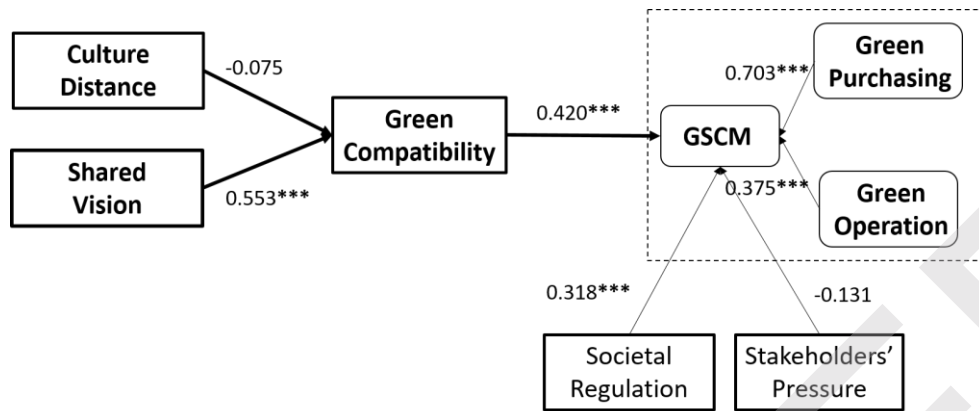
Note: *$p < .05$; **$p < .01$; ***$p < .001$.

**Figure 3: Results of the proposed research model**

In addition, our results show that societal regulation directly affects subsidiaries' green supply chain management level (0.318**), supporting H4. Consistent with previous green adoption studies conducted with SMEs at the firm level and within one country, government regulations and pressure from public groups are still strong compulsory forces that push enterprise subsidiaries to adopt green, thus fending off environmental controversy. However, different from earlier firm-level studies, stakeholder pressure is found to have no significant impact on subsidiaries' GSCM level (-0.131).

In summary, our findings conclude that, when coping with green practices in the context of cross-national MNC subsidiaries, compatibility stemming from national culture differences, regulations, and pressure from public groups are dominant factors affecting MNCs' successful implementation of GSCM, whereas pressure from stakeholders is a less prevalent factor. National culture differences indeed affect green compatibility between headquarters and subsidiaries, but such effects can be alleviated by a shared vision.

**5.2 Post-hoc analysis: Enhancing Shared Vision through Culture**

Since the above results show that shared vision enhances green compatibility and offsets the negative impact of national culture distance, a fundamental question emerges for headquarters: *How can we increase the shared vision?* The extant studies in Table 3 found that some national cultural dimensions are more supportive for innovation, and suggest that MNCs launch their innovation activities in such countries

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(Ambos and Schlegelmilch, 2008; Jones and Davis, 2000). This reasoning signifies the need to conduct a post-hoc analysis to understand how each of the six host country's national *cultural dimensions* may affect a local subsidiary's *shared vision* of green innovation, with a segregated, fine-grained approach.

**(1) Power Distance (PDI) and Shared Vision**

As shown in Figure 4, our results indicate that power distance (PDI) does not significantly influence shared vision (-0.065).

**(2) Individualism (IDV) and Shared Vision**

In our analysis, subsidiaries located in low individualism countries are better at building a green shared vison with headquarters (-0.387*** in Figure 4), which is consistent with propositions in earlier studies (Williams and van Triest, 2009). In a high individualism society, people tend to focus on individual achievement, high autonomy, and independence (Hofstede, 1980). These concepts are argued to have a strong impact on innovation, and such individualistic cultures welcome original breakthrough innovations (Hofstede, 1980). In order to appeal to subsidiaries located in countries with individualistic cultures, headquarters could provide employees with clear targets and individual rewards. On the other hand, subsidiaries located in collectivistic countries are not pioneers in innovation adoption. Jones and Davis (2000) indicate that collectivism may be better suited for the later stages of innovation processes (e.g., exploitation). Collectivism is highly tied to in-groups, and employees tend to see headquarters and their division as a united community. We suggest headquarters could disseminate green practices to such subsidiaries in a later stage during their worldwide diffusion.

**(3) Uncertainty Avoidance (UAI) and Shared Vision**

Countries with high uncertainty avoidance cultures usually control uncertainty through religion or strict rules, so high uncertainty avoidance may hinder organizational capability to innovate (Hofstede, 1980). In contrast, in low uncertainty-avoidance countries, people have more tolerance for uncertain innovation (Hofstede, 1980). Our analysis results provide empirical evidence to confirm that subsidiaries located in low uncertainty avoidance countries indeed can more easily build a shared green vision with headquarters

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(-0.160\*), so headquarters can start their green innovation diffusion with subsidiaries with such a culture.

**(4) Masculinity & Femininity (MAS) and Shared Vision**

Masculinity and femininity are related to leadership style and attitude regarding how members deal with problems. When handling conflicting ideas, masculine people solve problems by struggling through. High levels of masculinity favor purposefulness, assertiveness, achievement, competition, and recognition; all are positively related to innovation acceptance (Hofstede, 1980). Our results show that subsidiaries with masculine features could be better at building a green shared vision (0.172\*).

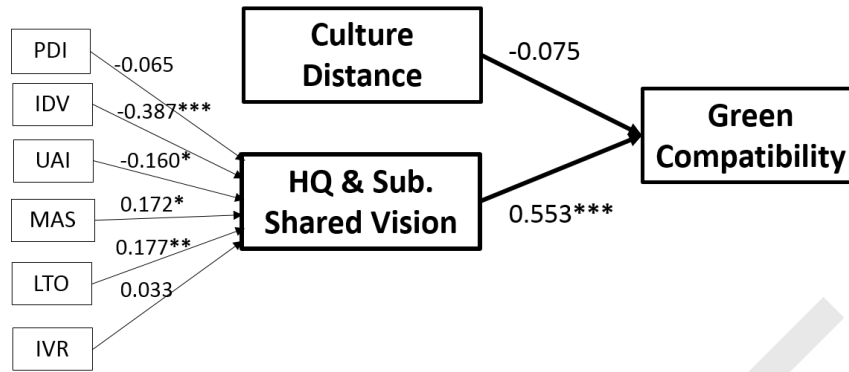**(5) Long-term & Short-term Orientation (LTO) and Shared Vision**

Long-term orientation focuses more on the future whereas short-term orientation focuses on the present. Employees in a long-term oriented subsidiary are characterized by persistence, hard work, thrift, and willingness to accept a long-term plan; therefore, it is suitable for strategic and sustainable development for enterprises (Hofstede, 1980). On the other hand, a well-known formulation is more easily accepted in a short-term-oriented culture (O'Reilly and Chatman, 1996). Subsidiaries in countries with short-term culture prefer to align to the existing standards and look for immediate returns. Our analysis shows that subsidiaries with long-term orientation (0.177\*\*) are more willing to build a green shared vision.

**(6) Indulgence versus Restraint (IVR) and Shared Vision**

Indulgence refers to the fundamental desire of people, such as pursuit of happiness. A restrained culture is under a tight society with strict norms (e.g., regulations and public values). Our result shows the indulgence and constraint cultural dimension does not significantly affect shared vision (0.033).

In conclusion, four cultural characteristics strengthen shared vision, including low individualism, low uncertainty avoidance, masculinity, and a long-term orientation, whereas two other cultural dimensions, power distance and indulgence, are insignificant factors in influencing shared vision. These results provide MNCs insights to identify which countries with what kinds of cultural characteristics are more inclined toward the green shared vision advocated by headquarters[4].

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[4] We thank one reviewer suggesting that cultural distance may be a determinant of shared vision on green practices, but our data and analysis results show that cultural distance does not significantly affect shared vision.

PDI  -0.065

IDV  -0.387***

UAI  -0.160*

MAS  0.172*

LTO  0.177**

IVR  0.033

**Culture Distance**  -0.075

**HQ & Sub. Shared Vision**

**Green Compatibility**

0.553***

Note: \*$p < .05$; \*\*$p < .01$; \*\*\*$p < .001$.

**Figure 4: Results of the structural model**

## 6. DISCUSSION

An MNC is composed of geographically dispersed subsidiaries that are culturally different, goal-disparate, and have to interact with suppliers, customers, and regulators in their local environments. The complexity challenges both headquarters and subsidiaries of MNCs in diffusing green innovation to their worldwide subsidiaries. Our research examines (1) how national *culture distance* between headquarters and subsidiaries affects subsidiaries' GSCM adoption, and (2) how headquarters can conquer national culture distance by leveraging subsidiaries' different cultural dimensions to foster GSCM practices among subsidiaries worldwide. In this effort, we make several contributions to extant environmental operations management and MNC governance in business literature.

***Theoretical contribution.*** First, most existing green adoption studies focus on the firm level, and their sampling firms are usually SMEs within one country. Limited efforts are expended on green adoption in MNCs at the subsidiary level, while very few studies incorporate *national culture* as an important perspective to examine GSCM diffusion in MNCs. Given the lack of MNC subsidiary-level investigation, it remains unclear if national *culture characteristics,* such as uncertainty avoidance or individualism, and *cultural differences* between headquarters and subsidiaries impact green diffusion and acceptance. This study bridges that research gap by examining a possible link between national culture distance and GSCM

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adoption by worldwide subsidiaries of an MNC. We contribute to the literature by providing empirical evidence that national culture distance indeed has a significant negative influence on green compatibility and, consequently, subsidiaries' GSCM adoption levels. Considering MNCs vast size and cross-border power that could guide other firms environmental green practices, our examination of MNC subsidiary-level data, and focus on the national culture perspective, provides a critical extension of the existing studies and responds to leading business journals' calls for more research in this area.

Second, our study not only provides evidence to show the negative impact of national culture distance on GSCM adoption in MNC subsidiaries, but also proactively proposes a concept of *shared vision,* which refers to internally nourished firm-culture to help headquarters offset possible negative impact resulting from external cultural differences. MNC literature indicates that the use of social controls (e.g., shared vision, values, and norms) is an approach for managing subsidiaries (Nohria and Ghoshal, 1994). The shared vision approach encourages subsidiaries "*to pursue the interests of the MNC as a whole and not just their partisan interests"* (Nohria and Ghoshal, 1994, p. 494). Drawing from value internalization in a social system, a shared vision approach is used to legitimize local decision making, such as subsidiaries' decisions on adopting GSCM (Williams and van Triest, 2009). Rather than merely acknowledging the existence of cultural differences, our paper represents a critical step in enlarging our understanding of how to conquer inherent national culture differences through a shared vision. Our study provides empirical evidence to validate the critical role of the shared vision that has only been conceptually proposed in the emerging Natural Resource-Based View (NRBV).

Third, conventional wisdom and traditional firm-level green studies assume that as long as MNC headquarters exerts reinforcement (e.g., policies, pressure, audits, etc.), subsidiaries will adopt GSCM accordingly. However, different from an independent firm, subsidiaries are obligated to comply with headquarters' guidelines, but they also operate in a domestic environment endowed with different cultures. This unique duality faced by MNC subsidiaries makes traditionally validated determinants of green adoption

(e.g., pressure, policy, regulation, etc.) change their importance in the MNC subsidiary context. For example, our results show that *pressure from stakeholders*, which existing studies claim has great impact on firms' green adoption, seem to show minor influence on subsidiaries.

In summary, in the MNC subsidiary context, national culture plays a pivotal role, but is overlooked by extant green adoption studies. Building on subsidiary-level data from 141 senior subsidiary managers of an MNC, our study not only provides empirical evidence to support conceptual papers (Bansal and Roth, 2000) and culture contingency theory (CCT) that posits green adoption in MNC should involve a national culture perspective, we also conduct a more comprehensive empirical investigation than earlier studies by examining all six cultural dimensions jointly (not just one or two), and by using data from 39 nations or areas (not just a single country). The key insight of our results is that MNCs should give national culture a more prominent role in deciding how to roll out their GSCM diffusion.

*Managerial insights*. This study provides managerial insights by further explicating how to use different *national culture dimensions* inherent in subsidiaries to augment shared vision, thereby offering a clear roadmap for MNCs' dissemination of GSCM across their worldwide subsidiaries. By examining each of the six national culture dimensions, we found that a green shared vision can be more easily built in cultures with *low individualism, low uncertainty avoidance, masculinity,* and *long-term orientation*. Therefore, headquarters can disseminate their GSCM implementation in subsidiaries located in countries with such cultural characteristics, then roll out to other subsidiaries without such a close cultural fit. Meanwhile, for those subsidiaries located in countries without favored cultural characteristics, headquarters can still strengthen their shared vision of green by undertaking organizational structures and mechanisms that are suitable to their national culture (e.g., centralized vs. decentralized, individual vs. collective reward, long-term vs. short-term goals) to strategically use cultural similarity in response to each unique culture rooted in subsidiaries.

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There are still some limitations of our study and we suggest some directions for future research. First, we used a key informant approach by asking senior managers and staff in charge of green operations in each subsidiary to respond to the survey questions. Although we checked for non-respondent biases and common method bias, future studies could use multiple data sources to achieve data triangulation. Second, our results are from the subsidiaries of a single MNC; future studies could examine other MNCs located in different countries with different cultures, and generalize results that can cross organizational cultures and contexts. Also, there might be cases that headquarters does not advocate green management while subsidiaries do due to cultural distance. We encourage future research to re-examine our research framework when the headquarters exerts different control on green management to their subsidiaries. Third, future research can measure the key constructs in our study such as shared vision in both headquarters and subsidiaries settings to further understand how each side perceives such concepts.

***Concluding remarks.*** National culture is a double-edged sword. It can be a constraint as well as a solution for MNCs to successfully disseminate GSCM. Depending on how MNCs can exploit the differences and similarities inherent in cultures, some MNCs can reap great value from cross-culture cooperation if they consider national cultural differences more proactively. Calculating national culture distance in advance helps MNCs select the most suitable subsidiaries to initiate their GSCM practices. Evaluating different combinations of national culture dimensions enables MNCs to find the cultural portfolios with the best fit when selecting subsidiary locations. By establishing an internally nurtured culture (a shared vision), MNCs can alleviate the negative effect of national culture distance. Our study takes the first step to assist MNCs in disseminating GSCM across their worldwide subsidiaries more effectively and smoothly.

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