Measuring the impact of integration practices on firms' supply chain performance: role of organizational antecedents in this relationship

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Abstract

Purpose – This study empirically tests a conceptual framework that shows how integration practices are significantly associated with supply chain (SC) performance. This study also intends to achieve the following purposes: first, how the performance is influenced by the integration practices, i.e. internal and external; second, to measure the mediating effect of organizational antecedents (market orientation, learning orientation) between integration practices and firm's SC performance.

Design/methodology/approach – In a noncontrived study environment, a cross-sectional study design was used with a questionnaire. The study used a stratified proportionate random sample of 205 managers from manufacturing firms in China. Six hypothesized relationships were examined using the structural equation modeling (SEM) technique in AMOS software, and five were shown to be valid. The proposed model was validated through various techniques.

Findings – Results of this study indicate that both external and internal integration influence SC performance and confirms the mediating role of organizational antecedents between integration practices and SC performance. According to the findings, five out of the six hypotheses are accepted. Findings of this research also offer very expedient insights for the companies' management which can help them to ensure optimal output by giving due importance to external as well as internal integration.

Research limitations/implications – The data for the study were only obtained from one province, which was Henan Province, and one industry, which was manufacturing; this constrained the generalizability of the study. The findings may be further validated in the future by expanding the scope of the studies to include various cultural contexts and types of businesses. Second, this study used data from a cross-sectional analysis; however, future research may potentially make use of a longitudinal design in order to more thoroughly confirm the findings.

Practical implications – Findings of this study offer substantial managerial insights suggesting various ways to develop better internal as well as external integration to get better results. Management of the company should focus and give more importance to job rotation, trainings and management commitment as part of internal integration. Moreover, management should strive for improving the capabilities of integration in internal functions prior to external integration as internal collaboration, teamwork and interaction within the company are considered as a precondition to maintain integration with external stakeholders. It is also a social process which needs to be built up over a longer period of time.

Originality/value – The authors contribute to the literature by experimentally evaluating the effects of integration practices on SC performance using a conceptual model drawn from current theories. The study also offer additional empirical evidence for Han *et al.* (2007), who found that SCI enhances firm performance through

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quality management in their analyses of the relationships between SCI, quality management practices and firm performance.

Keywords Integration practices, Internal integration, External integration, Market orientation, Learning orientation, Supply chain performance

Paper type Research paper

1. Introduction

It has been broadly observed that the organizations are supporting supply chain (SC) collaboration initiatives and showing great interest in integration practices. Firms are striving for greater and efficient SC collaborations by having knowledge of their key suppliers and valued customers and leveraging their resources to lower the transactions costs, reduce uncertainty, knowledge creation by capitalizing on opportunities, building of core competence and for improvement in competitive position. According to the researchers, the competition is now across SC rather than between organizations/companies. This is due to a rise in technological transformation of businesses and competitive markets, as well as shorter product life cycles and immediate availability of customized items for customers. Since the last few years, academics and practitioners have been paying close attention to SC integration (SCI) (Frohlich & Westbrook, 2001; Narasimhan & Kim, 2002; Zhao, Huo, Flynn, & Yeung, 2008; Droge, Jayaram, & Vickery, 2004; Flynn, Huo, & Zhao, 2010; Braunscheidel & Suresh, 2009; Swink, Narasimhan, & Kim, 2005). Therefore, firms are compelled to concentrate on their competitive and unique skills and to outsource nonessential activities to other connected firms having greater expertise in a similar area. Researchers have been articulating the need for strong integration and close relationship among suppliers and manufacturers since long (e.g. Lambert, Robeson, & Stock, 1978; Armistead & Mapes, 1993). Organizations are now compelled to re-consider the necessity of mutually beneficial and cooperative SC collaborations due to increase in competition globally (Lambert & Cooper, 2000; Wisner & Tan, 2000) and jointly, improvements in inter-organizational process are now on high precedence (Zhao *et al.*, 2008). SCI and developments have been theorized as important strategy to improve firm performance (Flynn *et al.*, 2010; Frohlich & Westbrook, 2001; Koufteros, Vonderembse, & Jayaram, 2005; Vickery, Jayaram, Droge, & Calantone, 2003; Wong, Boon-Itt & Wong, 2011).

Many businesses are competing to improve their efficiency in order to participate in the global market of the twenty-first century. This market is electronically linked and has a high level of activity. The continuous improvement in performance has become a critical concern for vendors, manufacturers, and associated retailers in order to obtain and sustain competitiveness in a dynamic supply chain. Different performance enhancement strategies have been utilized in practice by many SC oriented firms, such as Dell, Samsung, Wal-Mart and others to support their organization's SC policies (Cai, Liu, Xiao, & Liu, 2009).

In order to provide the better understanding regarding the effect of external and internal integration on firms' performances, few researchers have assimilated mediating and moderating variables in their analysis. For instance, Yang, Yeo and Vinh (2014) have found the fully mediated role of external integration in relationship between internal integration and firm's performance. Horvath (2001) and Pagell (2004) also advocated and acknowledged the role of SCI in the management of SC and also termed these factors as a source of value creation in firm.

There is a growing dependence on SC partners to provide goods and services in the correct amount at the appropriate time and location under constant cost and quality demands for modern businesses (Wiengarten, Humpreys, Gimenez, & Melvor, 2016; Haleem, Farooq, Wæhrens, & Boer, 2018). Lean manufacturing and global sourcing are two examples of

cutting-edge operational tactics that companies are using to achieve a competitive advantage (Kauppi, Longoni, Caniato, & Kuula, 2016).

In another research, Huang, Yen, and Liu (2014) introduced moderating factors like environmental uncertainty and vagueness of demand in explaining the variance in intensity of effect of internal and external integration on firm's performance. Although existing body of knowledge has been improved due to the significant findings of recent studies concerning the relationships between SC integrations and firms' performance, but still there is scarcity in the literature explaining the disaggregated influence of each component of SCI on performance. Moreover, interactions and potential possible synergies among aforementioned components have not been sufficiently explained in currently available literature. SCI mainly has two components: internal integration and external integration (Stank, Keller, & Daugherty, 2001a; Stank, Keller, & Close, 2001b).

The current study hypothesizes the existence of synergies among the components of internal and external integration. Since their interactions may provide additional evidences and contributions in firm performances. Therefore, researchers aim to examine the impact of components of SCI on firm's performance and presence of synergies between SCI components.

SCI importance has been well accredited globally but still there are many issues regarding integration of organizations for establishment of relationships with other SC partners and its impact on organizations' performance. This area of study has already been explored in advanced countries but capped in mixed outcomes. Hence said, that the concept of SCI is at its inceptive level which needs more empirical evidences in many more cultural settings. So the present research aims to inspect the level of integrations and their antecedents' impact on SC performance and further on overall performance of organizations. The designed framework includes moderating role of market and learning orientations in the relationship between internal, external integrations and firm performance.

The study intends to achieve the purposes: first, to identify and investigate the areas that need improvement to achieve integration capabilities in organization. Second, how the performance is influenced by the integration practices i.e. internal and external and lastly, measure moderating role of market and learning orientation (LO) between integration practices and firm's performance.

There is a lack of research on internal integration, which is necessary for a better external integration, as noted in the literature (Basnet & Wisner,2014; Huo, 2012) According to various approaches to supply chain integration and the numerous circumstances in which prior research were done, the literature on integration–performance correlations is inconsistent (Chen & Paulraj, 2004; Flynn *et al.*, 2010, p. 11; Leuschner, Rogers, & Charvet, 2013; Terjesen *et al.*, 2012), so research in various cultural contexts is necessary because of this fact. Aside from these elements, research has underlined the importance of investigating how these factors affect company–partner interactions. (Flynn *et al.*, 2010; Gimenez, van der Vaart, & van Donk, 2012; Huang *et al.*, 2014; Wong *et al.*, 2011; Braunscheidel, Suresh & Boisnier, 2010).

Further, recent literature has acknowledged the relevance of SC integration in controlling SC risks and boosting performance, but ideas and linkages are still dispersed and additional study is needed to comprehensively assess the effect of SCI on performance (Zhu, Krikke, & Caniels, 2017; Chaudhuri, Boer, & Taran, 2018).

Accordingly, the current study established a complete model to cover the aforementioned gap and within the Chinese context, which encompasses both internal integration and its antecedents, internal integration and its link with external (i.e. consumers and suppliers) and performance, as well. The current study additionally examined the moderating effect of organizational antecedents (Market and learning orientation) on the relationship between a company and its business partners.

Congruently, this study is one of the first to experimentally examine the mediating influence of organizational antecedents (market orientation (MO), LO) between integration methods and the company's social capital performance.

2. Literature review and major concepts

2.1 Supply chain integration (SCI)

SCI can be defined as a philosophy of management which relates to notions of SC coordination (Mackelprang, Robinson, Bernardes, & Webb, 2014) it can also be defined as partnership process or practices which aligns firm's internal process with external operations (Cao, Vonderembse, Zhang, & Ragu-Nathan, 2010; Lockström, Schadel, Harrison, Moser, & Malhotra, 2010). Moreover, these integration practices can remove hindrances which obstruct the flow of material, information finances in the SC process. In existing literature, Kim (2009) and Lau, Tang, and Yam (2010) used different methods to examine SCI. They theorized SCI as a uni-dimensional construct which contains many activities a firm can practice. On the other hand, Bowersox, Closs, and Stank (2000) theorized SCI at complex level and characterized SCI as a multi-dimensional construct. They classified SCI into several different components like technology, material, measurement and relationship integration. It can be further classified with regard to utilization level which can be strategic, tactical or operational (Vickery *et al.*, 2003).

Lee, Seo, and Dinwoodie (2016) undertook their research with the intention of empirically testing the moderating effects that supply chain dynamism (SCD) has on the association between SCI and logistics performance. They measure the perspective of South Korean manufacturers through the use of a survey approach using moderated hierarchical regression. According to their findings, SCI has the potential to improve logistics performance when the level of SCD is high; however, the impacts of SCI on logistics performance are less clear when SCD levels are low.

Furthermore, to theorize SCI Zhao *et al.* (2011) and Huo (2012) explained the most common method which is based on direction of integration i.e. internal integration, customer integration and supplier integration. Since both customer integration and supplier integration involve integration with external stake holders, i.e. SC partners so these can be further combined in one construct, i.e. external integration (Germain & Iyer, 2006; Topolsek *et al.*, 2009; Zhao *et al.*, 2011). The ecosystem's other actors' cooperation constantly places restrictions on strategies (Kohtamäki, Parida, Oghazi, Gebauer, & Baines, 2019). They collected their data through the use of a survey. They came to the conclusion that manufacturing enterprises in the SC may increase their organization's performance by cultivating synergy with their suppliers and consumers. The research enables simultaneous testing of many strategies to increase firm performance, including competence management, SCI, SC quality and operational capabilities.

Moreover, Kwak, Seo, and Mason (2018) conducted their research with the purpose of proposing and validating a theoretical model to investigate whether SC innovation positively affects risk management capabilities, such as robustness and resilience in global SC operations, and to investigate how these capabilities may improve competitive advantage. Specifically, the researchers wanted to determine whether SC innovation positively affects risk management capabilities, and if so, how. They constructed a theoretical model based on previously published studies and evaluated it by creating a large-scale questionnaire survey and administering it to South Korean firms and logistics middlemen who were involved in global SC activities. In order to verify the accuracy of the proposed model, the data were subjected to both confirmatory factor analysis (CFA) and structural equation modeling (SEM). They discovered that innovative supply chains have a detectable beneficial effect on

all dimensions of risk management competence, which in turn has a considerable impact on strengthening a company's competitive edge.

2.2 Internal integration

Internal integration is generally assumed as first step in SCI process (Vickery *et al.*, 2003; Rosenzweig, Roth, & Dean, 2003). In order to meet the requirements of customers, internal integration reduces the internal functional barriers and stimulates healthy cooperation. It also identifies that functional areas and different departments within a firm should function as integral part of integrated process. Preceding literature does not have mistrust/disbelieves regarding internal integration significance. Firms which properly demonstrate coordination practices within the organization and in different functional areas are way more successful in creating new products and development and exploitation of knowledge and information which leads towards enhancement in firm's performance. (Morash & Clinton, 1997; Narasimhan & Das, 2001). Due to the inherited complexities and interdependence of SC, selection of the appropriate performance measure is quite difficult and challenging. In order to cater for the profit motive of shareholders, Chen and Paulraj (2004) theorized and examine the financial performance factor as the main measure of SC performance; whereas other researchers explained limitations on just relying on financial measure as performance. (Skinner, 1971; Johnson & Kaplan, 1987; Dixon, Nanni, & Vollmann, 1990; Eccles & Pyburn, 1992).

2.3 External integration

External integration is integration regarding logistics and activities across the boundaries of the firms (Stock *et al.*, 1998). Researchers believe that it refers to the collaboration and coordination with other members or organizations in SC which companies usually do for their strategic relationship. (Anderson & Narus, 1991; Kraljic, 1983; Cooper & Gardner, 1993). Here it is a need to ponder on the integration level in specific SC as it is very difficult to assign global level of external integration with a firm. Few authors, Masella and Rangone (2000), established extraordinary collaborating relationship with members of their supply and others they theorized that firms intend to serve their customers through establishing collaborative relationships with their customer and supplier and have to re-design their strategies in befitting manner to achieve their goals. This all process may be known as external integration. Furthermore, Frohlich and Westbrook (2001), highlighted the significance of external integration with regards to down and upstream features and reveals associated benefits. Both up and downstream is termed as external integration. According to (Braunscheidel *et al.*, 2010) it includes the overall flow of goods and services along with coordination practices and information with both up and downstream. This kind of integration helps in entailing mutual understanding, process coordination and information sharing and association of SC partners, i.e. customers and suppliers in the process of product development (Zhao *et al.*, 2008; Droge *et al.*, 2004; Stank *et al.*, 2001a, b, 2010; Petersen, Handfield, & Ragatz, 2005). Hence it is proposed that:

H1. There is a positive relationship between internal integration and external integration.

External integration is further classified into two major parts, i.e. customers integration and supplier integration.

2.4 Customer integration

Customers play a vital role in innovation process within any firm. Firms are always in dire need to get to know about their customers' needs and to fulfill them in a befitting manner. Therefore, a strong linkage is counterfeit between customers and company. So customer

integration encompasses in determining the requirements of customers and tailoring activities to meet the desired requirements. Stump *et al.* (2002) opine that the involvement of customers includes obtaining the reactions of product design to attain customer feedback for desirable products and alternate application for modification. According to Christopher (2016), establishing good customer relationships will boost customer satisfaction while cutting associated expenses, hence improving SC performance. Theories suggest that the nascent design of integration relates to operational performance in several ways. They opine that the firms performed better if they have better configuration of inter-connected elements, (Sinha, Van de Ven, & Andrew, 2005; Drazin, Van de Ven, & Andrew, 1985). For instance, SC patterns that are very strong in customer integration will have strong relationship with customers' satisfaction.

2.5 Supplier integration

In this component of integration, several researchers find positive significant association between suppliers integration & performance (Cousins & Menguc, 2006; Petersen *et al.*, 2005; Koufteros, Cheng, & Lai, 2007; Handfield, Petersen, Cousins, & Lawson, 2009; Wong *et al.*, 2011). Nonetheless, others witnessed no direct relationship in performance and suppliers e,g Stank *et al.* (2001a, b) and Flynn *et al.* (2010) yet others found negative association between suppliers integration and operational performance like (Stank *et al.*, 2001a, b; Koufteros *et al.*, 2005; Narasimhan & Das, 2001)

2.6 Learning orientation

Learning Orientation is an another cultural driver which have been investigated in recent years and have great importance. Slater and Narver (1995) theorized that firms should continue the performance improvements, behavior change and seek the process of learning. Learning orientation is also identified as an important cultural element which goes with market orientation coactively (Slater & Narver, 1994; Sinkula, Baker, & Noordewier, 1997). Sinkula *et al.* (1997) theorized learning orientation as organizational value which effects the tendency of organizations in knowledge creation, usage, learning and adaptability. Organizations continuously creates updated body of knowledge within the existing perspective and frameworks on regular and day to day basis. (Nonaka, 1994). In an another research Baker & Sinkula (1999a, 1999b) argues that the learning is not a compulsory outcome of a firm which demonstrate market orientation. Slater and Narver (1995) conceptualize that the synergy of learning and market orientation positively influences competitive advantage. In an another research Baker and Sinkula (1999) examined the impact of synergy between market and organization orientation on performance of firms. They found the independent significant impact of learning orientation and market orientation on firm's overall performance, new product development and relative market share. In synergy both had significant impact on relative market share but no impact on performance.

2.7 Market orientation

Market Orientation has been theorized by Narver and Slater (1990) as an organizational culture which establishes and develops set of behavior and practices which are necessary and helps the organization in creation of superior value products for its customers. Those behaviors include: (1) competitors orientations, (2) customers orientation and (3) inter-functional coordination. Competitive directions refer to both short-term strengths and weaknesses as well as long-term strategies for potential and current competitors. While customer focus leads to insight into generating superior value for target buyers. Thus, strongly customer-oriented companies actively seek to increase the value of their offerings on demand from customers. In addition, the researchers believe that competitiveness and

customer orientation are actively associated with activities aimed at generating information about competitors and buyers and disseminating it further within the organization.

Third, the interfunctional coordination assumed as the coordinated use of organizational resources to create superior products for target customers. The organization responds to information and intelligence extracted through collective efforts to produce, design, distribute and promote offers. Day (1994) opines that it is market-driven culture which enhances the market value intelligence and coordinated actions to gain competitive advantage. Slater and Narver (1995) theorized MO as the culture which prioritizes profitability, development and maintenance of higher customer value by taking into account the interest of other stakeholders. It also explains the behavior to respond market information and organizational development. Therefore, the following hypotheses are proposed:

H2. Organizational antecedents (Learning orientation, market orientation) positively moderate the relationship between internal integration and SC performance.

H3. Organizational antecedents (Learning orientation, market orientation) positively moderate the relationships between external integration and SC performance.

2.8 Integration strategy, supply chain efficiency and overall performance

Firm's integration method within internal functional units, i.e. internally as well as between businesses, resulted in improved forecast accuracy, inventory management and customer service, leading to the conclusion that internal integration is just as important as external (Kahn & Mentzer, 1996; Pagell, 2004). Furthermore, internal integration is seen as a requirement for achieving outward integration and is favorably associated to its establishment (Braunscheidel & Suresh, 2009; Gimenez & Ventura, 2005; Huo, 2012; Zhao *et al.*, 2011).

A recent research by Luque, Garcia and Lopez (2014) underlined that for better external integration, management should first focus on internal integration, which would assist in achieving comprehensive integration advantages. Any business with internal integration processes may readily transfer them beyond organizational boundaries, making external connections with consumers and suppliers easier. According to Stank *et al.* (2001a, b), marketing and purchasing departments are more crucial for developing integration with external partners since marketing has contact with demand side (i.e. consumers) and purchasing has with supply side (i.e. suppliers). Tangible and intangible performance gains include flexibility, cost, sale growth and market share improvement (Wong *et al.*, 2011). Flynn *et al.* (2010) argue that customer integration requires internal integration. Braunscheidel and Suresh (2009) found favorable connections between internal integration, customer integration and supplier integration. Childerhouse and Towill (2011) discovered in an international comparison that while most organizations are still in illusion and have problems implementing SCI, if they focus on internal integration first, they would gain a competitive edge. If a company's SC is not properly planned and managed, it poses a severe problem for management. While investigating 72 chains in the UK, Thailand and New Zealand, the aforementioned evidence was found. In such a scenario, the study found that although SCI is challenging to attain, internal integration is adequate to stay competitive.

The existing literature on integration-performance found that broader integration improved organizational performance Sofyahoglu and Ozturk (2012) found that internal integration improves corporate performance. Previous research has shown that an organization that values collaboration and, teamwork through information sharing and coordination is better able to manage demands through less demand amplification and bullwhip effect, which increases market share and competitive edge Flynn *et al.* (2010) found that internal integration not only reduces myopia but also helps companies better service customers, leading to performance gains. An organization that values integration across

internal functions and opposes myopic unit behavior would better use internal resources and competences, which are key sources for improving organization performance (Droge *et al.*, 2004; Pagell, 2004). Research shows a positive relationship between SC performance and organization performance. If the SC is cost-effective, reliable, flexible and responsive, then organization performance improves (Qrunfleh & Tarafdar, 2013). Following hypotheses are based on the preceding discussion and literature review:

H4. Higher external integration enhances SC performance.

H5. Higher internal integration enhances SC performance.

H6. Higher SC performance enhances overall organizational performance.

2.9 Conceptual framework

The conceptual model is shown as Figure 1.

3. Research methodology

3.1 Study design

According to Kumar (2005), research design determines how you will conduct your research and what process will be used to answer the research questions once the researcher has selected what he wants to research. It is the study's blueprint or procedural plan, which identifies the procedures and processes involved in gathering and analyzing the required data. Sample selection, operationalization and instrumentation, data collection, hypothesis testing, and analysis of the results may all be included (Zikmund, 2003). The survey approach was used as the research method for measuring the respondents' impressions of the components in the current investigation. This strategy is used to collect information from a defined sample using a questionnaire and is regarded the best method for conducting research (Cooper & Emory, 1995).

3.1.1 Study setting. The current study is co-relational and noncontrived, and data were obtained in a natural rather than a controlled environment. Because of the time constraints, the current study used a cross-sectional methodology for data gathering.

3.2 Questionnaire design and measures

In order to ascertain valid measures, we thoroughly examined and surveyed the literature and adapted extant scales to measure the variables (Table 1). A seven-point Likert scale,

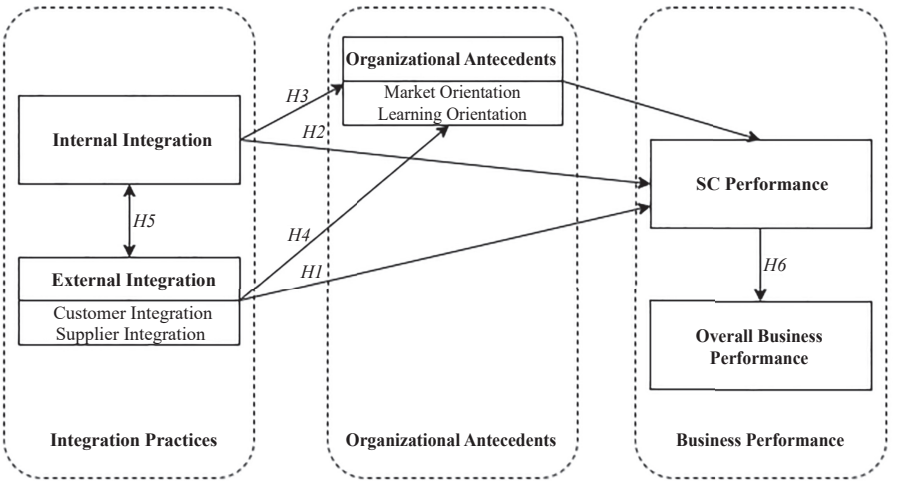

Figure 1.
Conceptual model

Measure	Items	Adapted from
Market orientation	12	Narver and Slater (1990)
Learning orientation	9	Sinkula *et al.* (1997)
Internal integration	13	Jaworski and Kohli (1993) Stank *et al.* (2001a, b), Pagell (2004)
Supplier integration	28	Stank *et al.* (2001a, b), Van Hoek *et al.* (2001), Christopher (2000), Frohlich and Westbrook (2001), Shah (2002)
Customer integration	12	Frohlich and Westbrook (2001), Shah (2002)
Supply chain performance	6	Huo (2012)
Overall business performance	7	Huo (2012)

Table 1.
Measures and items

which is commonly used in supply chain management (SCM) research studies, is used in this research as this scale provides more choices to the respondents than the five-point Likert scale. We conducted a pilot study in order to determine the extent to which the constructs might be applied to the practices of 15 active Chinese manufacturers. These manufacturers were requested to provide feedback on the initial instruments in order to validate the content of those instruments. The practitioners who were targeted as responders were those who held senior positions in their respective organizations and had sufficient knowledge about the processes, activities and results of their organizations as a whole. In order to accomplish this goal, the authors developed the Chinese version of the questionnaire, which was then translated from English to Chinese by two linguists who are academics in China and are bilingual.

Market orientation is measured by 12 items and adapted the scale which was used by Narver and Slater (1990). A seven-point Likert scale was used ranging from *1 = Strongly Disagree to 7 = Strongly Agree*. Learning orientation is measured by nine items. The same was adapted from Sinkula *et al.* (1997). A seven-point Likert scale was used ranging from *1 = Strongly Disagree to 7 = Strongly Agree*. Internal integration is measured by using 13 items and these were adapted from Jaworski and Kohli (1993). A seven-point Likert scale was used ranging from *1 = Not at All to 7 = Extensive*. The same was also used by Stank *et al.* (2001a, b) and Pagell (2004) in their studies. Supplier integration is measured using 28 items, which was adapted from (Stank *et al.*, 2001a, b). The same was also used by van Hoek, Harrison, and Christopher (2001), Christopher (2000), Frohlich and Westbrook (2001) and Shah (2002). A seven-point Likert scale was used ranging from *1 = Not at All to 7 = Extensive*. Customer integration is measured using 12 items and was adapted from Frohlich and Westbrook (2001) which was also used by Shah (2002). A seven-point Likert scale was used ranging from *1 = Strongly Disagree to 7 = Strongly Agree*.

3.3 Population and sample

In order to conduct an in-depth investigation of the underlying factors, a survey was carried out in January 2022. A total of 600 questionnaires were distributed/mailed to the middle to top-level management who had adequate knowledge of these domains including operations manager, procurement manager, general managerial and owner/entrepreneurs of manufacturing companies based in China out of which 205 questionnaires were received back duly completed. Stratified random sampling was used like Burns and Bush (2008). Sample adequacy (205 of 600 population) was determined by using Yamane (1973) method, which is n = N/(1 + Ne^2) having 95% confidence level. Moreover, the sample size of each level was proportionately stratified (Hair, Black, Babin, Anderson, & Tatham, 2006).

3.3.1 Selection of companies and geographical location. First, like other industrial sectors of China, the industrial sector in Henan province of China is being challenged by escalating global rivalry, fast technological advancements, and ever-higher customer demands. Choosing, implementing, and evolving the correct operations strategy may have a significant impact on a company's competitiveness. SC efforts have shown to be effective for companies in achieving this level of competition. Second, because the study's lead researchers are affiliated with a well-known institution in Henan province, they chose this area so that they could readily reach the industry.

According to the database maintained by ListCompanies.net, the province of Henan is home to a total of 5,977 different companies. As a result of the fact that the primary emphasis of the research is on manufacturing companies, the researchers chose to conduct their investigation on manufacturing companies that had at least 50 employees. Therefore, the grand number is 980, of which 600 are companies that have made their contact information public and were contacted (see Table 2).

Demographic	Frequencies	Percentage
Gender		
Males	167	81
Females	38	19
Age (years)		
20-29	45	21.90
30-39	112	54.60
40-49	39	19.01
Above 50	9	4.48
Education level		
High School Diploma	6	2.86
Graduate	134	65.36
Post Graduate	65	31.78
Job experience (years)		
0-1	2	1
2-6	28	13.69
7-11	87	42.40
12-20	64	31.20
Above 20	24	11.71
Job title		
CEO	1	0.41
Vice President	2	0.99
Procurement Manager	8	3.90
Logistics Manager	18	8.79
General Manager	19	47.80
Others	78	38.1
Company nature		
Electronic manufacturing	44	21.41
Electrical equipment and components	86	41.99
Furniture and fixtures	12	5.80
Computer equipment	8	3.90
Mobile accessories	18	8.79
Miscellaneous manufacturing industries	37	18.09

Table 2. Demographic characteristics

3.4 Data collection

The required information was gathered using a mail survey. The manufacturing company was the unit of analysis. The main responders were CEOs, VPs, SC managers, operations managers or general managers who were knowledgeable in answering questions about competitive strategies, SCI, performance, LO and MO. The survey was conducted with a single respondent in each organization, as recommended by Flynn *et al.* (2010).

To boost the response rate, we took the strategy provided by Frohlich and Westbrook (2002). The companies were first contacted to ask for their cooperation, and the finest informants were chosen. We conducted phone calls for the selected companies to explain the study and identify the key informant who would be able to respond to the questionnaire. 600 of the 980 manufacturing enterprises randomly chosen from the database have proper contact information. These businesses were contacted, and a total of 205 completed questionnaires were received.

3.5 Psychometric testing

A thorough process was adopted to validate the research instrument like Flynn, Sakakibara, Schroeder, Bates, and Flynn (1990), Chen and Paulraj (2004). The content validity of the constructs that were used in this study was determined by first conducting a review of the relevant prior research, then conducting a rigorous synthesis and critical analysis of previously established constructs and finally conducting an iterative construct review with the assistance of subject matter experts, according to Flynn *et al.* (2010). To check that the scales were unidimensional, an exploratory factor analysis of the components was performed. The underlying dimensions were discovered using a principal component factor analysis with varimax rotation. All of the items were found to be loaded on the precise factor they were supposed to test, according to the results. Furthermore, all of the factor loadings above 0.40 were established by Hair *et al.* (2006) as the threshold value. We also tested construct validity. Confirmatory factor analysis was used to test convergent and discriminant validity. Each item was linked to its associated concept, and the covariances among the constructs were freely estimated to ensure convergent validity. The chi-square and root mean square error of approximation model fit indices were better than Hu and Bentler's (1999) proposed threshold values.

The internal consistency or reliability was tested through Cronbach's alpha in two steps. First, overall reliability was checked as shown in Table 3 and the value was (0.87) which is higher the generally acceptable lower limit, i.e. 0.70 as suggested by (Nunnally, 1978; Flynn *et al.*, 1990).

To assess the scale reliability of each construct Cronbach's alpha was used and the values are in the range of 0.71 to 0.91 as shown in Table 4, which was again at higher side of the benchmark range, thus acceptable in such a study (Flynn *et al.*, 1990).

4. Data analysis and results

Descriptive Statistics of all variables are provided below:

Individual effects of exogenous constructs have been examined on each other and obtained results which are shown in Table 5. Results are indicating that all the antecedents are positively related to each other. Moreover, Chi-square statistics and model fit indices have been found within the range (Hair *et al.*, 2006) $X^2 = 109$, CFI = 0.90, NFI = 0.90, RMSEA = 0.034 (see Table 6).

First, the significant positive relationship of internal integration with SC performance is consistent with earlier findings (Wong *et al.*, 2011; Swink *et al.*, 2005; Lee, Kwon, and Severance (2007). The significant path between two constructs indicates that the higher the internal integration, the higher will be the SC performance. Employees' rotation, employees training, commitment and support of top management and coordination among functional units and sharing the information gathered through various sources. All these factors influence in

amplification of organizational capabilities and enhance the collaboration within the functional areas (Kogut & Zander, 1992; Lukas, Hult, & Ferrell, 1996). So we will accept the H1.

Second, the significant positive relationship of external integration with SC Performance has been revealed. The significant path between two constructs signifies that the stronger the external integration, the higher will be the SC performance. This supports hypothesis H2 which means companies should not only focuses on internal integration rather their efforts should be linked with supplier as well as customer integration. Previous studies also confirm the relationship between these variables which includes interaction among stakeholder, exchange of information and inter-organizational relationships for enhancing integration process between suppliers and buyers (Chung, Singh, & Lee, 2000; Chalos & O'Connor, 2004; Gupta & Govindarajan, 2000; Cooray & Ratnatunga, 2001). Hence H2 will be accepted.

Third, the role of organizational antecedents was found significant in terms of relationship between internal integration and SC performance; it supports the notion that having organizational antecedents in practice, stronger internal integration can lead towards higher and better SC performance, which means that the joint efforts of employees, their integration among organizational functions, collective vision, their focus on similar goals and objectives will lead the organization towards optimum level of performance delivery (e.g. Pagell, 2004; Basnet & Wisner, 2014) Hence, H3 will be accepted.

Fourth, this study could not find the moderating role of organizational antecedents in external integration and SC performance as the results were insignificant (Shown in Table 4) so we will reject H4. Previous studies also found such insignificant relationships (e.g. Flynn *et al.*, 2010; Frohlich and Westbrook, 2001) (see Table 7).

Table 3.
Reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	*N* of items
0.874	0.914	87

Table 4.
Reliability statistics

Construct	No of questions	Cronbach's alpha
Market orientation	12	0.87
Learning orientation	9	0.91
Internal integration	13	0.73
Supplier integration	28	0.71
Customer integration	12	0.73
Performance	13	0.77

Table 5.
Descriptive statistics

	N	Mean	Std. deviation	Variance
MarketOrientation	205	4.7752	0.90792	0.824
External_Intgr	205	5.3263	0.85382	0.729
Customer_Integration	205	4.9573	0.36934	0.136
Supplier_Integration	205	4.6474	0.56920	0.324
SCPerformance	205	5.1780	0.45360	0.206
OBPerformance	205	5.0355	0.46617	0.217
Internal_IntegrationN	205	.9476	3.82289	14.614
Antecedent	205	5.3154	1.20601	1.454
Valid N (listwise)	205			

Fifth, the positive and significant relationship between internal integration and external integration has been revealed which means that majority of firms adopts integration with external partners, i.e. suppliers and customers, and have been found to have stronger internal integration and hence improved performance, therefore H5 is supported. The results are similar with the study conducted by Frohlich and Westbrook (2001).

Variable	Item	Standardized factor loading	CR	AVE
Market orientation	MO1	0.885	0.964	0.506
	MO2	0.680		
	MO3	0.532		
	MO4	0.757		
	MO5	0.848		
	MO6	0.685		
	MO7	0.519		
	MO8	0.806		
	MO9	0.684		
	MO10	0.519		
	MO11	0.660		
	MO12	0.832		
Learning orientation	LO1	0.928	0.977	0.712
	LO2	0.693		
	LO3	0.894		
	LO4	0.793		
	Lo5	0.729		
	LO6	0.703		
	LO7	0.825		
	LO8	0.859		
	LO9	0.689		
Internal integration	II1	0.846	0.945	0.564
	II2	0.726		
	II3	0.552		
	II4	0.715		
	II5	0.675		
	II6	0.685		
	II7	0.736		
	II8	0.935		
	II9	0.781		
	II10	0.882		
	II11	0.884		
	II12	0.874		
	II13	0.734		
Integration with customers	IWKC	0.844	0.975	0.630
	IWKC2	0.967		
	IWKC3	0.690		
	IWKC4	0.623		
	IWKC5	0.931		
	IWKC6	0.706		
	IWKC7	0.767		
	IWKC8	0.864		
	IWKC9	0.984		
	IWKC10	0.684		
	IWKC11	0.656		
	IWKC12	0.693		

(*continued*)

Table 6.
Descriptive statistics

Variable	Item	Standardized factor loading	CR	AVE
Integration with suppliers	IWKS1	0.985	0.967	0.519
	IWKS2	0.916		
	IWKS3	0.906		
	IWKS4	0.773		
	IWKS5	0.875		
	IWKS6	0.805		
	IWKS7	0.897		
	IWKS8	0.965		
	IWKS9	0.603		
	IWKS10	0.916		
	IWKS11	0.974		
	IWKS12	0.906		
	IWKS13	0.916		
	IWKS14	0.624		
	IWKS15	0.962		
	IWKS16	0.680		
	IWKS17	0.985		
	IWKS18	0.939		
	IWKS19	0.535		
	IWKS20	0.829		
	IWKS21	0.797		
	IWKS22	0.796		
	IWKS23	0.648		
	IWKS24	0.783		
	IWKS25	0.750		
	IWKS26	0.705		
	IWKS27	0.796		
	IWKS28	0.641		
Performance	OP1	0.686	0.982	0.886
	OP2	0.628		
	OP3	0.640		
	OP4	0.698		
	Op5	0.840		
	OP6	0.628		
Overall business performance	OBP1	0.631	0.945	0.535
	OBP2	0.628		
	OBP3	0.840		
	OBP4	0.688		
	OBP5	0.698		
	OBP6	0.628		
	OBP7	0.599		

Table 6.

			Estimate	S.E.	C.R.	P	Outcome
Org Antecedents	←	Internal_Integration	0.043	0.022	1.894	***	Supported
Org Antecedents	←	External_Integration	0.122	0.100	1.218	0.223	Rejected
SCPerformance	←	Internal_Integration	0.045	0.002	22.704	***	Supported
SCPerformance	←	Antecedent	0.310	0.006	50.690	***	Supported
SCPerformance	←	External_Integration	0.031	0.009	3.538	***	Supported
OBPerformance	←	SCPerformance	0.944	0.028	33.256	***	Supported

Table 7.
Regression analysis

Last, the study reveals that the SCM performance is positively related and influences organizational performance which support the notion that there is direct positive significant relationship between organizational performance and SC performance, thus H6 is supported.

5. Discussion and managerial implications

5.1 Discussion

The current study considers the connection between integration practices and their impact on SC performance of firms by inquiring about degree of integration. It is critical to find answers to these concerns because the existing body of material is so ambiguous. Accordingly, six hypotheses are offered and a reliable measuring scale is utilized to conduct a large-scale survey of various Chinese enterprises from a variety of industries. With the use of MO and LO, the researchers set out to see what effect SC integration strategies had on SC performance. In order to verify the hypotheses, the approach of SEM was utilized. These hypotheses have been validated by the findings of the data analysis, which also showed that the performance of the SC will improve if it is managed in a way that is both effective and efficient. These factors do have a positive link with one another, and they also have a correlation with one another. Moreover, a high degree of SCI gives manufacturers the ability to increase their flexibility to meet the expectations of their clients, which in turn enables them to minimize their inventory, delivery times and the many other hurdles that stand in the way of efficient supply chains. (Barratt, 2004). These findings are in line with those found in the research conducted by Wilson (1995), Maloni and Benton (2000), Herrmann and Hodgson (2001), Walter, Miller, Helfert, and Ritter (2003) and Prajogo and Olhager (2012).

According to the findings of this research, the efficiency of a company's SC will improve in direct proportion to the amount of attention that is paid by the business to integration practices.

In general, the results of the study provide insightful information that may be helpful to the management of firms. This information can assist the companies in maximizing their production by giving appropriate weight to both their internal and their external integration.

5.2 Theoretical contribution

The following are some theoretical contributions made by this research to the current body of literature.

Firstly, this study is an early attempt to experimentally evaluate the effects of integration practices on SC performance using a conceptual model drawn from current theories. A conceptual model that explains the relationships between components and their possible effects on performance is also backed by earlier research studies. The results of this study also offer additional empirical evidence from Han, Omta, and Trienekens (2007), who found that SCI enhances firm performance through quality management in their analyses of the relationships between SCI (internal and external integration, supplier–buyer relationship coordination, integrated IT and logistics management), quality management practices (supplier quality management, quality design, process management, etc.) and firm performance (market share, profitability, etc.) Moreover, the study provides a foundation for developing SCI theory and expands the SCI literature into the manufacturing sector. Finally, this study could serve as a springboard for future research in SCI, as the industrial sector is subject to strict quality and safety regulations that may have consequences for integration projects in this field that go beyond those often considered.

5.3 Managerial implications

Findings of this study offer substantial managerial insights suggesting various ways to develop better internal as well as external integration to get better results. Management of the

company should focus and give more importance to job rotation, trainings and management commitment as part of internal integration. Moreover, management should strive for improving the capabilities of integration in internal functions prior to external integration as internal collaboration, teamwork and interaction within the company are considered as precondition to maintain integration with external stakeholders. It is also a social process which needs to be built up over a longer period of time. Secondly, companies should also focus on the integration with their key customers and suppliers in order to maintain healthy relationship with them to achieve better SC performance. Through the suggested conceptual model, which incorporates critical concepts, the current study aims to provide directions for future research on SC integration. While certain concepts are generic in nature, we believe the conceptual model provides a useful platform for additional research into SC process integration. More particular concepts related to the framework could be identified in future studies. In order to validate or modify the conceptual model, empirical tests are also required. Although evaluating the complete model in a single research may seem daunting, attempts should be made to test groups of the links on a regular basis.

Despite the fact that the importance of customer orientation has long been emphasized, many nonmarketing managers still assume that it is solely the role of the marketing manager to truly care about customers. Customer orientation is still seen as a distant and unimportant idea by many managers in other fields. Even companies that want to become more customer-centric find it difficult to do so because they underestimate how difficult it is to change an organization's focus to both internal and external concerns (Day, 1994). However, according to the proposed conceptual model, SC process integration, which encompasses diverse functional areas inside and between enterprises, necessitates the inclusion of customer orientation at every step. SC process integration can only create value for customers and achieve the intended financial benefits for the company if customer orientation is established and maintained.

Moreover, this research also offers managers evidence of the benefits of MO and LO as antecedents of SCI. Companies could gain greater competitive advantages by working on these attributes. Further, these findings will not only assist the companies and its stakeholders, but they will also offer value to current theories.

Further, the performance of manufacturers may be enhanced by establishing both internal and external cooperation. When it comes to internal integration, managers in Henan province need to pay particular attention. Customers play an important part in enhancing SC performance and managers should be aware of this. In order to do so, they need devise long-term strategies to acquire and integrate their most important consumers. Management is also recommended to review their present supplier connections. Export prospects may be lost to overseas rivals if firms do not take advantage of the valuable projected contribution of supplier integration.

5.4 Limitation and future research

Despite the fact that the current study has produced insights and discoveries that are beneficial for both theory and practice, the study does have a number of limitations, some of which may help open up new paths for research in the future.

In the first place, the data for the study were only obtained from one province, which was Henan province, and one industry, which was manufacturing; this constrained the generalizability of the study. The findings may be further validated in the future by expanding the scope of the studies to include various cultural contexts and types of businesses.

Second, this study used data from a cross-sectional analysis; however, future research may potentially make use of a longitudinal design in order to more thoroughly confirm the findings. The current study explored the practices that promote the integration practices and provided an alternative model in terms of integrated model. The next research that needs to be undertaken is one that can investigate the model to verify this holistic model in different sectors.

Furthermore, other elements such as environment, trust, relationship commitment, role of culture and power should be examined in future research to better comprehend the interaction between a company's internal stakeholders and its external stakeholders, such as customers and suppliers.

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