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A national culture perspective in the efficacy of supply chain integration practices

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ABSTRACT

While today's supply chains involve partners from different countries, national culture has been a critical component in supply chain management. Yet, our understanding on its role in affecting the performance outcomes of supply chain integration (SCI) is limited. Using data collected from 19 countries and the GLOBE concept of national culture, we analyze the role of national culture in affecting SCI. This paper examines how differences in national culture influence SCI operational outcomes. Our results indicate that the collaborative behavior oriented national culture dimensions of future orientation, institutional collectivism, humane orientation and in-group collectivism moderate the extent to which SCI improves operational performance. Specifically, the relationship between internal integration and quality outcomes is moderated by institutional collectivism, humane orientation, and future orientation. The relationship between internal integration and cost is moderated by in-group collectivism, while the customer integration and delivery performance relationship is moderated by institutional collectivism.

1. Introduction

Supply chain integration (SCI) has been an important topic in the operations and supply chain management (SCM) literature due to its prominent role in facilitating collaborations and partnerships across functions and firms beyond national boundaries (Frohlich and Westbrook, 2001). The concept of SCI is defined as the inter- and intra-organizational coordination and collaboration among different partners in a supply chain (Flynn et al., 2010; Wong et al., 2011). Its relevance is due to its significant influence on the competitive advantage of firms (Alfalla-Luque et al., 2012; Huo et al., 2016). The SCI–operational/business performance relationship has been extensively studied in the international business and supply chain management literature (e.g., Baladhanadyutham and Venkatesh, 2012; Droge et al., 2012; Handfield et al., 2009; Lee et al., 1997; Murray et al., 1995; Wasti and Wasti, 2008; Wong et al., 2015a,b,c, 2016, 2017). However, there is still a lack of consensus on its efficacy, especially when involving cross-country supply chain partners who possess different national cultures.

While some prior studies have found positive results in the efficacy of SCI (Danese et al., 2013; Narayanan et al., 2011), others have found insignificant or negative results on operational outcomes from the use of SCI (Flynn et al., 2010; Koufteros et al., 2005). These results suggest that there is not a universally accepted conclusion about SCI–performance relationship. Prior research has tried to shed light on these mixed results by studying potential contingencies that may affect the relationship between SCI and performance such as uncertainty or supply complexity (e.g., Flynn et al., 2010; Gimenez et al., 2012; Huang et al., 2014; van der Vaart and van Donk, 2006; Wong et al., 2011). A recent study by Wiengarten et al. (2014) examined the role of country factors in the efficacy of SCI practices and showed that it is country dependent and that SCI helps overcome the country's logistical capabilities deficiencies. Overall, the moderators considered in prior studies are largely related to the tangible and operational aspects of both firms and their respective operating environment even the importance of soft aspects, such as collaboration, mutual understanding and cooperation in SCI (Barratt, 2004), have been extensively highlighted to be valuable for coordination of cross-firms activities (Ellinger et al., 2006; Huo et al., 2016; Sanders, 2008; Van Donk et al., 2012). In this paper, collaborative behavior is defined as behavior that possess such qualities as trust, shared responsibility, or adaptability in arrangements in a partnership (Wong et al., 2009) and it is considered an important soft aspect.

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On the other hand, country factors have been highlighted as playing a role in the SCI – operational performance relationship. Although a few studies have provided preliminary understanding on the impact of cultural differences by focusing on relational management across partner firms (e.g., Cheung et al., 2010; Zhao et al., 2008), there is a paucity of knowledge on how national culture conditions the efficacy of SCI in achieving operational performance. Cultural differences are reflected in the differences of cultural behaviors, which have an impact on the practices and activities of firms in managing SCI. As SCI often forms across national boundaries to facilitate movement of goods and flow of finance across countries, it provides an appropriate context for investigating how different national cultures affect the performance results of SCI across nations.

In this paper we address the two highlighted research gaps related to collaborative aspects and national culture. We investigate differences in the efficacy of SCI practices in countries characterized with different levels of collaborative national cultures. Subsequently, we establish the following research question: *How national culture dimensions that reflect collaborative behaviours affect the efficacy of SCI practices on operational performance?* By answering this research question, we contribute to the international business literature by revealing the role of national culture in facilitating collaboration among firms. To do so, we collect multi-country data, and conduct multilevel analysis to analyze the SCI-performance relationship in multiple countries and study the role of national culture on the SCI efficacy. Our study contributes to provide empirical evidence on the impact of national culture in affecting the performance results of SCI efforts, generating practical insights for managers in establishing SCI with their supply chain partners in different countries.

The remaining of the paper is organized as follows. First, a literature review on SCI and national culture is provided and hypotheses are developed. Second, the method used to test the proposed hypotheses is presented. Third, data are analyzed and results are reported. The paper finishes with a discussion of the results and a conclusion section.

2. Theoretical background and hypotheses development

2.1. National culture and supply chain management

As the operations of today's supply chains are globally spanning with multiple partners locating in different parts of the world, the development of SCI to facilitate coordination of business activities across firms becomes crucial to compete in the globalized economy. SCI is referred to the collaborative efforts of supply chain partners by integrating management systems, information exchange, planning, and other supply chain activities with the aim to facilitate trade by enabling seamless interactions across partners (Frohlich and Westbrook, 2001; Wong et al., 2011). To ensure the success of partnerships when involving partners from multiple countries, it is important to not only manage the operations through SCI, but to also understand the role of a collaborative culture across partners. Such view is supported by the contingency theory, which advocates that performance results of organizational efforts are dependent on the contextual environment of their operations (Drazin and Van de Ven, 1985; Luthans and Stewart, 1977). In line with this theory, as stated by Scott: "the best way to organize depends on the nature of the environment to which the organization must relate (1981:114)". In this paper, we consider national culture as a contingency that needs to be taken into account when implementing SCI in supply chains.

A culture is a system of social phenomenon that exhibits behaviors and practices of people, reflecting the "mental programs" of different nations (Hofstede, 1980). Culture is defined as "…patterns, explicit and implicit, of and for behavior acquired and transmitted by symbols, constituting the distinctive achievement of human groups (Kroeber and Kluckhohn, 1952:13)". National cultures differ in their set of values, beliefs, ideas, attitudes and morals, which guide behaviors of individuals (Vitell et al., 1993). Culture across nations is different because of the background and stimuli surrounding people in different nations are different. Such difference in national culture spans to the organizational culture, affecting the management and operations of daily processes that are performed and managed by the local people (Hofstede, 1985). According to the contingency theory of operations (Sousa and Voss, 2008), national culture brings upon a contextual difference that can have an impact on the efficacy of supply chain management efforts.

Prior studies pointed out the potential impact of national culture on supply chain collaboration across countries (e.g., Flynn et al., 2010; Marin-Garcia et al., 2013), and the important role of collaborative behavior in SCI (e.g., Barratt, 2004; Huo et al., 2016; Ellinger et al., 2006; Sanders, 2008; Van Donk et al., 2012). However, they provide no empirical evidence on how the specific national cultures might affect the efficacy of SCI. This paper studies the role of collaborative cultures on operational performance outcomes coming from SCI efforts. In the following sections we will first describe the link between SCI and operational performance, and then, present the contingency approach to SCI.

2.2. Supply chain integration and performance

Firms integrate internally and externally with suppliers and customers with the aim to establish linkages with supply chain partners to facilitate the coordination of supply chain activities across borders. To study the performance implications of SCI, the lenses of the resource based view (RBV) (e.g., Huo et al., 2016; Narasimhan and Kim, 2002; Swink et al., 2007; Wiengarten et al., 2014; Wong, 2013; Wong et al., 2016, 2017) have been extensively adopted in the literature. The RBV views the firms as a bundle of resources which enables the creation of resources that are valuable, rare, and difficult to copy, thus leading to competitive advantage (Barney, 1991). In other words, by deploying these unique resources the firm can achieve superior performance. Studies that have applied the RBV in the study of SCI argue that the integration of processes between departments and/or supply chain partners help develop relationships that result in performance benefits and competitive advantage (Cao and Zhang, 2011; Schoenherr and Swink, 2012). The RBV therefore suggests a positive relationship between SCI and operational performance. In the following, we will further develop our hypotheses by relying on the RBV argument and prior empirical evidence.

SCI involves internal and external integration. Internal integration refers to the extent to which organizational structures facilitate information sharing and joint decision making across internal functions, with the aim to streamline workflows and make collaborative decisions (Lau et al., 2009; Wong et al., 2011). Such integration enables firms to break down the functional silos so as to increase communication and information sharing across internal functions to enable joint planning and decision making (Chen and Paulraj, 2004; Flynn et al., 2010). While internal integration is responsible for functionally specialized activities, it also enables internal processes to collaboratively work together to achieve the common objective of satisfying customers. In addition to firm performance (Lai et al., 2004; Narasimhan and Kim, 2002), internal integration has been found to have a positive impact on operational outcomes, such as quality (Swink et al., 2007), process flexibility (Narasimhan et al., 2010), and delivery performance (Wong et al., 2011). Based on previous empirical findings and the RBV, we hypothesize that:

Hypothesis 1. Internal integration is positively associated with (a) cost, (b) quality, (c) delivery and (d) flexibility.

Supplier and customer integrations are commonly referred to as external integration, yet they feature different operational characteristics. Supplier integration is concerned with collaboration and partnership between a focal firm and its suppliers to manage upstream inter-organizational activities through information sharing, joint decision making, system coupling, and collaborative planning (He et al., 2014; Petersen et al., 2003). The aim of supplier integration is to establish

collaborative planning, forecasting, and replenishment capability with suppliers to reduce supply risk, inventory and associated costs. Supplier integration enables a focal firm to access resources and competencies beyond its organizational boundaries, and reduces transaction costs by adhering to standards and norms of exchange. Supplier integration facilitates collaboration with suppliers through information sharing and supplier involvement, thus contributing to the establishment of mutual understanding across partner firms (Petersen et al., 2003). Several papers have found that sharing information with suppliers or making joint decisions with them lead to better operational performance outcomes in the forms of more reliable delivery, higher product quality and flexibility (Ettlie and Reza, 1992; Frohlich and Westbrook, 2001; Scannell et al., 2000; Rosenzweig et al., 2003; Wong et al., 2011). There are also studies that have linked supplier integration to cost reductions due to better production planning and lower levels of inventory (Devaraj et al., 2007; Lee et al., 1997; Scannell et al., 2000; Wong et al., 2015a,b). Based on this empirical evidence and the RBV, we hypothesize that:

Hypothesis 2. Supplier integration is positively associated with (a) cost, (b) quality, (c) delivery and (d) flexibility.

Customer integration is defined as the collaboration and partnership between a focal firm and its customers to manage downstream inter-organizational activities through information sharing, joint-decision making, system coupling, and collaborative planning. Integrating with customers allows the incorporation of information and resources from customers into the processes and decisions of a focal firm (Vargo, 2008). Customer integration improves the understanding of market needs, thus enabling firms to design and develop products with a higher level of acceptance (Griffin and Hauser, 1996). A better understanding of the market needs, which results from information-sharing between manufacturers and customers, can lead to more appropriate adjustments in production plans, which can result in better operational outcomes through lower costs and higher delivery outcomes (Rosenzweig et al., 2003; Scannell et al., 2000; Wong et al., 2011). Also, the collaboration of firms with customers helps to build a common understanding between both parties, achieve better product quality and improve process flexibility (Ettlie and Reza, 1992; Frohlich and Westbrook, 2001; Rosenzweig et al., 2003; Scannell et al., 2000; Wong et al., 2011). In line with these authors and the RBV, we hypothesize that:

Hypothesis 3. Customer integration is positively associated with (a) cost, (b) quality, (c) delivery and (d) flexibility.

For all these three hypotheses, we will test the impact of each SCI dimension (i.e., internal, customer and supplier integration) on each operational performance outcome (i.e., cost, quality, delivery, and flexibility) separately. These four dimensions of operational performance have been considered in previous studies (e.g., Wiengarten and Longoni, 2015; Wong et al., 2011) and reflect the capabilities of firms to compete in an international business context (Schmenner and Swink, 1998). By considering each operational performance dimension, we will be able to obtain a holistic understanding of the relationships among different SCI practices and performance dimensions.

2.3. The moderating role of national culture

To understand the role of national culture in the SCI-performance relationship, we particularly focus on the dimensions of the GLOBE framework of national culture (House et al., 2004). The GLOBE project is an extension of the Hofstede national culture framework and is one of the most recent studies on organizational values and cultures which explores, among others, the effect of culture in organizational efficacy (House et al., 2004). The project is the result of a 10 years research effort in which more than 150 researchers collected information from 17,000 managers in 951 different organizations on more than 62 countries around the world.

Other national culture models are available in the literature. For instance, Ronen and Shenkar (1985) created eight country clusters to explain differences in beliefs and values, which took into account cultural factors, such as religion, language, legal systems and history. Later, a study carried out by Trompenaars (1994) identified five dimensions (i.e., universalism, individualism, neutral, specific, and achievement) that help explain work relationships in different cultures. Finally, the national culture framework from Hofstede (1983) is the result of an empirical study that examined more than 10,000 managers in 50 different countries.

The resulting dimensions from the GLOBE study comprised the following: power distance, uncertainty avoidance, institutional collectivism, in-group collectivism, humane orientation, performance orientation, assertiveness, gender egalitarism, and future orientation. Since this study focuses on the role of collaborative national cultures, it is appropriate to focus only on those GLOBE dimensions associated to how individuals relate to each other, namely, assertiveness, future orientation, humane orientation, in-group collectivism and institutional collectivism. Power distance (i.e., the extent to which individuals expect inequalities in power distribution) and gender egalitarism (i.e., the degree to which gender roles are minimized) are related to individual behavior on peer-to-peer and supervisor-and-subordinate relationships; performance orientation (i.e., the degree to which achievement and performance improvements are being valued) and uncertainty avoidance (i.e., the degree to which the unpredictability of future events are coped with) are related to the orientation in valuing performance results and coping with uncertainties. These later GLOBE dimensions (i.e. power distance, gender egalitarism, performance orientation and uncertainty avoidance) seem to fail to capture how (well) cross-national organizations work together by establishing relationships through SCI. Thus, the national culture dimensions that we will consider in our study are: institutional collectivism, in-group collectivism, humane orientation, assertiveness and future orientation. From now on, we will refer to these national culture dimensions as "collaborative behavior oriented national culture dimensions". We explain the role played by the five selected national culture dimensions in the SCI efficacy in the following sections. Fig. 1 summarizes our research framework.

2.3.1. Institutional collectivism

Institutional collectivism is defined as "the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action (House et al., 2004: 30)". Individuals working in an institutional collectivistic environment are assumed to align and fulfil group objectives by being cooperative and supportive in order to gain legitimacy (Gelfand et al., 2004; Parboteeah and Addae, 2012). While such a national culture assumes

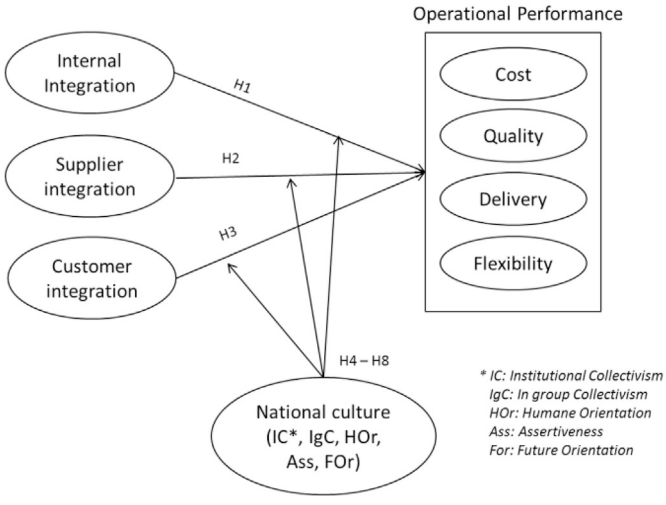

Fig. 1. Research framework.

interdependence of individuals in a group and decisions are made at the group level, institutional collectivism is found to be negatively associated with autonomy of performing group activities (House et al., 2004). As such, both the purpose of establishing internal integration which is to streamline works across internal functions, as well as the purpose of supplier and customer integration which is to facilitate tasks coordination across supply chain partners is likely to be defected. This is because autonomy would be difficult to achieve under an institutional collectivism environment. Also, institutional collectivism encourages group loyalty of individuals and individuals are likely to be discouraged to critically question the decisions and actions of other group members in order to reflect their supports to the group. Recognition to individual contribution to task success is also less likely to be found in a highly institutional collectivistic environment. As a result, institutional collectivism is likely to negatively moderate the relationship between SCI, which aims to develop collaborative efforts across the supply chain, and operational outcomes. Thus, we hypothesize:

Hypothesis 4. Institutional collectivism negatively moderates the relationships between (a) internal integration, (b) supplier integration and (c) customer integration and operational performance.

2.3.2. In-group collectivism

The dimension of in-group collectivism is defined as "the degree to which individuals express pride, loyalty, and cohesiveness in their organizations (House et al., 2004: 30)". In an in-group collectivism society, a strong sense of belonging to the group or to the organization is highly emphasized. In an in-group collectivism environment, group members are expected to behave according to their obligations and duties, rather than their own rationality (Parboteeah and Addae, 2012). Such a national culture is likely to enable SCI to improve performance outcomes by ensuring partners behave according to the norms and fulfilling the established agreements and obligations in the development of SCI. Moreover, in-group collectivism is positively associated with team orientation (House et al., 2004), which reflects the values of emphases on relatedness and support within the group. As in-group collectivism facilitates cohesiveness and support amongst functions and partners, the clear distinction of in-groups and out-groups discourage opportunistic behavior of partner firms that nurture effective collaboration and partnership. As a result, the performance impacts of SCI are likely to improve when firms operate in a highly in-group collectivism environment. We therefore hypothesize:

Hypothesis 5. In-group collectivism positively moderates the relationships between (a) internal integration, (b) supplier integration and (c) customer integration and operational performance.

2.3.3. Humane orientation

Humane orientation is described as "the degree to which an organization or society encourages and rewards individuals for being fair, altruistic, friendly, generous, caring, and kind to others (House et al., 2004: 569)". While a humane oriented nation concerns interest of others, firms operating under such a culture are likely to support their supply chain partners motivated by a need for belonging and affiliation (Parboteeah and Addae, 2012). They are less likely to behave opportunistically to take advantages of their supply chain partners. As such, humane orientation nurtures a trusting and collaborative relationship amongst partners, and is likely to improve the relationship between SCI and operational performance.

However, such national culture might not be beneficial to the collaboration across internal functions. While members of a humane orientated society assume to be caring, respect, and consider the well-being of one another (House et al., 2004), it is likely that the members would not criticize the decisions and actions of one another. Such behavior of individuals inside a firm can lead to the problem of inertia, becoming an inefficacy of operations as members do not actively monitor and look for ways to improve the operations. Thus, humane orientation might have an adverse impact on the SCI – operational performance relationship. Thus, we hypothesize:

Hypothesis 6. Humane orientation negatively moderates the relationships between (a) internal integration and operational performance; humane orientation positively moderates the relationships between (b) supplier integration and (c) customer integration and operational performance.

2.3.4. Assertiveness

The national culture dimension of assertiveness "reflects beliefs as to whether people are, or should be, encouraged to be assertive, aggressive and, tough, or non-assertive, non-aggressive, and tender in social relationships (House et al., 2004: 395)". Assertiveness is concerned with how people relate to each other. House et al. (2004) suggest that an assertive nation tends to value competition and success over cooperation and warm relationships. Thus, individuals in assertive countries are likely to behave opportunistically (Parboteeah and Addae, 2012). Under an assertive environment, it is difficult to nurture trust and mutual understanding amongst functions and partner firms. Close collaboration and cooperation amongst functions and partner firms are difficult to establish. As a result, it is likely to hinder the efficacy of implementing SCI to facilitate coordination of business activities to improve operational performance. We therefore hypothesize:

Hypothesis 7. Assertiveness negatively moderates the relationships between (a) internal integration, (b) supplier integration and (c) customer integration and operational performance.

2.3.5. Future orientation

Future orientation is defined as "the degree to which a collectivity encourages and rewards future-oriented behaviours such as planning and delaying gratification (House et al., 2004: 282)". Future orientation societies emphasize on long-term aspects, such as long-term relationships with partners, and are characterized by having flexible and adaptive organizations. This national culture cultivates adaptation of firms in aligning their objectives and plans to meet the needs of partner firms with an aim to develop a long-term relationship. Future orientation is therefore likely to nurture a collaborative relationship and deter opportunistic behavior of partner firms. Thus, we hypothesize:

Hypothesis 8. Future orientation positively moderates the relationships between (a) internal integration, (b) supplier integration and (c) customer integration and operational performance.

3. Method

3.1. Sample and data collection

To test our research model, we combined primary and secondary data sources. The primary data were gathered from the sixth iteration of the International Manufacturing Strategy Survey (IMSS), which was carried out in 2013 to collect data related to SCI practices as well as operational performance from a total of 22 countries. The secondary data are related to national culture. GLOBE framework of national culture was used to draw the data on cultural variables in different countries.

The IMSS is a global network that was originally launched by the London Business School (UK) and the Chalmers University of Technology (Sweden). The network comprises different business schools that collaborate with manufacturing firms to develop a common survey instrument and data collection protocols to study manufacturing and SCM. To ensure that the data are sampled in the same manner for all countries, a common research methodology is used. In the first phase, a common questionnaire was developed and a pre-test was conducted in different countries, which resulted in minor changes in the wording of some of the items. Throughout the years, new questions have been included to reflect new issues. The finalized common questionnaire is simultaneously

administered by local research groups. The operations, production or plant manager is the target respondent. Once a respondent agrees to participate in the study, the questionnaire is sent and a reminder is provided a few weeks later. Finally, non-response and late-response bias tests are performed in each country by local research coordinators. In the case of non-response bias, key demographic variables (i.e., sales, number of employees and SIC codes) were compared from those who answered the survey and those who did not. We conducted t-tests comparing sales and number of employees between the respondents and non-respondents. Chi-square tests were conducted between the same groups in the case of SIC codes. In the case of late-respondents, we ran the t-tests and Chi-square tests using the same demographic variables (i.e., sales, number of employees and SIC codes) between the following two groups: (1) responses obtained after the first contact email and (2) responses obtained after the remainder e-mail. The results of these procedures showed that non- and late-response bias is not an issue. The magnitude (i.e., relatively high sample size), involvement of companies in the development of the questionnaire (to ensure content validity) and history (i.e., both instrument and protocols have been extensively pre-tested by other researchers) are the strengths of the IMSS data set (Wiengarten et al., 2014).

The original IMSS-VI initial sample consisted of 931 plants from 22 countries. Our analysis uses a portion of the IMSS-VI database that contains countries with available GLOBE scores and complete data for the variables under study. The resulting sample is composed by 677 plants from 19 countries. A descriptive of the IMSS sample is provided in Table 1. To ensure that there are no systematic differences between the subsample of 677 and the entire IMSS sample we conducted independent sample t-tests using size, Return on Sales (ROS) and sales. Results indicate that mean scores for size ($p = 0.182$, $t = -0.1.337$), ROS ($p = 0.750$, $t = 0.319$) and sales ($p = 0.298$, $t = 1.042$) are not significantly different. This suggests that there are no systematic differences between our subsample and the overall IMSS sample for these contextual variables.

As already mentioned, the national culture scores for each country were obtained from the GLOBE study (House et al., 2004). For each of the dimensions, the degree to which respondents agreed on different items related to that national cultural dimensions were assessed. All dimensions are measured on a 1–7 point scale, where 1 indicates low values and 7 high values of each specific dimension. Table 2 shows the GLOBE scores for the selected dimensions in the countries of study. It is important to mention that from all the existing frameworks on national culture, we chose GLOBE as a framework to study national culture due to the following reasons. First, it is one of the most up-to-date and wider studies on national culture. Hence, itreflects quite accurately current differences between countries (Husted, 2000). Second, the choice of countries and regions for Europe is wider and more adequately for GLOBE (Shi and Wang, 2011). Given that the majority of our countries are European we found GLOBE to be more suitable. Third, being China one of the samples of the study, it is important to mention that Hofstede scores for this country are an estimate number derived from Taiwan and Hong Kong while this is not the case in GLOBE (Shi and Wang, 2011). Besides from these arguments it is important to mention that regardless of their different dimensions and operationalizations, all national culture models have reached similar conclusions with respect to the multi-country nature of national culture and its role in explaining differences in organizational matters (Pagell et al., 2005).

Table 1
Descriptive statistics of sample.

Country	N	%	ISIC code	N	%	Size (Number of employees)	N	%
Brazil	25	4	25	195	29	Less than 50	18	3
Canada	28	4	26	93	14	Between 50 and 249	286	42
China	109	16	27	110	16	Between 250 and 499	111	16
Denmark	33	5	28	176	26	More than 500	262	39
Finland	27	4	29	67	10	**Total**	677	100
Germany	11	2	30	36	5			
Hungary	46	7	**Total**	677	100			
India	56	8						
Italy	36	5						
Japan	66	10						
Malaysia	9	1						
Netherlands	41	6						
Portugal	26	4						
Slovenia	15	2						
Spain	28	4						
Sweden	30	4						
Switzerland	28	4						
Taiwan	23	3						
Total	677	100						

3.2. Measures

The IMSS survey questions that are related to internal, customer and supplierintegration and operational performance were used to test the hypotheses. Internal integration included four items: sharing information and joint decision making with both the purchasing and the sales departments. External integration included the sharing of information, development of collaborative approaches, joint decision making and system coupling with both suppliers and customers. Managers had to indicate the current level of implementation of action programs related to SCI which ranges from 1 (none) to 5 (high). These items have been used in previous studies (e.g., Ellinger et al., 2000; Gimenez and Ventura, 2005; Speakman et al., 1998) and reflect the extent to which a firm is internally and externally integrated. The specific items are listed in Appendix 1.

Operational performance was measured across the dimensions of quality, flexibility, delivery and cost (Rosenzweig and Roth, 2004; Schoenherr and Swink, 2012; Wiengarten et al., 2014). Per each performance dimension, the respondents were asked to answer multiple items that indicated their performance relative to their main competitor. All performance items were measured by using a 1 to 5 Likert-scale where 1 indicates much worse, 3 is equal, and 5 is much better. The operational performance items are also included in Appendix 1.

To avoid method bias from close proximity, SCI and performance questions were placed on different pages of the questionnaire (Podsakoff et al., 2003). Also, we tested our sample for common method bias by following the Harman's single factor test (Podsakoff et al., 2003). The rationale behind the Harman's single factor method is that if a "substantial amount of common method bias is present, either (a) a single factor will emerge from the factor analysis, or (b) one general factor will account for the majority of the covariance among measures (Podsakoff et al., 2003:889)". Results indicate that the single factor model produced a significantly worse model fit compared to our proposed and confirmed seven-factor model (RMSEA = 0.18, SRMR = 0.12, $X^2/df = 21.86$, CFI = 0.53).

3.3. Validity and reliability

In this section, we will discuss the validity of our measures in terms of convergent and discriminant validities, and reliability (Anderson and Gerbing, 1988; Nunnally, 1978). By following the suggestions in O'Leary-Kelly and Vokurka (1998), we conducted a confirmatory factor analysis (CFA) as a first step in our data analysis procedure to test for convergent validity. The results showed that the proposed structure of items to measure SCI practices and each operational performance dimension results in a reasonably good fitting model ($X^2/df = 3.06$; RMSEA = 0.0.06; CFI = 0.95; TLI = 0.93; SRMR = 0.03). In addition, all loadings surpassed the suggested threshold of 0.50 and exceeded twice the value of their associated standard error (Flynn et al., 2010; Vickery

Table 2
Cultural dimension scores per GLOBE for countries in study.

Country	Assertiveness	In-group collectivism	Institutional collectivism	Future orientation	Human orientation
Brazil	4.20	5.18	3.83	3.81	3.66
Canada	4.05	4.26	4.38	4.44	4.49
China	3.76	5.80	4.77	3.75	4.36
Denmark	3.80	3.53	4.80	4.44	4.44
Finland	3.81	4.07	4.63	4.24	3.96
Germany	4.64	4.27	3.68	4.11	3.29
Hungary	4.79	5.25	3.53	3.21	3.35
India	3.73	5.92	4.38	4.19	4.57
Italy	4.07	4.94	3.68	3.25	3.63
Japan	3.59	4.63	5.19	4.29	4.30
Malaysia	3.87	5.51	4.61	4.58	4.87
Netherlands	4.32	3.70	4.46	4.61	3.86
Portugal	3.65	5.51	3.92	3.71	3.91
Slovenia	4	5.43	4.13	3.59	3.79
Spain	4.42	5.45	3.85	3.51	3.32
Sweden	3.38	3.66	5.22	4.39	4.10
Switzerland	3.99	3.91	4.14	4.29	3.77
Taiwan	3.92	3.59	4.59	3.96	4.11
US	4.55	4.25	4.20	4.15	4.17

et al., 2003). All of these results (see Table 3) indicate that convergent validity is met. Discriminant validity was assessed by comparing the average variance extracted (AVE) of each construct and the shared variance between each pair of constructs (Anderson and Gerbing, 1988). Table 4 indicates that there is sufficient discriminant validity since the square root of the AVE of each construct is higher than its correlations. Finally, reliability was tested by using Cronbach's alpha (α). As shown in Table 3, all of the Cronbach's α scores are above the commonly accepted level of 0.70, thus indicating high reliability.

4. Results

To answer our research question and test the hypotheses, we used multilevel regression analysis (Stata 14 software) in which operational performance (i.e., quality, cost, delivery and flexibility) is our dependent variable and internal, supplier and customer integration are the independent ones. In addition, different dimensions of national culture moderate the relationship between SCI practices and operational performance. Finally, firm size, % of outsourcing and the logistics performance index (LPI) are included as control variables. Multilevel regression is a suitable technique since our data are clustered (i.e., plants are nested in countries) and we have variables at different levels of analysis (i.e., plant and country levels). Multilevel regression accounts for the non-independence of samples and avoids obtaining inefficient estimators

Table 3
Confirmatory factor analysis results, convergent validity and reliability.

Construct	Item	Mean	SD	Loading	S.E.	Cronbach's α
Internal Integration	II_1	3.56	0.88	0.76	0.02	0.89
	II_2			0.81	0.02	
	II_3			0.84	0.02	
	II_4			0.85	0.01	
Supplier Integration	SI_1	3.24	0.87	0.79	0.02	0.83
	SI_2			0.83	0.02	
	SI_3			0.76	0.02	
Customer Integration	CI_1	3.03	1.05	0.87	0.01	0.87
	CI_2			0.85	0.01	
	CI_3			0.78	0.02	
Quality Performance	QUAL_1	3.59	0.72	0.83	0.02	0.80
	QUAL_2			0.81	0.02	
Flexibility Performance	FLEX_1	3.45	0.77	0.82	0.03	0.74
	FLEX_2			0.71	0.03	
Delivery Performance	DEL_1	3.57	0.82	0.82	0.02	0.82
	DEL_2			0.87	0.02	
Cost Performance	COST_1	3.01	0.71	0.70	0.06	0.71
	COST_2			0.80	0.06	

Table 4
Discriminant validity.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Internal Integration (1)	0.82[a]						
Supplier Integration (2)	0.56[b]	0.80					
Customer Integration (3)	0.43	0.60	0.84				
Quality Performance (4)	0.28	0.29	0.23	0.82			
Flexibility Performance (5)	0.23	0.23	0.16	0.42	0.77		
Delivery Performance (6)	0.18	0.22	0.22	0.49	0.43	0.84	
Cost Performance (7)	0.17	0.17	0.12	0.10	0.18	0.16	0.75

[a] AVE square root (Note: all values in the diagonal are the square-root of AVE).
[b] Correlations.

that would lead to type I errors. Furthermore, it also accounts for the differences in sample sizes within countries which otherwise would lead to biased results.

A step taken prior to running the analysis was to check for multicollinearity among the independent variables since its presence can bias the regression estimates. Thus, we examined the variance inflation factor (VIF), and the results showed that the highest VIF score is 4.10, which is below the suggested threshold of 10.0. Therefore, multicollinearity does not pose problems in the interpretation of the results. However, given that a few collaborative behavior oriented national culture dimensions (i.e., moderators) are correlated, as shown in Table 5, and to provide additional certainty that multicollinearity is not present, the regression analysis including the moderating effects are estimated in separate models. Specifically, we have one regression model per each performance dimension outcome (i.e., quality, cost, delivery and flexibility) in which we test for the direct effect of each SCI dimension (i.e., internal, supplier and customer integration). Then, per each of these models we run five moderating models to analyze the role of national culture on the relationship between SCI and operational performance.

The results of the multilevel analysis are shown in Tables 6–9. Per each performance dimension model, we followed the next steps. First, we run an empty model which decomposes the variance of each operational performance dimension into within-group variance σ^2 (plant level) and between group variance τ^2_0 (country level). Next, in Model 0, we include firm size, % of outsourcing, and LPI, which are our control variables. The results showed that firm size, % of outsourcing and LPI are insignificant in all models. Model 1 incorporated the independent variables (i.e., internal, supplier, and customer integration). Finally, Model 2 includes the interaction terms of collaborative behavior oriented national culture dimensions.

To assess model fit, we compared the deviance reduction across

Table 5
Correlation matrix.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Internal Integration (1)	1											
Supplier Integration (2)	0.56	1										
Customer Integration (3)	0.43	0.60	1									
Quality (4)	0.28	0.29	0.23	1								
Flexibility (5)	0.23	0.23	0.16	0.42	1							
Delivery (6)	0.18	0.22	0.22	0.49	0.43	1						
Cost (7)	0.17	0.17	0.12	0.10	0.18	0.16	1					
Assertiveness (8)	0.06	−0.07	−0.05	−0.09	−0.06	−0.002	−0.02	1				
In group collectivism (9)	0.01	0.08	0.004	−0.05	0.07	−0.03	0.06	−0.12	1			
Institutional collectivism (10)	−0.04	0.02	0.05	0.10	0.04	0.004	0.03	−0.71	−0.11	1		
Future Orientation (11)	0.02	−0.004	0.06	0.05	−0.01	−0.02	−0.01	−0.37	−0.58	0.56	1	
Human Orientation (12)	0.03	0.08	0.09	0.09	0.08	0.05	0.01	−0.68	0.14	0.66	0.56	1

Table 6
Multilevel regression results for COST.

Parameters	Dependent variable: COST							
	Empty Model	Model 0	Model 1	Mode2.a ASS	Model 2.b IGC	Model 2.c IC	Model 2.d FO	Model 2.e HO
Grand intercept								
Constant	3.01***	3.01***	3.01***	3.01***	3.02***	3.02***	3.02***	3.01***
Control variable								
Firm's size		0.04	0.02	0.02	0.023	0.022	0.020	0.020
Outsourcing		0.004	0.01	0.009	0.009	0.009	0.013	0.010
LPI		−0.03	−0.03	−0.04	−0.01	−0.05	−0.04	−0.003
Nat cult dim.				−0.01	0.02	0.03	0.01	−0.003
Direct effects								
Internal Integr			0.06**	0.06**	0.06**	0.07**	0.06**	0.06**
Supplier Integr			0.07**	0.07**	0.08**	0.07**	0.07**	0.07**
Customer Integr			0.009	0.009	0.006	0.007	0.008	0.01
Interactions								
II*Nat. cult. dim.				0.02	0.07**	−0.03	−0.04	−0.03
SI*Nat. cult. dim				−0.02	−0.03	0.01	−0.01	−0.01
σ^2	0.004	0.003	0.003	0.002	0.0008	0.004	0.002	0.003
τ^2_0	0.438	0.44	0.42	0.42	0.42	0.42	0.42	0.42
Deviance (D)	1367.62	1363.97	1340.47	1339.55	1335.77	1338.19	1337.52	1338.76
AIC	1373.62	1375.97	1358.47	1363.55	1348.77	1362.19	1361.52	1362.77
BIC	1387.18	1403.07	1399.13	1417.77	1373.98	1416.41	1415.74	1416.98

*p ≤ 0.10; **p ≤ 0.05; ***p ≤ 0.001.

Table 7
Multilevel regression results for QUALITY.

Parameters	Dependent variable: QUALITY							
	Empty Model	Model 0	Model 1	Mode2.a ASS	Model 2.b IGC	Model 2.c IC	Model 2.d FO	Model 2.e HO
Grand intercept								
Constant	3.57***	3.56***	3.57***	3.57***	3.57***	3.57***	3.57***	3.58***
Control variable								
Firm's size		0.01	−0.02	−0.02	−0.03	−0.02	−0.02	−0.02*
Outsourcing		−0.06*	−0.04	−0.05	−0.04	−0.04	−0.04	−0.05
LPI		0.07	0.07	0.06	0.09	0.05	0.07	0.06
Nat. cult dim.				−0.07*	0.03	0.05	−0.001	0.06
Direct effects								
Internal Integr			0.13***	0.13***	0.13***	0.13***	0.13***	0.13***
Supplier Integr			0.13***	0.13***	0.12***	0.12***	0.12***	0.12***
Customer Integr			0.03	0.03	0.03	0.03	0.03	0.03
Interactions								
II*Nat. cult. dim.				0.03	−0.003	−0.06**	−0.07**	−0.10***
SI*Nat. cult. dim				−0.04	−0.01	0.03	0.03	0.05*
σ^2	0.03	0.03	0.02	0.01	0.02	0.02	0.020	0.020
τ^2_0	0.49	0.49	0.44	0.44	0.44	0.43	0.43	0.43
Deviance (D)	1462.48	1456.99	1376.40	1371.77	1375.88	1370.77	1371.06	1364.92
AIC	1468.48	1468.99	1401.40	1395.77	1399.88	1394.77	1395.06	1388.92
BIC	1482.03	1496.10	1460.06	1449.98	1454.09	1448.98	1449.27	1443.14

*p ≤ 0.10; **p ≤ 0.05; ***p ≤ 0.001.

Table 8
Multilevel regression results for DELIVERY.

Parameters	Dependent variable: DELIVERY							
	Empty Model	Model 0	Model 1	Mode2.a ASS	Model 2.b IGC	Model 2.c IC	Model 2.d FO	Model 2.e HO
Grand intercept								
Constant	3.56***	3.55***	3.56***	3.55***	3.56***	3.55***	3.55***	3.56***
Control variable								
Firm's size		0.027	−0.009	−0.008	−0.009	−0.006	−0.01	−0.01
Outsourcing		−0.04	−0.03	−0.03	−0.03	−0.03	−0.03	−0.03
LPI		0.03	0.03	0.04	0.03	0.06	0.07	0.04
Nat. cult dim.				0.03	−0.002	−0.06	−0.06	0.01
Direct effects								
Internal Integr			0.06*	0.06*	0.06*	0.06*	0.06*	0.06*
Supplier Integr			0.08**	0.08**	0.08**	0.09**	0.08**	0.08**
Customer Integr			0.09**	0.09**	0.09**	0.09**	0.1***	0.09**
Interactions								
SI*Nat. cult. dim				−0.03	−0.0005	−0.02	−0.02	−0.02
CI*Nat. cult. dim.				0.05	−0.008	−0.08**	0.02	0.02
σ^2	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.03
τ^2_0	0.59	0.59	0.55	0.55	0.55	0.55	0.55	0.55
Deviance (D)	1583.26	1580.80	1539.55	1537.37	1539.47	1533.40	1538.26	1539.06
AIC	1589.26	1592.80	1557.55	1561.37	1563.47	1547.40	1562.26	1563.06
BIC	1602.82	1619.90	1598.21	1615.58	1617.68	1567.61	1616.48	1617.28

*p ≤ 0.10; **p ≤ 0.05; ***p ≤ 0.001.

Table 9
Multilevel regression results for FLEXIBILITY.

Parameters	Dependent variable: FLEXIBILITY							
	Empty Model	Model 0	Model 1	Mode2.a ASS	Model 2.b IGC	Model 2.c IC	Model 2.d FO	Model 2.e HO
Grand intercept								
Constant	3.44***	3.44***	3.44***	3.45***	3.45***	3.44***	3.44***	3.45***
Control variable								
Firm's size		0.03	0.002	−0.0004	−0.001	0.002	0.0006	0.003
Outsourcing		0.003	0.01	0.009	0.01	0.01	0.02	0.01
LPI		0.01	0.01	0.005	0.10*	−0.007	0.02	0.007
Nat. cult dim.				−0.05*	0.12***	0.04	−0.01	0.05**
Direct effects								
Internal Integr			0.11***	0.12***	0.11**	0.12***	0.11***	0.11***
Supplier Integr			0.09**	0.09**	0.09**	0.09**	0.09**	0.09**
Customer Integr			0.02	0.01	0.02	0.02	0.02	0.02
Interactions								
II*Nat. cult. dim.				−0.04	0.005	−0.03	−0.03	−0.04
SI*Nat. cult. dim				0.001	−0.002	0.01	0.0003	0.02
σ^2	0.005	0.005	0.006	0.0009	6.11e-21	0.0030	0.006	0.001
τ^2_0	0.50	0.50	0.47	0.47	0.47	0.47	0.47	0.47
Deviance (D)	1463.20	1461.89	1413.31	1408.75	1406.47	1411.23	1411.87	1408.53
AIC	1469.20	1473.89	1431.31	1432.75	1430.47	1435.23	1435.87	1432.53
BIC	1482.75	1501.00	1471.97	1486.97	1484.68	1489.45	1490.08	1486.74

*p ≤ 0.10; **p ≤ 0.05; ***p ≤ 0.001.

models in each performance dimension. The bigger the reduction the better, as it suggests that the model has a better fit. Our results showed that deviance is reduced in all four multilevel models when moving from Model 0 to Model 2. We then took further steps to test for model fit by checking the Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) across models since they take into account the inclusion of indicators. In the cost, quality and delivery dimensions models, when the interaction term is significant, the AIC and BIC are lower for Model 2 as opposed to Model 0 and 1. This suggests that for models in which moderation is significant, Model 2 is a better fit than Model 0. In the case of flexibility performance, these indicators are always lower in the case of Model 1. These results suggest that in the case of flexibility, national culture does not have any moderating role in the SCI-performance relationship. Next, we describe the results of the direct effects between SCI and each operational performance outcome.

In the case of quality performance, the results showed that both internal integration ($\beta = 0.13$, $p < 0.01$) and supplier integration ($\beta = 0.13$, $p < 0.01$) are positively and significantly associated with quality performance. Yet, customer integration is found insignificantly related to quality. Similarly, in terms of flexibility performance, internal integration ($\beta = 0.11$, $p < 0.01$) and supplier integration ($\beta = 0.09$, $p < 0.05$) are positively associated with flexibility performance outcome, but customer integration is not significantly related to flexibility performance. In the case of delivery performance, the results showed that customer integration ($\beta = 0.09$, $p < 0.05$) and supplier integration ($\beta = 0.08$, $p < 0.05$) are positively associated with delivery outcomes. Internal integration is not positively associated. In the case of cost performance, both internal ($\beta = 0.06$, $p < 0.05$) and supplier integration ($\beta = 0.07$, $p < 0.05$) are positively associated to cost reductions, while customer integration is insignificantly related to cost reductions.

Overall, our results provide support for H2, which posits that supplier integration is positively associated with operational outcomes. Our results provide support for H1a, H1b and H1d, which posit that internal integration is positively associated with quality, cost and flexibility

outcomes. Also, H3c, which posits a positive association between customer integration and delivery outcomes is supported. Finally, H1c, H3a, H3b and H3d are not supported. In the following lines we present the results of the moderating models.

Institutional collectivism negatively moderates the relationship between internal integration and quality, as well as the relationship between customer integration and delivery. These results lend partial support for H4a and H4c, which posit that the SCI-performance relationship is negatively affected by institutional collectivism. In Group Collectivism positively moderates the relationship between internal integration and cost performance, offering support for H5a. Humane Orientation negatively moderates the relationship between internal integration and quality, lending partial support for H6. Assertiveness does not moderate the relationship between any type of integration and operational performance, providing no support for H7. Finally, Future Orientation negatively moderates the relationship between internal integration and quality, failing to lend support for H8, which hypothesized a positive moderating effect. Table 10 provides a summary of the supported and not supported hypotheses.

Table 10
Summary of hypotheses.

Hypotheses	Results
Hypothesis 1. Internal integration is positively associated with (a) cost, (b) quality, (c) delivery and (d) flexibility	Partially supported
Hypothesis 2. Supplier integration is positively associated with (a) cost, (b) quality, (c) delivery and (d) flexibility	Supported
Hypothesis 3. Customer integration is positively associated with (a) cost, (b) quality, (c) delivery and (d) flexibility	Partially supported
Hypothesis 4. Institutional collectivism negatively influences the relationships of (a) internal integration, (b) supplier integration and (c) customer integration with operational performance.	Partially supported
Hypothesis 5. In-group collectivism positively influences the relationships of (a) internal integration, (b) supplier integration and (c) customer integration with operational performance.	Partially supported
Hypothesis 6. Humane orientation negatively influences the relationships of (a) internal integration with operational performance; humane orientation positively influences the relationships of (b) supplier integration and (c) customer integration with operational performance.	Partially supported
Hypothesis 7. Assertiveness negatively influences the relationships of (a) internal integration, (b) supplier integration and (c) customer integration with operational performance.	Not supported
Hypothesis 8. Future orientation positively influences the relationships of (a) internal integration, (b) supplier integration and (c) customer integration with operational performance.	Not supported

5. Discussion

The objective of this paper is to investigate the role of national culture in affecting the performance results of SCI in multiple countries and analyze the possible differences in its efficacy due to differences in national culture. By collecting data from multiple countries, we found that the efficacy of SCI practices differs depending on specific collaborative behavior oriented national culture dimensions. The discussion on the results is structured into two different sections. We first discuss the SCI operational performance relationship and then the moderating role of national culture.

5.1. SCI–operational performance

The results related to the direct relationship between SCI and operational performance suggest that each SCI dimension has a different impact on each operational performance outcome. While supplier integration is positively associated with all operational performance outcomes (i.e., cost, quality, delivery and flexibility) and internal integration with all except for delivery performance, customer integration is only positively associated with delivery performance. In the following paragraphs we discuss these results.

In the case of internal integration, our results support the fact that there is a need to remove functional barriers in order to reduce cost (Ettlie and Stoll, 1990), improve flexibility (Sawhney, 2006) and quality (Swink et al., 2007). That is, joint decision making with respect to stock levels between manufacturing and purchasing departments leads to cost reductions. For example, the sharing of information between the sales and manufacturing departments can help to better adjust the production rate to cope with demand fluctuations. These three performance dimensions (i.e., cost, quality and flexibility) can therefore be considered as highly dependent on the internal coordination of a firm.

The results related to supplier integration support the fact that working together with suppliers in terms of information sharing and joint decision making result in better operational outcomes in the form of higher flexibility, delivery, quality and lower costs (Frohlich and Westbrook, 2001; Scannell et al., 2000; Wong et al., 2011). It is important to mention that delivery performance is highly sensitive to external inputs and collaboration with external entities (Wong et al., 2011) since it is also improved by integrating externally with customers. Thus, these results reinforce the key role of suppliers and customers for the focal firm as providers of information and as collaborative partners (Galbraith, 1973), as collaborating with them results in improvements in operational performance outcomes. For example, making joint decisions with suppliers about product design ensures that firms receive material inputs that allow them to produce products that meet design specifications. Also, sharing information with key customers or implementing continuous replenishment programs leads to higher delivery results (i.e., the manufacturer is able to fulfill customer orders quicker and on-time).

Overall, our results provide additional insights on the SCI – operational performance relationship as we have considered the impact of each SCI dimension on each operational performance outcome. The examination of how SCI affect these four performance outcomes provides a holistic understanding of the operational performance that are crucial in supply chain coordination across firms as well as countries. In fact, our study advances the SCI literature by revealing that not all SCI dimensions improve operational performance. Thus, showing that this relationship is not universal, which is line with our next theorization that the SCI-performance relationship is contingent on contextual conditions (i.e., national culture). In the following section we discuss the moderating role of national culture.

5.2. The moderating role of national culture

We hypothesized that some collaborative behavior oriented national culture dimensions positively (or negatively) affect the relationship between SCI and operational performance as they facilitate (or deter) collaborative relationships across functions (i.e., internal integration) and across firms (i.e., supplier and customer integration). Our results show that future orientation, humane orientation and institutional collectivism negatively affect the relationships between SCI and various operational performance dimensions. Consistent to our theorization, institutional collectivism negatively affects the relationships between internal integration and quality and customer integration and delivery. Our results show that in high collectivism environments the efficacy of SCI in terms of quality and delivery is lower than in low collectivism environments. One possible explanation is that institutional collectivism encourages group loyalty of individuals, and therefore, individuals are likely to be discouraged to critically question the decisions and actions of other group members in order to reflect their support to the group. Therefore, autonomy is low. If autonomy is low and a collaborative behavior is already present in this type of environments, SCI is less effective.

In line with our theorization that humane orientation negatively influences the relationship between internal integration and operational

performance, our results show that internal integration has a negative impact on quality in a humane oriented context. This result can be explained as follows: As humane orientation leads to problem of inertia and lack of continuous improvement, in this type of contexts internal integration will be less effective.

Future orientation, contrary to what we expected, has been found to have a negative impact on the relationship between internal integration and quality. A possible explanation of this result is that as different internal functions aim to develop long-term relationships, they are not likely to criticize the wrongdoings of other functions. Instead, they choose to adapt to the needs of other functions, though that may compromise the performance of the company.

Regarding the role of in-group collectivism (which is related to the cohesiveness of individuals in their organizations), we found a moderating effect of this cultural trait. Our results show that this cultural trait has an enabling role in facilitating internal integration to achieve cost reductions. We also found that assertiveness (i.e. how people relate to each other) does not have any moderating impact on SCI-performance relationship. This could be explained as follows: in the context of business relationships how people relate to each other is more based on in-group collectiveness than on the level of the national culture trait of assertiveness.

Finally, it has to be stressed that the operational variable affected by more dimensions of national culture traits is quality. This results is in line with several papers that have successfully shown that quality is influenced by national culture (e.g., Flynn and Saladin, 2006; Kull and Wacker, 2010; Lagrosen, 2002; Wiengarten et al., 2011). In fact, quality can be considered a "soft" dimension of operational performance, in comparison to cost or delivery, which is more dependent on human factors. Therefore it makes sense that national culture, which has been described as influencing human behaviors, mostly affects operational performance in terms of quality outcomes.

6. Conclusions

Grounded in the contingency theory, which advocates the contextual impact on the efficacy of organizational efforts, we posited that firms in countries characterized by in-group collectivism and future orientation improve the performance outcomes of SCI. We also theorized that institutional collectivism and assertiveness deter the performance outcomes of SCI. Finally, we posited that humane orientation is beneficial to internal integration, but not to supplier and customer integration, in achieving operational performance.

As hypothesized, our results suggest that in societies with high levels of future institutional collectivism and humane orientation, the impact of the implementation of internal integration will be lower. These societies have the following characteristics: their members are loyal to the group and individuals are likely to be discouraged to critically question the decisions and actions of other group members in order to reflect their support to the group; their members also care, respect, and consider the well-being of one another, and are motivated primarily by a need for belonging and affiliation. In these societies, the implementation of internal integration to achieve quality is less effective, as their members want to reflect their support to the group (motivated by their need of belonging) and this can lead to the problem of inertia and not interest in searching ways to improve operations.

Future orientation, contrary to what was hypothesized, negatively affects the relationship between internal integration and quality. Its explanation follows a similar line of argument: as different internal functions aim to develop long-term relationships, they are not likely to criticize the wrongdoings of other functions, and therefore, the efficacy of internal integration practices is reduced.

Our results, also in line with our hypothesis, show that in societies characterized by high in-group collectivism the impact of internal integration on cost is lower. In these societies, there is a strong sense of belonging to the group or to the organization. Our findings show that this trait enhances the impact of internal integration on the cost dimension as it enables the implementation of collaborative practices between departments. In plants located in these environments, employees working in different functional areas (operations, marketing, logistics, etc.) work effectively with one another, reducing the costs of operations.

Our findings are interesting for both researchers and managers. Our paper contributes to the SCI literature and the contingency theory by showing the moderating role of national culture in the SCI-performance relationship. Previous literature had focused on contextual variables such as environmental uncertainty, supply complexity or some characteristics of the buyer-supplier relationship (Sancha et al., 2016). However, there was a lack of research considering national culture. Our paper contributes to this stream of literature and the contingency theory by showing that culture needs to be considered as contextual variable in the SCI-operational performance relationship, as some cultural environments can enhance (or deter) the impact of the SCI.

As a result of our study, managers of multinational firms with plants around the world can understand better why the efficacy of their SCI practices is not uniform. For instance, managers can expect better quality results from internal integration practices in countries with cultural characteristics including low institutional collectivism, humane orientation and future orientation. Examples of countries with these characteristics are: Greece, Russia or Denmark. Also, related to cost performance, managers need to bear in mind that the efficacy of internal integration is higher in countries characterized by high in-group collectivism. Finally, in terms of customer integration and delivery outcomes, the impact of the first on the latter would be improved in countries with low institutional collectivism (e.g., Venezuela). Overall, these results can guide managers on their decisions regarding where to locate their companies or plants. Once the competitive priority of the firm has been set, managers might identify the country with a national culture that can enhance the efficacy of SCI.

Besides these contributions, our paper has some limitations that need to be acknowledged. First, performance constructs use managers' perceptions regarding their performance with respect to their major competitors. Further research should consider objective data for these performance measures. Second, we have considered the moderating role of national culture. Further research should consider if an organizational culture that favors a collaborative behavior can counterbalance the possible negative effect of a specific trait of the national culture. Third, our study is based on the assembly industries (NACE codes 25, 26, 27, 28, 29, 30). The choice of this setting helps to ensure high internal validity, however results may differ in other contexts (i.e. other manufacturing industries or the service sector e.g., Chan et al., 2016). In industries or sectors less intensive in capital national culture may have a higher impact. Because of this, it would be useful that future research explores if these results still hold in other industries. Finally, our results show that national culture does play an important role in the operational efficacy of SCI practices from the perspective of manufacturers. We have considered the national culture of the country in which the plant is located. However, given that different stages of the supply chain might be in different locations with different national cultures, future studies might consider taking a supply chain perspective and study what national culture (i.e., national culture from supplier, manufacturer, retailer) prevails and how do they interact throughout a supply chain.

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Appendix 1

List of items, description and source

Item Description	Reference
Internal Integration	
Indicate the current level of implementation of action programs related to internal integration: (1. None – 5. High)	
II_1 Sharing information with purchasing department (about sales forecasts, production plans, production progress and stock levels)	Adapted from Ellinger et al. (2000) and Gimenez and Ventura (2005)
II_2 Joint decision making with purchasing department (about sales forecasts, production plans and stock levels)	
II_3 Sharing information with sales department (about sales forecasts, production plans, production progress and stock levels)	
II_4 Joint decision making with sales department (about sales forecast, production plans and stock level)	
Supplier Integration	
Indicate the current level of implementation of action programs related to external integration: (1. None – 5. High)	
SI_1.Sharing information with key suppliers (about sales forecasts, production plans, order tracking and tracing, delivery status, stock levels)	Adapted from Ellinger et al. (2000) Gimenez and Ventura (2005) and Speakman et al. (1998)
SI_2. Developing collaborative approaches with key suppliers (e.g. supplier development, risk/revenue sharing, long-term agreements)	
SI_3. Joint decision making with key suppliers (e.g. vendor managed inventory, just-in-time, Kanban, continuous replenishment)	
Customer Integration	
Indicate the current level of implementation of action programs related to external integration: (1. None – 5. High)	
CI_1.Sharing information with key customers (about sales forecasts, production plans, order tracking and tracing, delivery status, stock levels)	Adapted from Ellinger et al. (2000) Gimenez and Ventura (2005) and Speakman et al. (1998)
CI_2. Developing collaborative approaches with key customers (e.g. risk/revenue sharing, long-term agreements)	
CI_3. Joint decision making with key customers (e.g. vendor managed inventory, just-in-time, Kanban, continuous replenishment)	
Operational Performance	
How does your current performance compare with that of your main competitor(s)?	
Quality Performance (1 – much lower, 3 – equal, 5 – much higher)	Adapted from Rosenzweig and Roth (2004) and Schoenherr and Swink (2012)
QUAL_1 Conformance quality	
QUAL_2 Product quality and reliability	
Delivery Performance (1 – much lower, 3 – equal, 5 – much higher)	Adapted from Rosenzweig and Roth (2004) and Schoenherr and Swink (2012)
DEL_1 Delivery speed	
DEL_2 Delivery reliability	
Flexibility Performance (1 – much lower, 3 – equal, 5 – much higher)	Adapted from Rosenzweig and Roth (2004) and Schoenherr and Swink (2012)
FLEX_1 vol flexibility	
FLEX_2 Mix flexibility	
Cost Performance (1 – much higher, 3 – equal, 5 – much lower)	Adapted from Rosenzweig and Roth (2004) and Schoenherr and Swink (2012)
COST_1 Unit manufacturing cost	
COST_2 Ordering cost	

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