Acting as Expected:
Global Leadership Preferences and the Pursuit of an Integrated Supply Chain

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Abstract

While research has extensively explored the potential benefits companies gain with integrated supply chains, the topic of why some companies are better at pursuing supply chain integration (SCI) is relatively under-examined. We take the perspective that SCI is associated with preferred forms of leadership using leadership preference derived from path-goal logic. By combining global data sources, we examine the relationships among leadership style preferences, internal integration

(i.e., between sales and purchasing) programs, and external integration (i.e., supplier side) programs. Our country-level results challenge the assumption that the choice to pursue internal and external integration have similar origins. Specifically, while collaborative-style leadership preferences relate to internal integration programs, societies preferring individualistic-style leaders will be pre-disposed towards external integration programs. Our study's contribution is in the novel use of theories on leadership to explain variations in approaches toward supply chain integration.

Keywords: Leadership, supply chain integration, secondary data, multilevel analysis

INTRODUCTION

Orchestrating an increasingly complex global supply chain landscape requires certain managerial approaches operating as a sequence of actions for integration (herein referred to as Supply Chain Integration - SCI) – both internally (i.e., cross-functionally between sales and purchasing department) and externally (i.e., through supplier integration) (Vickery et al., 2003). We conceptualize internal integration as collaboration and cooperation in terms of information sharing and joint decision making between sales and purchasing departments to facilitate mutually acceptable outcomes (Pagell, 2004). For external integration, we adopt the definition of Vanpoucke et al. (2014) who describe external integration as partnering with suppliers in a collaborative way so as to synchronize inter-organizational strategies and processes. This study seeks to better characterize the managerial and leadership aspects of these SCI programs by investigating facilitators at the societal level.

Implementing SCI programs can be particularly difficult given the various stakeholders to the programs. For example, employees of organizations with entrenched silos may refuse to cooperate. Employees who do not strongly identify with the organization may refuse to participate in the change processes that integration demands (Pagell, 2004). Moreover, because supply chain members are different organizations with differing incentives, their programmatic participation is even more difficult (Fawcett et al., 2012). Given these challenges, conditions that align stakeholder preferences with leadership efforts toward SCI are likely to facilitate SCI programs. However, this role of preferences for leadership actions in establishing SCI programs continues to be under-researched.

We use path-goal logic and implicit leadership theory to suggest that leaders adopt SCI programs because SCI reflects a style of leadership preferred by followers. Research has found correspondence between the extent of SCI and collaborative/cooperative approaches for managing supply chains (Ellinger, Keller, & Hansen, 2006; Paulraj & Chen, 2007). Here, leadership style describes characteristics and traits that are either possessed by leaders or which people perceive are possessed by leaders (House et al., 2004). A preference sets one thing above another because of a notion of superiority (Brown, 1984; Von Wright, 1972). And, collaboration and cooperation are understood as *"socially* contrived mechanisms for collective *action"* (Ring & Vandeven, 1994: 96). Taken together, we argue that SCI programs are more likely to exist where followers exhibit a preference for leadership styles consistent with such management approaches.

In this study, we adopt the idea that leadership preferences are societal; that is, different societies prefer certain specific leadership styles. We take a country-level perspective using the leadership preference scores of the Global Leadership and Organizational Behavior Effectiveness (GLOBE) study (House et al., 2004) to determine if such preference scores relate to differences in the existence of SCI programs across countries. As such, we follow a theory-driven approach to test the field's prevailing view linking collaboration with SCI by, specifically, examining whether societal preferences for collaborative leadership styles associate with the presence of internal and external SCI programs. Our specific research questions are (1) To what extent does a societal preference for collaborative-type leadership styles facilitate SCI program existence, and (2) do these preferences increase the presence of supplier integration programs given the presence of internal integration programs? While recent research has shown that a country's cultural traits will predict alliance formation (Choi & Contractor, 2016), we hypothesize that a country's leadership preferences are also predictive. That is, in countries preferring collaborative-type styles of leadership, firms (and managers) will be more likely to accept and adopt both internal, cross-functional integration between sales and purchasing departments and external, supplier integration.

Our findings indicate some support for a positive association between preferences for collaborative-type leadership styles (i.e., participative and team-based styles) and an organization's internal integration programs (limited to sales and purchasing integration programs). However, these relationships do not hold for external, supplier integration programs. Furthermore, preferences for a collaborative leadership style do not positively moderate the association between

internal integration programs (i.e., sales and purchasing) and external integration programs. Interestingly, preferences for what can be considered individualistic leadership styles (i.e., self-protective and autonomous styles) are found to positively moderate this relationship. Our results demonstrate the need for greater interdisciplinary research between global leadership and supply chain disciplines (Sanders, Zacharia, & Fugate, 2013).

Our research makes two important contributions to the supply chain literature. First, we show the importance of leadership concepts to SCI research. We show that preferences for specific leadership styles are consistent with differing levels of SCI, thereby introducing important non-economic drivers to the field. More importantly, supply chain literature has historically been technique-focused, with concerns for who was leading or for leadership style being out-of-scope. By our study connecting preferences for leadership styles to forms of SCI, we highlight the connections between SCM policy and leadership.

Second, we demonstrate that preferences for different leadership styles are associated with both external (in this study with suppliers specifically) integration programs and internal (in this study between sales and purchasing departments) integration programs. Through this, we question the current belief that external integration is homogenous with internal integration, at least in its enactment. Thus, a situational leadership perspective is implied, showing that internal and external SCI programs present very different challenges, requiring different managerial and leadership approaches.

LITERATURE AND HYPOTHESES DEVELOPMENT

Supply Chain Integration: Internal and External Considerations

The supply chain literature states that SCI programs have multiple dimensions; meaning there is an internal focus to SCI that considers integration across a firm's departments and an external focus that considers integration between a focal firm and its upstream and downstream trading partners (Flynn, Huo, & Zhao, 2010). SCI has regularly been defined as the sharing of information internally (Pagell, 2004) and with suppliers (Petersen, Handfield, & Ragatz, 2005), joint planning, joint decision making, and long-term collaborative behavior (Wu, Chuang, & Hsu, 2014). In this research, we consider the information sharing and joint decision practices and

programs leading to SCI as integration programs and specifically focus on supply-side programs for external integration.

Previous research has largely researched SCI aspects from a firm performance perspective (e.g., Schoenherr & Swink, 2012) with the conclusion that SCI has positive performance implications and a lack of SCI has negative implications (e.g., the bullwhip effect). From a managerial perspective, it is widely stated that integration is achieved through coordination and collaboration practices (Fawcett et al., 2012). Through various practices and programs related to information sharing, decision making, and alignments relational capabilities that span across companies are developed (Wang & Wei, 2007). It has been described as a governance mechanism that is based on behavioral aspects such as trust (Cai, Jun, & Yang, 2010) which is in contrast, or a complement, to enforcement practices such as contracts (Handley & Benton, 2009).

Thus, research shows that integration is realized through mechanisms related to both coordination and control, where through regulating the information processing activities between diverse operating entities a firm can better achieve its goals (Katz & Kahn, 1966; Srinivasan & Swink, 2015). Research also shows that process choice and purpose matter. For instance, Kim et al. (2003) find that leaders must choose among various processes – i.e., personal interaction, information systems, formalized procedures, and centralized decisions – when integrating entities. Meanwhile, Kusaba et al. (2011) point out that leaders may have different purposes for pursuing external integration, i.e., to react to a threat and protect its current position or to proactively lead to a competitive advantage. While these and other studies emphasize that important environmental contingencies influence integration activities (Koufteros, Vonderembse, & Jayaram, 2005; Reuer & Devarakonda, 2016), prior studies have not considered how a society's leadership preferences might be relevant.

Leadership Styles and Supply Chain Management

Leadership is defined by Bennis (1989) as composed of: *"...vision, ideas, direction, and has* more to do with inspiring people as to direction and goals than with day-to-*day implementation."* (p. 139). Many theories and conceptual frameworks are proposed to explain what effective leaders do, how they can be identified, and what general leadership styles exist (Aycan et al., 2013). Although particular styles are identified as being associated with effective leadership (Lord, De Vader, & Alliger, 1986), many criticize this approach for being too simplistic and, in particular, for

ignoring situational factors regarding how different styles of leadership are appropriate in different environments. Currently, it is accepted that the "life context" in which a person was raised and works is much more important than heritability in predicting the leadership style one strives for (Arvey et al., 2007). This scholarship highlights the role of the environment in determining leadership preference and these theories focus on the leadership situation in order to understand behaviors contingent on circumstances. The situational leadership perspective views the actions of a leader as contingent on the situation the leader faces (Hemphill, 1949) and research has explored this view in varying degrees of detail. More recently, Lord et al., (2001) argue that while people are drawn to a prototypical leader that exemplifies their referent group, existing constraints and challenges allow prototypes to adapt. This research calls into question the notion that "ideal" leadership styles exist and are consistent over time.

Complementing the situational leadership perspective, House (1971) develops the perspective of path-goal theory. This theory is based on "the meta proposition that leaders, to be effective, engage in behaviors that complement subordinates' environments and abilities in a manner that compensates for deficiencies and is instrumental to subordinate satisfaction and individual and work unit performance" (House, 1996, p.323). In other words, path-goal theory proposes that while multiple paths exist to achieve organizational goals because a leader's situation constitutes organizational members and stakeholders, leaders will choose paths that best match the preferences of these constituents. That is, leaders are more likely to act as expected by followers. The path-goal logic helps explain the role of society in determining leadership style. Specifically, differences in leadership behavior among societies, according to Javidan et al. (2006), can result from different implicit assumptions that a society makes regarding requisite leadership qualities. In the GLOBE study, the path-goal approach is articulated through measuring a number of leadership styles – not by how they are practiced, but by the expectations (i.e., the needs) of stakeholders. In addition, the GLOBE study captures—at the national level—scores measuring the preference (i.e., the perceived efficacy) of particular leadership style rather than how leaders actually lead. Path-goal logic argues that effective leaders develop pathways by which followers can achieve their goals. Following from this logic is the proposition from Implicit Leadership Theory that leadership is "in the eye of the beholder" (Javidan et al., 2006). That is, followers' beliefs, perceptions and expectations are critical in determining whether a leader will be perceived

to be effective and, therefore, likely to be followed. It is on this basis that we use the GLOBE country-level leadership preference scores as a measure of preferred leadership styles within societal cultures. We do this not to explain leader behavior at an individual level directly, but rather to examine the linkages between leadership preferences (i.e., the expected actions of leaders) and the extent of SCI programs at the societal level.

Six leadership styles are identified: charismatic/values-based, team-oriented, participative, humane-oriented, autonomous, and self-protective (see Table 1 for definitions). Expectedly, the actual styles of leaders are found to be similar to the styles preferred by members in a society (House et al., 2013).

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Consistent with path-goal logic, leadership actions are found to be associated with preferences for leadership styles (Aritz & Walker, 2007). As an example, the preference for participative leadership in a country is found to moderate the relationship between organizational structure and continuous improvement (Huang, Rode, & Schroeder, 2011). In addition, the effectiveness of transformational leadership is shown to differ among managers in the United States and Taiwan (Spreitzer, Perttula, & Xin, 2005). Even among geographically close countries of Europe, Elenkov and Manev (2005) report that employee expectations influence leadership behavior that, in turn, impacts innovation.

Recent studies highlighting the important role of leadership in managing supply chain operations include: Research by Hult et al. (2000) finds supply chain relational commitment is more successful with transformational leadership (i.e., inspiring employees toward a high mission) than with transactional leadership (i.e., focusing on path-to-goal implementation). Similarly, Fredendall et al. (2005) suggest that visionary leadership can be influential for both internal and external supply chain cooperation. Huang et al. (2011) find that participative leadership improves the effectiveness of organic structures in manufacturing operations. Furthermore, Overstreet et al. (2014) find a servant leadership style (i.e., a focus on the needs of employees not in leadership positions) builds worker commitment and enhances performance in the motor-carrier industry. While inspiring commitment, influencing cooperation, and raising consciousness are important

aspects of managing supply chains, the initial decision to integrate internal and external systems that tightly couple information flow and synchronize processes is equally important. Following from these studies, we develop leadership hypotheses consistent with House's (1996) path-goal approach to test situational drivers conducive to pursuing SCI programs.

The Facilitating Role of Leadership for Internal and External Integration

Supply chains incorporate a complex and dynamic mix of interactions within and between firms to form collaborative networks pursuing goals of mutual interest. Cooper et al. (1997) emphasize that managing supply chains is distinct from operating a logistics function; a supply chain has an integrative philosophy. Such integration requires programs that involve the sharing of information and joint decision making[1]. This is in line with Houlihan (1988), who proposed that supply chain management creates the need for shared objectives and for trading partners to eliminate fragmentation. As these characterizations suggest, the likelihood of synchronizing such a complex network would be low without appropriate facilitative leadership.

In developing our first set of hypotheses, we argue for the general relationship between SCI programs and a leadership style preference. We begin by using path-goal logic to propose that leadership preferences of subordinates can be expected to influence the behaviors of leaders (Antonakis & House, 2014). As such this logic is predicated on the notion that followers endorse (comply with) the directions of leaders who meet their expectations regarding motivation and satisfaction. This logic underpins the Implicit Leadership Theory that asserts that leadership is in the "eye of the beholder" (Javidan et al., 2006) and, as a result, effective leaders facilitate followers attaining their objectives (create pathways to achieve their goals). Effective leadership is therefore defined as more a function of matching action to follower expectations than of "leading" followers toward an alternate reality.

We, therefore, propose that the presence of SCI programs will be associated with preferences for leadership styles congruent with SCI. We operationalize these expectations by taking the country-level perspective to incorporate the fact that societies prefer different leadership styles as operationalized in the GLOBE leadership dimensions. Leaders in these societies engage in behaviors that are complementary to the societal preferences of those cultures (House, 1996). If

[1] See Table 2 for details of the integration programs as operationalized in the IMSS data

these preferences are conducive to the leadership behavior represented by SCI programs, the firms in such societies should show a higher presence of these SCI programs. This framing agrees with Waldman et al. (2006) who show that, at a national culture level, having collectivistic values, which can be associated with a collaborative style, result in positive relationships with stakeholders.

Our hypotheses build on the GLOBE study to propose that, ceteris paribus, firm leaders are more likely to choose to pursue internal and external SCI when their society prefers GLOBE leadership dimensions that characterize collaborative leadership: i.e., team-oriented and participative leadership preferences. These two leadership styles are chosen because collaboration and cooperation are social processes built on collective action (Ring & Vandeven, 1994), and both team-oriented and participative leadership styles reflect collaborative approaches toward decision making and goal achievement (see Table 1) (Yukl, 1989). Following from the path-goal view that leader behaviors are influenced by existing leadership preferences (House & Aditya, 1997; Waldman et al., 2006), we argue that firms in countries with preferences for team-oriented and participative leadership styles will be more likely to demonstrate collaborative behavior by choosing the path of SCI programs.

Regarding internal SCI programs between sales and purchasing departments, because extant literature indicates that a collaborative approach is integral to effective integration when organizational members exist in a society preferring a collaborative approach to leadership, internal SCI programs will be more likely to exist. Employees and managers within a firm that prefer participative and team-oriented leadership styles will be less likely to resist an internal integration initiative, avoiding what has been referred to as behavioral constraints to integration (Kull, Ellis, & Narasimhan, 2013). We argue that choosing the internal SCI path (i.e., between sales and purchasing departments) as a means to lead an organization to success is less constrained and more facilitated when collaborative leadership preferences exist[2].

H1(A, B): The presence of internal integration programs between sales and purchasing is positively associated with preferences for collaborative-type leadership styles as

[2] We have included only the two collaborative approaches – team-oriented and participative in our hypothesis as we did not have theoretical basis to suspect the impact of other forms of leadership on internal (between purchasing and sales) and supplier integration programs.

represented by (A) team-oriented and (B) participative leadership styles.

A similar argument can be made for external SCI (i.e., in our study supplier integration) programs: a focal firm in a society preferring collaborative modes of leadership will have managers and employees that view external integration programs favorably and welcome it over other more arms-length modes of relationship. Following the path-goal logic, we hypothesize that societies preferring team-oriented and participative leadership will have a heightened number of firms choosing to compete via the path of supplier integration programs. We note, however, that because supplier integration programs reach outside the firm, concerns regarding the right structure to govern inter-organizational relationships may exist (Dekker, 2004).

Although we recognize that the dominant view in the supply chain literature characterizes SCI as embodying collaboration, international business literature would imply that testing such a proposition using a multi-country dataset may reflect a more complex reality. There have been warnings that prescriptions regarding the universal acceptance of a particular leadership style across cultures can be problematic. Articulating this idea, House et al. (1999, p.37) note: "it may be argued that some cultures may more highly value leaders who can find pragmatic accommodations…values-based leadership may be far less important than the ability to achieve pragmatic results regardless of the means by which such results are attained". As such, our use of a multi-country dataset is particularly useful because GLOBE's leadership style preferences may help predict when SCI will receive more or less resistance in implementation. Importantly GLOBE captures the extent to which a particular style of leadership is culturally acceptable within a country, not whether it is practiced. While direct causal relationships are not proposed, a general tendency toward choosing SCI programs as a method of supply chain leadership should be observed if the above arguments are true. Thus, we propose:

H2(A, B): The presence of supplier integration programs is positively associated with preferences for collaborative-type leadership styles as represented by (A) team-oriented and (B) participative leadership styles.

Moderating the Internal-to-External Integration Relationship

The association of internal integration with external integration has been well researched in the supply chain literature (Horn, Scheffler, & Schiele, 2014; Vickery et al., 2003). Scholarship

suggests that in order to integrate with external supply partners, firms first need to have capabilities in place to achieve internal integration (Schoenherr & Swink, 2012). Internal integration enables functional departments within an organization to realize their strengths and to identify cross-functional interdependencies (Pagell, 2004). To achieve external integration, firms must go through distinct stages of development – Stevens (1989) outlines these stages. He claims that firms mature from a state of complete functional disintegration and reactive, myopic planning to internal integration and then to external integration. Zhao et al. (2011) argue for the positive link between internal and external integration through the organizational capability perspective. Specifically, Zhao et al. (2011) argue that the outcome of internal integration is high level of internal communication and coordination capabilities that, in turn, make the firm able to achieve external integration with its suppliers and customers. They confirm this proposition through an empirical study conducted in China.

Recent conceptual research, however, cautions that as supplier communication increases, the same internal linkages that enabled such external integration may begin to suffer (Kull, Ellis, & Narasimhan, 2013); that is, supply issues may get resolved externally without informing internal stakeholders. Yet, the majority of recent supply chain literature commonly suggests that internal (in our study between sales and purchasing) integration will be positively associated with external (in our study supply side) integration (Zhao et al., 2011). Less common, however, are tests of this relationship across multiple countries and industries. In this study, we conceptualized internal integration through integration between sales and purchasing departments. More specifically, internal integration is operationalized through information and joint-decision making practices. Being able to share data internally in an accurate and timely manner is a pre-requisite for doing so externally (Bhatt, 2000). Furthermore, Carr and Kaynak (2007) identified that within company information sharing positively influences information between companies. Similarly, in terms of joint-decision making Gimenez and Ventura (2005) found that point planning across logistics and production international is positively influencing a company's ability to practice joint planning externally with their supply chain partners. Subsequently, we propose the following hypothesis:

H3: The presence of internal integration programs between sales and purchasing is positively associated with the presence of supplier integration programs.

Our final hypothesis is based on research showing that a managerial practice that is

consistent with a societal trait is more effective (moderated) in that society than a practice that is inconsistent with a societal trait (Fu et al., 2004; Huang et al., 2011). Collaborative leadership preferences, we argue, are such a societal trait facilitating the enabling effects of internal SCI programs on external SCI programs. That is, because internal integration programs raise the importance of collaboration, coordination, and teams for a firm's success, our moderation hypothesis proposes that the impact of internal integration programs on external integration programs is enhanced (i.e., increased) when there exists a preference for a collaborative leadership style.

Research suggests that many firms are likely pursuing SCI because of its performance-enhancing effects (Flynn, Koufteros, & Lu, 2016). While firms in a country that change their internal processes to be integrated are on the path to an integrated supply chain, constraints to such changes will be influenced by biases and preferences (Kull, Ellis, & Narasimhan, 2013). Thus, firms that are situated in an environment that is more preferential to collaborative approaches will have a higher readiness for internal changes than those firms lacking such preferences (Fawcett et al., 2012). From a path-goal logic, collaborative leadership preferences facilitate achieving the goal of internal SCI. That goal, as argued by Zhou et al. (2011), is high levels of internal communication and coordination capabilities that, in turn, enable external SCI.

Based on these arguments, we propose the transition from internal integration programs between sales and purchasing departments to external integration programs (in our study supply side integration) will be less resisted with employees and managers who are situated in a society preferential to collaborative leadership styles. As such, in these societies, internal coordination capabilities are more readily achieved. Because firms in a country smoothly transitioning from internal integration programs to external integration programs will, ceteris paribus, be less resisting to the transition, we propose that a collaborative leadership style preference (in the form of team-oriented and participative-oriented styles) acts as a positive moderator. That is, the pursuit of external integration will be more prevalent when both collaborative leadership preferences and internal integration programs exist than when both do not exist. Subsequently, we propose:

> **Hypothesis 4 (A, B):** The degree to which supplier integration programs exist when internal integration programs between sales purchasing departments are present will increase when preferences exist for collaborative leadership styles as represented by (A)

team-oriented and (B) participative-oriented styles.

METHODOLOGY

To test whether a country's collaborative leadership style preferences facilitate a firm's pursuit of internal and supplier integration programs, we combine the use of two cross-sectional, multi-country data sets. We use data from the International Manufacturing Strategy Survey (IMSS) and the secondary GLOBE study data on leadership style preferences. We use a random effects cross–classified multilevel model, with countries and industries both at level two, to test our hypothesis. While the use of multiple data sources reduces the risk of social desirability and common method biases, we perform multiple analyses reported below to support the validity of our statistical tests.

Our primary interest in this cross-level study is at the country-level. This is because we are assessing the impact that country-level leadership preferences have on the extent of internal and external SCI programs existing within firms in that country. Key informants within firms are best equipped to inform about such within firm programs (Davis- Sramek et al., 2017). Previous research investigating supply chain variables across countries have used single key informants (Chae, Choi, & Hur, 2017). In addition, the position-driven perceptual differences between multiple respondents may, in fact, create biased results (Teo & King, 1997). Thus the use of IMSS data with responses by key single informants within firms is appropriate for our research. However, the downsides of relying on single informants have been extensively discussed in the literature (Flynn et al., 2018; Ketokivi, 2019).

The IMSS is a global network of business schools that was founded in 1992 to collaborate with each other and manufacturing firms to develop a common survey instrument and data collection protocol for the global study of manufacturing management (Vanpoucke et al., 2014; Wiengarten et al., 2015). The data in this study was collected in 2013 and is part of the sixth iteration of the survey. The survey follows the key informant approach and the target informant was a plant, production, or operations manager of primarily assembly plants of 50 or more employees. The data collected represents 931 respondents from 22 countries and 6 industries, resulting in data for 108 country-industry combinations and exceeding that of similar studies (Flynn et al., 2016). These respondents tend to have a good understanding of the firm's upstream and internal programs (Huo, Flynn, & Zhao, 2017).

The IMSS sample itself does not follow a predefined sampling strategy within countries, but does seek observations across a variety of countries across multiple geographic regions. As such, it has to be acknowledged that the IMSS follows some convenience sampling. However, because our research question requires a complex, multinational sample, we find the IMSS data useful for gaining insights albeit with significant limitations. We note that the IMSS followed a common research approach in each country to ensure uniform sampling. The respondent was contacted by phone. If the respondent showed some interest in participating in the research, the questionnaire was sent by email or by sending a link to an online platform. If no survey response was received after a set time, a reminder to complete the survey was sent. Returned questionnaires were controlled for missing data and were handled case-by-case, usually by contacting the firm again. Fault-proof methods, such as double inputs and spreadsheet controls, were employed to assure data consistency. The final response rate after multiple reminders was 36% for the whole sample across countries. Because of the robust survey design, IMSS data has been extensively used by researchers (Kauppi et al.,2016; Wiengarten & Longoni, 2018; Wiengarten et al., 2014). We refer readers to Sancha, Longoni and Giménez (2015) for further details.

In such single informant studies, common methods bias can be a concern. Conscious survey design interventions have been done to minimize the impact. For example, the dependent and independent variables are grouped in different parts of the survey and have different formats; all questions involved objective concepts and included explanations (Dobrzykowski et al., 2015; Podsakoff et al., 2003). Furthermore, multiple studies have conducted measurement equivalence analyses to ensure the robustness of the IMSS data across nations (e,g., Wiengarten et al., 2016). Recently, Golini and Gualandris (2018) carried out tests using the generalizability theory method. Their results indicate the validity of the measures across countries. Also, it should be noted, that IMSS data explores the presence of integration programs and does not study the state of integration. Here, the presence of integration programs are monadic constructs and amenable to use of single informant studies (Flynn et al., 2018).

Measures

The 2014 IMSS-VI items for internal and external integration programs are from scales developed by IMSS since 2009 and are listed in Table 2. The items in these scales have a specific focus on integration with suppliers and internally with purchasing and sales departments. Because

of some differences in the 2014 instrument, a preliminary check for convergent and divergent validity was performed using an unrestricted factor analysis. Items loaded onto two factors as theoretically expected without problematic cross-loadings, explaining 72% of the variance and with scale reliabilities (Cronbach alpha) of. 0.89 and 0.83 for internal integration between sales and purchasing and supplier integration programs, respectively. A subsequent confirmatory two-factor analysis showed an acceptable fit (χ^2(df)=303(19), NFI=0.919, CFI=0.924, SRMR=0.049), with all standardized loadings significant similar to others (e.g., Wiengarten & Longoni, 2015) and above 0.60 with composite reliabilities above 0.80 (see Table 2).

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Following recommendations by Rungtusanatham et al. (2008), we conducted measurement invariance tests for the two factors. We studied each factor's four items across countries by examining A) the equality of item means and covariances; B) configural invariance; and C) metric (i.e., factor loading) invariance. First, we assessed whether item means and covariances were equal across countries because invariance would indicate no further analyses were needed. An ANOVA equality of means test rejected the null hypothesis of mean invariance (between country mean differences observed for all eight items, $p < 0.01$) and a Box's equality of item covariance test rejected the null hypothesis of covariance invariance across countries [M (df)=1555.9 (684), $p < 0.001$]. Second, we tested for configural invariance with a multi-group confirmatory factor analysis (CFA) using a multi-sample method in EQS with no restrictions of across-country equivalence. We found an acceptable fit in this unrestricted model (χ^2 (df)=6061(380), NFI=0.919, CFI=0.924, SRMR=0.049, CAIC=1987) with all standardized factor loadings above 0.6 and significant. Third, we constrained factor loadings to be equal across countries and found an acceptable fit (χ^2(df)=6061(494), NFI=0.919, CFI=0.925, SRMR=0.049, CAIC=764) with this restricted model and, thus, we were able to show metric invariance. In sum, our analysis supports measurement invariance across countries for both internal integration between sales and purchasing and supplier integration programs factors.

We assessed the degree to which common method bias is present using the correlated uniqueness approach (Podsakoff et al., 2003, p.139), where item error terms are allowed to correlate across factors in order to represent a common source of error. Using the Lagrange Multiplier (LM)

test to indicate significance, we found that 3 of the possible 10 error correlations should be released to achieve a significantly superior model based on Akaike's CAIC measure – i.e., $CAIC_{uncorrelated\ errors}$=156.3, $CAIC_{partially\ correlated\ errors}$=144.1 (a 7.8% improvement). All standardized loadings remained above 0.6 and significant. This assessment indicates a minor degree of common method bias and should be taken into consideration when interpreting our hypothesis testing.

The measures of leadership preferences we used in this study were drawn from the GLOBE study (House, Hanges, Javidan, Dorfman, & Gupta, 2004). This extensive study, involving 192 researchers, included more than 17,000 participants from 62 countries and three heterogeneous industries. The study involved pilot tests, double translations, psychometric checks, response bias controls, multi-item constructs, extensive item rationalization, validity assessments using multi-trait multi-method approaches, and correlational verifications with the previous cross-country studies of Hofstede, Schwartz, and others (House et al. 2004).

Because GLOBE's view of leadership relates to "the ability to motivate, influence and enable individuals to contribute to the objectives of organizations" (House et al., 2004 p. xxii), its constructs and measures are relevant to our study. Data from which each country's leadership score derived were collected from 62 countries. Scores for each participating country were provided for all six identified leadership styles: Charismatic/Value-Based, Team-Oriented; Participative; Humane-Oriented, Autonomous, and Self-Protective Leadership. These societal leadership and cultural norms tend to stay relatively stable over time. For example, Hofstede (2006) reports substantial similarity between the cultural scores developed by him (Hofstede, 1984) and the GLOBE scores. It is beyond the scope of this paper to fully articulate the development of these scores as this is done extensively in the published results of the GLOBE study (House et al., 2004) and also in Dorfman et al. (2012). We direct interested readers to this source for further information. Descriptive statistics for the focal IMSS VI and GLOBE constructs are shown in the supplementary documents for this manuscript.

Control Variables

Control variables were chosen based on economic- and strategic-based factors that may predict the presence or absence of internal integration between sales and purchasing and supplier integration programs. Specifically, because competition may exist that can motivate a firm toward

using integration and because complexities may exist that affect such integration, we controlled for internal integration between sales and purchasing with six variables: at the plant level, these variables were plant size (S), competitive rivalry (R), degree of lean methods (L), product complexity (C), and degree of production responsibility (P); at the country-level, the control was purchasing power parity (PPP) per capita (G). For supplier integration, we controlled for the following five variables: at the plant level, the variables were plant size (S), supplier power (W), percent of domestic suppliers (D), and percent of inputs sourced from intra-firm facilities (I); at the country-level, the variable was PPP per capita (G). For both. internal integration programs (between sales and purchasing) and supplier integration programs, we also controlled for industry and the non-hypothesized GLOBE leadership scores as described below.

Testing for Multi-Level Effects

We used a cross-classified random effects model through hierarchical linear modeling (HLM) to test the hypotheses (Raudenbush, Bryk et al., 2004). This multilevel method partitioned facility-level, country-level, and industry-level variances (Raudenbush & Bryk, 2002), thereby controlling for industry effects while allowing for an examination of the country-varying preferred leadership styles. This approach is advantageous because it avoids dichotomizing societal traits and, instead, allows countries to exist on a continuum on each dimension. The IMSS study designated 6 industry clusters and 20 countries for a total of 120 potential level-2, industry-country combinations. We observed sample size heterogeneity among these groups in the IMSS 6.0 data, which makes HLM attractive. That is, unlike other analysis methods, such as OLS regression, HLM accounts for such heterogeneity and reduces biases from larger samples (Hofmann, 1997; Raudenbush & Bryk, 2002).

Both, internal integration programs (between sales and purchasing) and supplier integration programs occur at the facility level, as do most of the control variables. However, each country is expected to vary not only in its degree of these integrations but also in the degree to which internal integration between sales and purchasing influences supplier integration. We hypothesized such country-level variances to be influenced by the leadership style preferences as given in the GLOBE scores. We show the multi-level models below, with (1) and (2) being the level-1 and level-2 models for internal integration between sales and purchasing programs (INT),

respectively, and models (3), (4), and (5) being the single level-1 and multiple level-2 models for supplier integration programs (BSI), respectively. Control variables are shown in brackets. We include all GLOBE leadership preferences for control and to reduce confirmation bias (Klayman & Ha, 1987).

$$INT_{ijk} = \pi^I_{0jk} + \theta^I_1 S_{ijk} + \theta^I_2 R_{ijk} + \theta^I_3 L_{ijk} + \theta^I_4 C_{ijk} + \theta^I_5 P_{ijk} + e^I_{ijk} \quad (1)$$

$$\begin{aligned}\pi^I_{0jk} = \theta^I_0 &+ \gamma^I_{01}(\text{Team-Oriented}) + \gamma^I_{02}(\text{Participative}) + \gamma^I_{03}(\text{Charisma}) \\ &+ \gamma^I_{04}(\text{Humane-Oriented}) + \gamma^I_{05}(\text{Autonomous}) \\ &+ \gamma^I_{06}(\text{Self-Protective}) + \gamma^I_{07} G_j + b^I_{00j} + c^I_{00k}\end{aligned} \quad (2)$$

$$BSI_{ijk} = \pi^S_{0jk} + \pi^S_{1jk} INT_{ijk} + \theta^S_1 S_{ijk} + \theta^S_2 W_{ijk} + \theta^S_3 D_{ijk} + \theta^S_4 I_{ijk} + e^S_{ijk} \quad (3)$$

$$\begin{aligned}\pi^S_{0jk} = \theta^S_0 &+ \gamma^S_{01}(\text{Team-Oriented}) + \gamma^S_{02}(\text{Participative}) + \gamma^S_{03}(\text{Charisma}) \\ &+ \gamma^S_{04}(\text{Humane-Oriented}) + \gamma^S_{05}(\text{Autonomous}) \\ &+ \gamma^S_{06}(\text{Self-Protective}) + \gamma^S_{07} G_j + b^S_{00j} + c^S_{00k}\end{aligned} \quad (4)$$

$$\begin{aligned}\pi^S_{1jk} = \theta^S_5 &+ \gamma^S_{11}(\text{Team-Oriented}) + \gamma^S_{12}(\text{Participative}) + \gamma^S_{13}(\text{Charisma}) \\ &+ \gamma^S_{14}(\text{Humane-Oriented}) + \gamma^S_{15}(\text{Autonomous}) \\ &+ \gamma^S_{16}(\text{Self-Protective}) + b^S_{10j}\end{aligned} \quad (5)$$

The level-1 variance of INT is explained in (1) by the following: a random intercept π^I_{0jk} that varies by country j and industry k, control effects (θ^I_1 *to* θ^I_5) shown in brackets that do not vary, and error e^I_{ijk}. Each country-industry combination's average INT is represented by π^I_{0jk}, which is then explained in (2) by a grand INT average θ^I_0, the fixed effect of all six leadership styles (γ^I_{01} *to* γ^I_{06}), the PPP per capita control, a country-level random error b^I_{00j}, and an industry-level random error c^I_{00k}. While H1A,B were tested by examining the significance of parameters $\gamma^I_{01}, \gamma^I_{02}$, we also included the effects of the other four leadership styles (γ^I_{03} *to* γ^I_{06}) for completeness.

Similarly, the level-1 variance of BSI is explained in (3) by the following: a random intercept π^S_{0jk} that varies by country j and industry k, control effects (θ^S_1 *to* θ^S_4) shown in brackets

that do not vary, and error e_{ijk}^{S}. However, (3) also includes the influence of INT represented by π_{1jk}^{S}. Each country-industry combination's average BSI is represented by π_{0jk}^{S}, which is then explained in (4) by a grand BSI average θ_{0}^{S}, the fixed effect of the six leadership styles ($\gamma_{01}^{S}\ to\ \gamma_{06}^{S}$), the PPP per capita control, a country-level random error b_{00j}^{S}, and an industry-level random error c_{00k}^{S}. Finally, in (5) the influence of INT π_{1jk}^{I} is explained by a grand INT effect θ_{5}^{I}, the fixed effect of all six leadership styles ($\gamma_{11}^{S}\ to\ \gamma_{16}^{S}$), and a country-level random error b_{10j}^{S}.[3] We tested H2A,B and H4A,B by examining the significance of parameters $\gamma_{01}^{S}, \gamma_{02}^{S}$ and $\gamma_{11,}^{S}\gamma_{12}^{S}$, respectively. As with H1, we included the other leadership styles for completeness.

In determining our analysis procedure, we noted that multiple GLOBE leadership dimensions are significantly correlated. As well, as noted by Snijders and Bosker (1999, p.94-97), multilevel models often have a limited number of groups and, as such, various techniques exist to accommodate sample size challenges. One such technique that we employ is a 'backward fitting' approach where all variables of interest (i.e., all leadership style preferences) are first entered into model estimation, and then the most insignificant variables are step-wise removed until a final set of significant effects exist. Those removed are designated not significant or "n.s.". Due to both the restrictive, level-2 sample size (N=20) and novelty of the research agenda, we set a target significance level of $p < 0.10$ for the level-2 models and note this as a limitation of our study. Moreover, because our level-1 and level-2 data are cross-sectional, we also included multiple assessments to help support the theoretical direction of influence. To compute the percent variance explained R^2 for both INT and BSI and to determine the usefulness of multilevel modeling, we estimated an "empty" model with no explanatory variables first in order to compute a baseline variance within-country σ^2, between-country τ_{b0}^2, and between-industry τ_{c0}^2 (Snijders & Bosker, 1999). Because R^2 represents a percent reduction in error variance at level-1 and at level-2, each level's error variance can be compared to the baseline variance to determine R^2 as variables are added.

RESULTS

In Tables 3 and 4, we show the results from the cross-classified HLM analyses in a progressive model form. For internal integration between sales and purchasing, Model 0 in Table 3

[3] Because the leadership-based hypotheses do not suggest an industry-specific effect, we do not include such a random effect. However, we did test for this effect and found it did not affect our results.

includes the six fixed control variables. Five controls show statistical significance in Model 1, with R, L, C, and P having a positive influence on INT. This finding suggests a facility's management chooses internal integration between sales and purchasing as a preferred mode of operation when high competition, lean methods, product complexity, and high production responsibility exist. Interestingly, G has a negative influence, suggesting that facilities in wealthier countries tend not to choose INT as often as facilities in poorer countries. As expected, the Empty Models shown in Tables 3 and 4 show that, while the majority of variance exists at level-1, substantial level-2 variance exists between-country but less so between-industry. To determine the usefulness of multilevel modelling, following Snijders and Bosker (1999, p.22), an F-test of the level-2 variance of interest (i.e., country) shows that significant country factors exist, and thereby shows the viability of the multilevel approach (F_{INT}=62.5, p<.001 and F_{BSI}=118.5, p<.001).

The change in deviation ΔD(df) is 96.9 (6), p<.001, showing significant model improvement from the empty model. The R^2 values represented by mean square error (MSE) reduction are 13.4% and 29.1% in level-1 and level-2, respectively, showing our control variables have some explanatory power. The reliability estimate for π^I_{0jk} is 0.349 in Model 0, showing that between-country INT variance is moderate.

We entered the six county-level GLOBE leadership styles in Model 1. Because no theoretical reason exists for a reverse direction of influence (i.e., that manufacturing integration efforts will change an entire country's leadership preference), we conducted tests only on the hypothesized relationships. As hypothesized, a preference for a collaborative-type leadership style reflected in the team-oriented is positive and significant ($\gamma^I_{01} = 0.633, p < .05$), supporting H1A. This finding suggests that within-facility departments are more likely to pursue coordination and synchronization when a facility is in a country where the workforce more likely favors a team approach in directing operations. Conversely, the other collaborative-type leadership style preference, i.e., participative γ^I_{02}, is not significant, thus not supporting H1B. Interestingly, three other leadership style preferences are significant yet less influential. We explore these results further in the discussion section.

---------- Insert Tables 3 & 4 Approximately Here ----------

For supplier integration programs, Model 1 in Table 4 includes the five fixed control

variables. Three controls show statistical significance in Model 0, with S and W having a positive influence on BSI, thus suggesting that managers of larger facilities faced with powerful suppliers will be more likely to choose supplier integration as a supply management strategy. This indicates the association of power with BSI that we review in the discussion section. Interestingly, D has a negative influence, suggesting non-domestic suppliers are more associated with the integration strategy. The change in deviation ΔD(df) is 40.3 (5), p<.001, showing significant model improvement from the empty model. Facility-level error variance σ^2 is high, and variance between countries τ^2_{b0} is higher than variance between industry groups τ^2_{c0}, but not as substantial a difference as with internal integration between sales and purchasing, perhaps indicating a stronger economic justification for supplier integration programs than for internal integration programs. MSE is reduced by 4.3% and 3.3% in level-1 and level-2, respectively, showing these control variables have little explanatory power. The reliability estimate for π^S_{0jk} is 0.398 in Model 1, showing that between-country BSI variance is moderate. We review H2 and H4 below after first reviewing H3. With respect to H3, we expected that globally the presence of internal integration programs between sales and purchasing would predict the presence of supplier integration programs. As shown in Table 4 Model 2, when we entered INT, the influence is positive and significant ($\gamma^S_{10} = 0.488, p < 0.001$) and the level-1 MSE reduction is substantial at 32.1%. While these results are promising, it is theoretically possible that BSI simultaneously influences INT (Kull et al., 2013). As such, we conducted a Durbin-Wu-Hausman test (Davidson & MacKinnon, 1993) to assess for the endogeneity of INT through use of six instrumental[4] variables that substantially predict INT (i.e., R^2 sufficient for a F-ratio exceeding 10) but do not correlate with e^S_{ijk} in (3). The residuals from regressing INT onto the instruments, which represent the endogeneity effect, was included in (3) as a regressor and found to be significantly negative ($\Delta\theta^S_6 = -0.275, p < 0.05$) while the effect of INT was found to significantly increase ($\Delta\theta^S_5 = 0.287, p < 0.05$), suggesting BSI simultaneously deters the positive influence of INT. As such, while we find support for H3, we include in our subsequent HLM analyses the results with and without two-stage least squares

[4] Six instrumental variables related to pressures to better internally coordinate were used following Antonakis et al.'s (2010) recommendation: environmental pressures from competition (A2e) and from supplier power (A2h), percent sales from consumers (sc2d), responsibility for procurement/logistics activities (g3b), information-system coordination (g4c), and outputs to external customers (g6b2)

(2SLS) endogeneity controls to improve our causal understanding (Antonakis et al., 2010). These results are similar those from earlier studies (Zhao et al., 2011) and this adds credence to our data and the methodology.

Regarding H2, the direct influence of leadership style preference on supplier integration programs was tested next in Model 3. As with H1, to our knowledge, no theoretical reason exists for supplier integration efforts changing a country's leadership preference, so we only tested the hypothesized relationships. For simplicity, we show the non-2SLS results in Table 4 but discuss the 2SLS for comparison. Contrary to the view that a preference for collaborative-type leadership styles would predict the presence of BSI, we find that γ_{01}^{S} and γ_{02}^{S} are each not statistically significant regardless if 2SLS if used. Therefore, we do not find support for H2A nor H2B. However, we do find that what can be considered non-collaborative, individualistic leadership style preference – i.e., autonomous and self-protective – are significant predictors of the supplier integration strategy, $\gamma_{05}^{S} = 0.181,\ p < 0.001,$ and $\gamma_{06}^{S} = 311, p < 0.05$ respectively. The 2SLS results do not significantly differ. Interestingly, these two styles represent approaches to promote the leader rather than collaborate with others. Taking this finding (along with the significant control variables) into account leads toward an alternative view of what supplier integration programs represent: a self-serving management approach rather than a collaborative management one. Model 4 replicates Model 3, but allows for a random effect of INT in order to compute % error variance reduction in τ_1^2.

Finally, we tested the moderating influences that a country's leadership style preference has on the ability of INT to predict BSI in Model 5. Again, contrary to the view that integration efforts in a country are accelerated from internal to external by preferences for collaborative approaches, we find in both the 2SLS and non-2SLS results that no collaborative-type leadership style preferences are significant and positive moderators. Interestingly, a participative style is surprisingly negative ($\gamma_{12}^{S} = -0.056, p < 0.10$) in Table 4 and is not significantly different using 2SLS. Thus, we find no support for H4A or H4B.

Interestingly, the effects of preferring the non-collaborative, individualistic styles of leadership – i.e., self-protective and autonomous – change in various ways. First, when 2SLS is not used, the individualistic styles change from being significant direct effects to being significant moderating effects, $\gamma_{15}^{S} = 0.056, p < 0.05$ and $\gamma_{16}^{S} = 0.049, p < 0.10$ respectively. Second, when

2SLS is used to remove the negative endogeneity effect while replicating the final result in Model 5, the self-protective leadership preference is not significant ($\gamma_{15}^{S} = 0.045, p = 0.300$) and the other leadership preference effects remain insignificantly different. Such a result suggests that a self-protective style is useful only if BSI has a simultaneous negative influence on INT.

Taken all together, these result suggests an important paradox: while a country's preference for collaborative leadership styles somewhat influences the presence of internal integration programs between sales and purchasing, a country's preference for non-collaborative, individualistic leadership styles influences the ability of plants to translate internal integration between sales and purchasing to supplier integration programs. We believe this result suggests a "situational" view of leadership (Thompson & Vecchio, 2009). We explore this idea further in the discussion section.

While we take advantage of the most recently available IMSS data, we observe a time difference of about 10 years between the release of GLOBE data and the release of IMSS-VI data. We assumed societal preferences to be slow-to-change as compared to business practices. In fact, Hofstede's societal culture scores have been used extensively multiple decades beyond their original release (Beugelsdijk, Maseland, & Hoorn, 2015). Yet, for robustness, we examine if results from IMSS-V, collected in 2009, produce similar results to IMSS-VI. After verifying the psychometric properties and forming factor scores for INT and BSI[5], we first find that collaborative leadership preferences significantly associate with INT ($\gamma_{01}^{\mathrm{I}} = 2.379, p < 0.01$ and $\gamma_{02}^{\mathrm{I}} = 0.715, p < 0.01$), which reinforces our IMSS-VI results. We also replicate the results for charismatic and humane-oriented leadership preferences, while also having at least one positive and significant individualistic-type leadership preference (i.e., autonomous). We next examine BSI and find that collaborative leadership preferences do not positively associate directly with BSI ($\gamma_{01}^{S} = -0.494,\ p = 0.481$ and $\gamma_{02}^{S} = -0.063, p = 0.739$), nor through moderating the influence of INT on BSI ($\gamma_{11}^{S} = -0.032, p = 0.940$ and $\gamma_{12}^{S} = 0.030, p = 0.616$). This reinforces our IMSS-VI results. Interestingly, we find self-protective leadership preferences to directly and positively associate with BSI rather than indirectly through moderating the association of INT. Charismatic leadership preferences also directly and positively associate with BSI. Therefore, we

[5] We use seven and nine items for INT (α=0.79) and BSI (α=0.86), respectively, giving adequate reliability and discrimination. While some facilities have randomly missing data, we form factor scores based on averages of non-imputed item values.

conclude that the time lag between GLOBE and IMSS-VI has little bearing on our conclusions for collaborative leadership preferences significantly associating with INT programs and not associating with BSI programs.

CONCLUSIONS AND LIMITATIONS

Overall, we recognize the general limitations that large, group-based survey efforts such as the IMSS have. We are aware that many of the requirements and issues raised by Flynn et al. (2018) are not met in this survey instrument. We encourage that future data collection be guided by Flynn et al. (2018) framework. However, it also has to be recognized that the opportunities given the size and global spread of the IMSS dataset has enabled researchers in our discipline to make important findings, making significant managerial and theoretical contributions (e.g., Vanpoucke et al., 2014, Wiengarten et al., 2013, Frohlich and Westbrook, 2001). Thus, our results have to be interpreted taking the following limitations into consideration. First, while our sample represents a large number of countries, the data is mainly focused on European countries. Given the effects we have measured based on cultural differences in terms of leadership preference, future research may test the applicability of our model in different regions, such as Asia or North America. Second, the results of our study are based on cross-sectional data. It may be the case that, depending on levels of maturity, firms adapt their integration efforts based on market requirements as much as on leadership preferences. Third, we are applying leadership scores from the GLOBE study based on general cultural preferences as to what leadership styles are preferred (Javidan et al., 2006). Future research could more directly assess the role of leadership in SCI by measuring a firm's or manager's leadership style (Lakshman, 2013). This methodological approach would account for managerial differences at the firm level that, in our study, are conceptualized at the country-level. Fourth, our integration measures are limited in the sense that from an internal perspective we are limited to assess integration efforts only from a sales and purchasing departmental perspective and from an external perspective only from a supplier perspective. Future research could introduce more holistic measures to generalize our findings further. Last, while our results may be directly applicable only for the 20 countries and six industries represented in IMSS VI, future research could explore other industries and countries. It should also be noted that our study examines the impact of societal leadership preferences on SCI programs, not the impact of such programs on firm performance. Future research could explore if leadership style preferences moderate the

influence of SCI programs on firm performance.

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TABLE

Table 1: Leadership style definitions (House et al., 2004, p. 675)

Charismatic/Value-Based Leadership defined as "…the ability to inspire, to motivate and to expect high performance outcomes from other son the basis of firmly held core values"
Team-Oriented Leadership defined as "…emphasizes effective team building and implementation of a common purpose or goal among team members"
Participative Leadership defined as "…the degree to which managers involve others in making and implementing decisions"
Humane-Oriented Leadership defined as "…supportive and considerate leadership but also includes compassion and generosity"
Autonomous Leadership defined as "…independent and individualistic leadership"
Self-Protective Leadership defined as "…ensuring the safety and security of the individual or group member"

Table 2: Confirmatory factor analysis of integration programs scale items

Item ID and Description	Standardized Factor Loading (t-value)
Internal Integration between sales and purchasing Programs	
Indicate the current level of implementation of action programs related to …	
SC5a2: Sharing information with purchasing department (about sales forecast, production plans, production progress and stock level)	0.769 (25.3)
SC5b2: Joint decision making with purchasing department (about sales forecast, production plans and stock level)	0.797 (26.7)
SC5c2: Sharing information with sales department (about sales forecast, production plans, production progress and stock level)	0.856 (29.7)
SC5d2: Joint decision making with sales department (about sales forecast,	0.854 (29.6)

production plans and stock level)	
Supplier Integration Programs	
Indicate the current level of implementation of action programs related to …	
SC6a2: Sharing information with key suppliers (about sales forecast, production plans, order tracking and tracing, delivery status, stock level)	0.744 (24.8)
SC6b2: Developing collaborative approaches with key suppliers (e.g. supplier development, risk/revenue sharing, long-term agreements)	0.818 (26.8)
SC6c2: Joint decision making with key suppliers (about product design/modifications, process design/modifications, quality improvement and cost control)	0.772 (24.7)
SC6d2: System coupling with key suppliers (e.g. vendor managed inventory, just-in-time, Kanban, continuous replenishment)	0.632 (19.0)

Table 3: Cross-classification HLM results with internal integration between sales and purchasing programs as dependent variable

Parameters	Empty Model Est. (std.error)	Model 1 Est. (std.error)	Model 2 Est. (std.error)
Grand Intercept			
θ_0^I	3.504***	5.075***	0.314
	(0.070)	(1.030)	(1.624)
Control Variables			
θ_1^I S (Size)		-0.001	-0.001
		(0.001)[a]	(0.001)[a]
θ_2^I R (Competive Rivalry)		0.072**	0.064*
		(0.030)	(0.030)
θ_3^I L (Lean Methods)		0.202***	0.200***
		(0.026)	(0.026)
θ_4^I C (Product Complexity)		0.094***	0.087***
		(0.024)	(0.024)
θ_5^I P (Production Resp.)		0.113***	0.137***
		(0.02)	(0.041)
γ_{07}^I G (per capita PPP)		-0.321***	-0.063

		(0.096)	(0.080)
Leadership Style Effects			
γ_{01}^{I} Team-Oriented (H1a)			0.633*
			(0.296)
γ_{02}^{I} Participative (H1b)			n.s.[b]
γ_{03}^{I} Charismatic			-0.536*
			(0.288)
γ_{04}^{I} Humane-Oriented			0.167†
			(0.125)
γ_{05}^{I} Autonomous			n.s. [b]
γ_{06}^{I} Self-protective			0.219*
			(0.133)
Deviance (D)	2077.4	1980.5	1964.3
ΔD (df)		96.9 (6)***	16.2 (4)***
σ^2 (Facility error variance)	0.6814	0.6152	0.6143
τ_{b0}^2 (Country error variance)	0.0484	0.0168	0.0005
τ_{c0}^2 (Industry error variance)	0.0077	0.0064	0.0034
Reliability			
π_{0jk}^{I}	0.349	0.171	0.006
% MSE reduction in INT_{ijk} (R_1^2)	n/a	13.4%	15.8%
% MSE reduction $\overline{INT}_{jk}$ (R_2^2)	n/a	29.1%	41.0%

p-values are based on one-tail test criteria †p < .10,*p < .05,**p < .01,***p < .001, [a] Values below 0.001 are shown as .001, [b] n.s. represents "not significant" per the backward fitting procedure

Table 4: Cross-classification HLM results with supplier integration programs as dependent variable

Parameters	Empty Model Est. (std.error)	Model 1 Est. (std.error)	Model 2 Est. (std.error)	Model 3 Est. (std.error)	Model 4[c] Est. (std.error)	Model 5 Est. (std.error)
Grand Intercept						
θ_0^S	3.146***	4.881***	1.592*	-1.506*	-1.608*	-0.201
	(0.090)	(1.527)	(0.938)	(0.865)	(0.872)	(0.694)
Control Variables						
θ_1^S S (Size)[a]		0.001***	0.001***	0.001***	0.001***	0.001***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
θ_2^S W (Supplier Power)[a]		0.083**	0.046*	0.039†	0.040†	0.038†
		(0.031)	(0.026)	(0.026)	(0.026)	(0.026)
θ_3^S D (%Domestic Suppliers)[a]		-0.004***	-0.002***	-0.003***	-0.003***	-0.003***
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
θ_4^S I (% Inputs Internal)		-0.001	0.001	-0.001	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
γ_{07}^S G (per cap. PPP)[a]		-0.173	-0.019	0.122*	0.131*	0.160**
		(0.144)	(0.086)	(0.062)	(0.062)	(0.064)
Direct Effects						
γ_{10}^s INT (H3)			0.488***	0.484***	0.480***	0.414†
			(0.027)	(0.027)	(0.031)	(0.305)
$\gamma_{01}^S, \gamma_{02}^S$ Team-Oriented, Participative (H2a, H2b)				n.s.[e]	n.s.[e]	n.s.[e]
$\gamma_{03}^S, \gamma_{04}^S$ Charismatic, Humane-Oriented				n.s.[e]	n.s.[e]	n.s.[e]
γ_{05}^s Autonomous				0.181*	0.169*	n.s.[e]
				(0.078)	(0.079)	
γ_{06}^s Self-protective				0.311***	0.330***	n.s.[e]
				(0.080)	(0.081)	
Moderation Effects						
γ_{11}^s Team-Oriented (H4a)						n.s.[e]
γ_{12}^s Participative (H4b)						-0.056†,[d]
						(0.040)
$\gamma_{13}^S, \gamma_{14}^S$ Charismatic, Humane-Oriented						n.s.[e]
γ_{15}^s Autonomous						0.056*,[d]
						(0.023)
γ_{16}^s Self-protective						0.049†,[d]
						(0.036)
Deviance (D)	2000.9	1960.7	1705.4	1685.9	1685.0	1679.9
ΔD (df)		40.3 (5)***	255.2 (1)***	19.6 (2)***	0.9 (2)	5.2 (1)*
σ^2 (Facility error variance)	0.6161	0.5879	0.4398	0.4377	0.4350	0.4340

τ^2_{b0} (Country error variance)	0.0521	0.0514	0.0137	0.00005	0.0450	0.0200
τ^2_{c0} (Industry error variance)	0.0262	0.0172	0.0120	0.0104	0.0105	0.0099
τ^2_1 (INT error variance)					0.0032	0.0013
Reliability						
π^S_{0jk}	0.390	0.398	0.190	0.001	0.436	0.260
π^S_{1jk}					0.235	0.113
% MSE reduction in BSI_{ijk} (R^2_1)	n/a	4.3%	32.1%	34.5%	28.2%	32.1%
% MSE reduction in $\overline{BSI}_{jk}$ (R^2_1)	n/a	3.3%	46.2%	56.6%	23.6%	42.0%
% error variance reduction τ^2_1						14.1%

p-values are based on one-tail test criteria $^{\dagger}p < .10, *p < .05, **p < .01, ***p < .001$, [a] Values below 0.001 are shown as .001, [b] Shows the influence of INT not affected by leadership, [c] Based upon Model 3 with random country effects for INT for comparison with Model 5, [d] When Self-protective is removed, Participative's coefficient is -0.100^{***} while *Autonomous'* coefficient is 0.069^{***}, [e] n.s. represents "not significant" per the backward fitting procedure