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THE DIRECT AND INDIRECT EFFECTS OF INTERNAL ENABLERS ON INTERNAL INTEGRATION AND BUSINESS PERFORMANCE

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Abstract. The present paper aims to assess both the direct as well as the indirect effects of internal enablers on internal integration and business performance in the supply chain. A full managerial comprehension of the connection between supply chain integration (SCI) and business performance is missing so far and earlier results are inconclusive. To fill this gap, this study expands the growing body of research on SCI and contributes to the SCM field by explaining the direct and indirect effects of internal enablers on internal integration and business performance. Results show that hierarchical organizational culture influences internal integration and supply chain performance, that top management support and information technology department size influence internal integration, and, finally, that supply chain performance impacts operational performance. These findings confirm the relevance for firms to pay attention to those key internal enablers of internal integration, and their benefits on business performance. Considering our results, future research should deepen on the influence of internal integration on business performance by focusing on the links between internal integration and the other dimensions of SCI, that is supplier and customer integration, as well as with the external side of the supply chain performance.

Keywords: supply chain, supply chain internal integration, internal enablers, information technology department, top management support, hierarchical organizational culture, business performance.

JEL Classification: M10, M11, M14, M15, M31.

Introduction

Supply chain management (SCM) implies the recognition of the business process as a whole network of upstream and downstream supply chain partners (Turkulainen et al., 2017) collaborating to achieve business goals (Huo et al., 2014) and enhance supply chain performance

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(SCP) (Oubrahim et al., 2023). Accordingly, seeking for this supply chain efficiency requires the integration of the firm along the supply chain, which is considered as a company's "strategic activity" (Loury-Okoumba & Mafini, 2021, p. 3). Indeed, this supply chain integration (SCI) denotes "*…linking major business functions and processes within and across companies…*" (Sacristán-Díaz et al., 2018, p. 698), and has been considered a key factor to achieve competitive advantages and achieve greater business performance in the marketplace (Chen & Lu, 2020).

Likewise, SCI is considered a powerful weapon for firms to gain competitive advantages and enhance operational performance (OP) (Frohlich & Westbrook, 2001). But, as Chen et al. (2009, p. 27) indicate "*…a better understanding of supply chain integration is needed…*" as "*…certain aspects of supply chain integration have not been adequately studied…*". Moreover, recent works called for additional work on this SCI-OP relationship (Ruzo-Sanmartín et al., 2023a; Wiengarten et al., 2019; Yu et al., 2021), since it: "*… has been extensively examined, but the results are still relatively inconclusive…*" (Wiengarten et al., 2019, p. 541). In this work, we embrace this research gap by particularly considering the internal side of SCI. Moreover, we consider corporate performance in a dual approach. That is operational and financial performance (FP). In so, OP relates to firms' capability to increase the success and effectiveness of its internal processes and production activities, by reducing costs or lead times, thereby improving firms' profitability or FP, which is truly considered a central indicator of companies' overall success (Nasir et al., 2017; Truong et al., 2017).

The internal face of SCI (i.e., internal integration (II)) is usually conceptualized as the integrated management and monitoring of operations within a firm (Atadeniz et al., 2021), exerting positive impact on business performance (Flynn et al., 2010; Liu et al., 2021; Wiengarten et al., 2019; Zhao et al., 2021). Therefore, it is of the utmost importance that firms integrate themselves first, by promoting internal cooperation, principally at a functional level (Kache & Seuring, 2014).

Knemeyer and Fawcett (2015) affirmed that research in the study of SCI fails in the understanding on "how' builds on 'why' and 'when" and that there is a need of research "*… that delineates the process of capability building, especially as it relates to the nuances of how diverse design elements should mesh to enable different types of SCI...*" (p. 302). Moreover, as per a systematic review on relevant literature of SCI, Atadeniz et al. (2021) develop a logical framework to guide future research in the field of SCI. Their observations and research motivate and are taken as the basis of the present study. Following this framework for further research, this study pays attention to internal enablers of SCI (i.e., information technology infrastructure, top management support, and as well as organizational culture) with the aim of examining their direct and indirect effects on internal integration and business performance (i.e., supply chain and operational performance).

Information technology (IT) infrastructure acts as a key internal enabler for integrating partners and sharing information between parties in the supply chain (Nayal et al., 2022), and it is necessary to establish an appropriate technological infrastructure for developing strategic- and tactical-level integration. Indeed, research has recognized that having the capabilities as well as the structure for information distribution, transaction handling, and collaborative planning, are all counted as enablers of SCI (Atadeniz et al.,

2021; Di Vaio & Varriale, 2020; Szymczak et al., 2018). Nevertheless, previous research literature has studied the link between IT-infrastructure and the external side of SCI, either on customer and/or supplier integration (Bruque-Cámara et al., 2016). This work complements filling this gap, focusing specifically on the direct effect of IT department size (ITSIZE) on the internal side of SCI.

Another important internal enabler influencing the success of SCI is related to executive practices, such as power and leadership structure, management procedures, or risk and recompense structure, among others (Lambert & Cooper, 2000), which are empirically supported (Jajja et al., 2018). Thus, top management support (TMS) is a key element in enhancing operational performance through SCI (Truong et al., 2017; Zhao et al., 2015), so that managerial elements should clearly be acknowledged as another enabler of integration, instead of proof of its presence (Atadeniz et al., 2021). As previous research was mainly devoted to the study of commitment and support to supplier and customer integration (Alfalla-Luque et al., 2015), the current work focuses on TMS as a key precursor of internal integration to fill this research gap.

Organizational culture (OC) is another key internal enabler for the success of SCI (Atadeniz et al., 2021; Lambert & Cooper, 2000). Accordingly, previous studies show that SCI implementation requires an appropriate OC (Cao et al., 2015). Therefore, this study also considers hierarchical organizational culture (HOC), an integration-oriented type of OC directed to internal focus, stability and control, as another key enabler of both internal integration and business performance (Braunscheidel et al., 2010; Cameron & Quinn, 2005; Lee et al., 2016).

Hence, this paper attempts to lengthen existing knowledge regarding the absence of result's unanimity across current empirical studies relative to the link between SCI and business performance (Wiengarten et al., 2019) and the need of research on "*…how diverse design elements should mesh to enable different types of SCI…*" (Knemeyer & Fawcett, 2015, p. 302). To do so, we consider the key internal enablers of SCI following recent calls for research (e.g. Atadeniz et al., 2021), focusing on the internal side of SCI and its effect on business performance (e.g. Wiengarten et al. 2019).

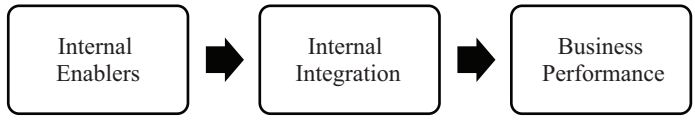

Figure 1. Logic of research model (source: author's own work)

Therefore, our study proposes the following research question (RQ), as shown in Figure 1:

RQ. What are the direct and indirect effects of internal enablers (OC, HOC, and ITSIZE) on internal integration and business performance (SCP and OP)?

To achieve our research goals, this paper is structured as follows. Firstly, theoretical background is presented. Secondly, we go through literature review and theoretical hypotheses development. Then, methodology is explained, results obtained from analysis are presented, and findings are discussed. Finally, implications, conclusions, limitations, and future research directions are presented.

1. Theoretical background

1.1. Supply chain integration (SCI)

Supply chain integration (SCI) denotes the connections concerning supply chain processes across organizations in the context of scope and strength (Leuschner et al., 2013). That is, SCI implies the "*…strategic alignment of functions and processes within an organization and between supply chain members…*" (Tiwari, 2021, p. 991). In addition, literature suggests that effective integration is critical to bring up competitive advantages that improves supply chain performance (SCP) (Oubrahim et al., 2023). In fact, researchers and practitioners in SCM have strongly agreed that SCI is a new field of innovation, providing opportunities that enable firms to increase their operational performance (OP) (Truong et al., 2017; Wiengarten et al., 2019).

Within such a scenario, the question is why some businesses obtain better performance than others in the marketplace? In fact, it has been claimed that current research needs to "*outline suitable strategies to achieve sustainable performance across a whole supply chain*" (Oubrahim et al., 2022, p. 1184). In this context, it can be asserted that both an effective and efficient coordination of activities through the supply chain will have positive effect on firms' operational performance, as coordinating activities among the chain partners will match supply with demand and ease the flow of goods and/or services. Firms need to consider the flow of information among the chain as a relevant instrument. Accordingly, research studies attempt to recognize those internal enablers that help partners to accomplish such efficiency and effectiveness.

1.2. Internal dimension of SCI

The majority of researchers have deemed SCI as multi-dimensional, dividing it into external and internal SCI (Pagell, 2004; Swink et al., 2007). Therefore, whereas external integration involves customer and supplier integration (Droge et al., 2012), internal integration denotes the degree a firm sets for its organisational practices, tactics, and behaviours to reach co-operative, standardized, and adequate procedures to satisfy customer requests (Huo, 2012; Ruzo-Sanmartín et al., 2023b).

The notion of internal integration is referred to the inner business activities. Yeh et al. (2020) defined this issue as the company's functional areas of coordination, collaboration, and integration. That is, how firms configure their strategies, business practices and procedures with the intention of obtaining cooperative processes, that allow them to satisfy customers' requests as well as interact with their suppliers (Aunyawong et al., 2020; Jones et al., 2023). Accordingly, the different functions of the firm should work and act as part of an internally integrated operation process (Flynn et al., 2010).

According to Frohlich and Westbrook (2001) there is a fundamental concept called "arc of integration", which includes an operationalization of the scope of integration inside and beyond boundaries of the firm. This concept confirms that a narrow arc of integration of internal functions is comparatively easier to achieve than a wider arc of integration inside and outside the organizational boundaries (Jayaram & Tan, 2010). In other words, internal integration is the beginning to further address external integration (Zhao et al., 2021). On this, Oubrahim et al. (2023, p. 5) affirm that: "*…organizations should be aware of incorporat-*

ing trading partners, which is evidenced by their relationship commitment, before implementing external integration…". In this paper, we apply the same direction as the literature on the SCI-construct, and focus on the internal dimension of SCI inside organisations, due to its preceding role to external integration (Kache & Seuring, 2014).

1.3. Internal enablers

To outline the key internal enablers of internal integration we consider Atadeniz et al. (2021) suggestions for increasing SCI and business performance. Particularly, we consider three suggested internal enablers to "*…operationalise integration in the supply chain…*" (Atadeniz et al., 2021, p. 151): information technology (IT), top management support (TMS) and organizational culture (OC). Indeed, they are not considered integrative activities in themselves but enablers for the accomplishment of integration decisions.

Information technology (IT)

The concept of information technology (IT) refers to technological solutions which enable the collection of relevant business process information and its sharing both within the organization itself and across its boundaries (Kim, 2017). IT-infrastructure considers all types of information resources that, combined with operational processes, enable firms to innovate and improve constantly (Hou, 2020). IT is considered a valuable resource that helps firms achieve sustainable competitive advantages by improving relationships, easing information-sharing and establishing lasting cooperative business relationships in supply chains (Yu et al., 2021). Therefore, IT is well thought out as one of the firm's resources and enablers that provides a sustained competitive advantage in the marketplace if it does not act alone, since IT can simplify and assist the development of supply chain capabilities (Wiengarten et al., 2019), foster integration, and enhance performance (Di Vaio & Varriale, 2020; Jones et al., 2023; Kim, 2017).

Top management support (TMS)

Another line of research has emphasized the relevance of TMS for SCI in terms of improving business performance (Jajja et al., 2018; Lambert & Cooper, 2000; Nayal et al., 2022; Truong et al., 2017; Zhao et al., 2015). The TMS refers to the level of support that higher management provides to a business issue. In this case, the core idea behind is to increase the comprehension of the influence of organizational support on the employee behaviour in a SCM context (Cantor et al., 2012). If the top management actively supports SCI and it is perceived to ensure beneficial results, this can increase the employees' behaviour towards SCI and foster specific organizational objectives (Eisenberger et al., 1986; Oubrahim et al., 2023). Therefore, the TMS can signal the relevance of a specific issue (i.e., SCM and its internal integration) to the whole organization and its employees (Cantor et al., 2012).

Organizational culture (OC)

The organizational culture (OC) of a firm refers to the shared beliefs or values of staff members of a company (Cameron & Quinn, 2005; Liu et al., 2010) and has been emphasized as a significant internal enabler of SCI-success (Atadeniz et al., 2021; Braunscheidel et al., 2010;

Lambert & Cooper, 2000). To emphasise developing people and improving internal processes and systems within the organisation, cultural preferences for an internal focus must be established by organisations (McDermott & Stock, 1999). Braunscheidel et al. (2010) developed a theoretical typology of organizational culture grounded on two main pivots: (i) internal against external emphasis; and (ii) stability and control as opposed to flexibility and discretion, including four forms of organizational culture, that is to say: clan, adhocracy, hierarchy, and market. In particular, the hierarchical organizational culture (HOC) designates the level of formalised or structured construction that has been established inside an organisation in order to assert procedures, stability, order, and the predictability of regulations (Lee et al., 2016). Thus, HOC emphasizes the improvement of internal processes (McDermott & Stock, 1999) and internal coordination (Naor et al., 2008), so that it is relevant as an enabler of internal integration practices (Braunscheidel et al., 2010) and operational performance.

2. Hypothesis development

2.1. Internal integration and key internal enablers: IT department size (ITSIZE), top management support (TMS), and hierarchical organizational culture (HOC)

As previously indicated, IT, TMS and HOC are not integrative activities in themselves but enablers for the accomplishment of decisions to integrate or not (Atadeniz et al., 2021). Recently, the conditions for doing business around the world have changed fundamentally due to the evolution and development of IT. As an infrastructure in itself, IT has been acknowledged as a crucial enabler in the enhancement of SCM (Pratt et al., 2022), due to its vital supporting role both inside the organisation itself and along the supply chain. Recent research has revisited the significance of IT-infrastructure as a key enabler of SCI (Atadeniz et al., 2021) and its particular relevance to internal integration in future research (Yu et al., 2021). IT may lead to superior performance of the firm and its parties upstream and downstream the supply chain, given its capability to offer reliable, accurate, and timely information (Di Vaio & Varriale, 2020; Hou, 2020; Jones et al., 2023; Kim, 2017). Thus, firms need an IT-department size to deal with several workforces to ease and enhance integrated information and internal procedures. Hence, by handling and enhancing integration processes, the IT-department has become the main driver for those internal and external activities of the firm, such as data or inventory management, communication, or customer relationship management. Therefore, and considering that this study adopts the same view in the field of internal integration, due to its preceding role in SCI, we formulate the subsequent hypothesis:

H1. IT-department size (ITSIZE) relates positively to internal integration (II).

In addition, it has been acknowledged the set of organizational values along with the development of the right managerial style to improve the firm's business performance, as one of the main functions of top managers. Even though TMS has been extensively and comprehensively considered, its function in internal integration and the SCI process remains merely unknown (Swink et al., 2007). Akkermans and van Helden (2002) showed that TMS was placed as a major aspect for success in implementing enterprise resource

planning. Ke and Wei (2008) claimed that the top management function can reinforce a learning atmosphere established by successful internal integrated systems. Therefore, it can be argued that TMS leads to a better integration of information and processes within a firm. Putting it differently, those firms with a high degree of TMS have more effective internal integration information and processes within its functional activities. Therefore, we formulate the next hypothesis:

H2. Top management support (TMS) relates positively to internal integration (II).

Firms characterised by hierarchical cultures enforce internal integration and coordination (Braunscheidel et al., 2010; Naor et al., 2008). Hierarchical organizational culture (HOC) is the type of organisational culture that controls top-down decision-making to enhance the incentives of employees to adopt risks and adjust to changes and ease the internal integration process (Braunscheidel et al., 2010). Using cross-functional teams and formal and informally integrated communication practices enhances internal integration within firms (Pagell, 2004). In line with previous arguments, the HOC emphasizes the improvement of internal processes (McDermott & Stock, 1999) and internal coordination (Naor et al., 2008), so that it plays a key role as an enabler of internal integration practices (Braunscheidel et al., 2010). Hence, we express the following hypothesis:

H3. Hierarchical organizational culture (HOC) relates positively to internal integration (II).

2.2. Internal integration and hierarchical organizational culture (HOC): influence on supply chain performance (SCP) and operational performance (OP)

The effect of organizational culture on firms' business performance has been investigated over the years in various studies showing a positive impact in the marketplace (Flamholtz & Kannan-Narasimhan, 2005; Liu et al., 2021).

Organizations that apply a hierarchical organizational culture (HOC) or a bureaucratic culture are internally oriented and focused on control. An internal focus strengthens coordination and smooths operations, as well as information sharing. Hierarchy, predictability, and efficiency are thus the main focus of control-oriented firms (Liu et al., 2010). Similarly, the work of Braunscheidel et al. (2010) exposed an association of organizational culture with SCI-practices. HOC is focused on ensuring processes, stability, order, and the expectably of regulations, and, consequently, increases efficiency, productivity, and the reliability of products (Lee et al., 2016). As HOC is expected to focus on control and efficiency of the chain, it is also logical to expect a significant influence on supply chain performance (SCP). Consequently, we frame the following hypothesis:

H4. Hierarchical organizational culture (HOC) relates positively to supply chain performance (SCP).

The benefits of integrated information and internal integration in supply chain networks is been considered an upward area of research interest in various management disciplines (Kim, 2017; Yu et al., 2021). The concept of internal integration is a central

part of the SCI-concept and one of the most noteworthy differentiators of a firm's overall business performance in the marketplace. However, integration within the supply chain or individual chain members is also apparently rare (Pagell, 2004). Firms with strong internal integrative capabilities have a better chance of coordinating and collaborating between their departments (Piprani et al., 2020). Considering sustainable and strong internal integrative mechanisms within the organization, firms can enhance their processes and supply chain performance (SCP). Thus, several studies have established the theoretical arguments by confirming the positive effect of internal integration on SCP, including the logistics service performance (Germain & Iyer, 2006), process efficiency and quality (Swink et al., 2007) and business performance (Flynn et al., 2010; Pagell, 2004). Consequently, we present the following hypothesis:

H5. Internal integration (II) relates positively to supply chain performance (SCP).

Investigation on the impact of SCP on operational performance is considered a relevant topic. Analysing and improving SCP is important to solving firm´s operational issues and challenges, stimulating managerial behaviour, and ultimately improving performance. This helps firms to reduce the demand-supply gap and to maintain supply chain excellence, and consequently, to develop a competitive advantage. Operational performance (OP) refers to the ability to increase customer satisfaction by means of fast product delivery with a good price-quality relationship and great operational flexibility (Flynn et al., 2010), as a basis for growth and profitability in the long run (Yu et al., 2021). SCI is positively related with the supply chain performance of a business in the supply chain, which improves its OP (Yu et al., 2021). Therefore, SCP positively impacts on OP of the company. Hence, we formulate the following hypothesis:

H6. Supply chain performance (SCP) relates positively to operational performance (OP).

These various hypotheses are summarized in our research framework in Figure 2.

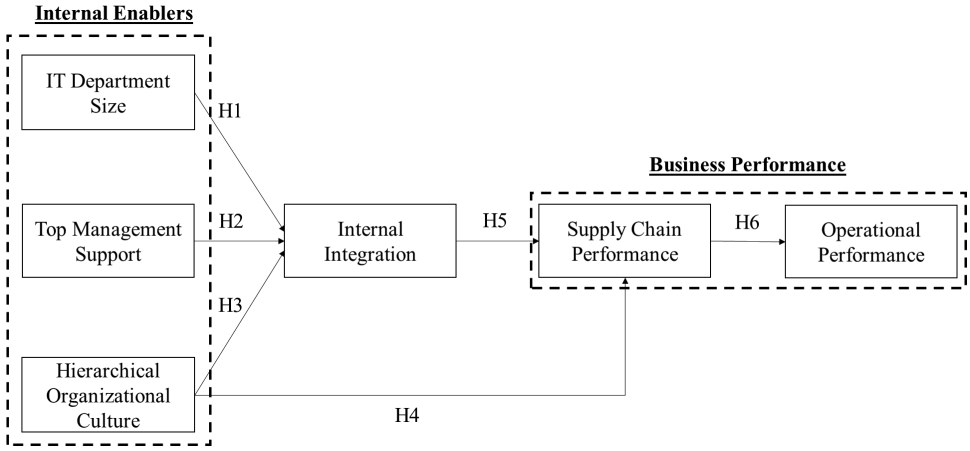

Figure 2. Conceptual model: graphical description (source: author's own work)

3. Empirical research methodology and data analysis

3.1. Survey design

To ensure content validity, we first developed a comprehensive literature review in order to build a structured questionnaire, and expert scholars and managers in the area checked the suggested measures. We relied on previously validated scales to measure the variables of the study. The items were measured with Likert-scales (five point, 1 = totally disagree; 5 = totally agree). The TMS scale used 6 items according to Zhao et al. (2015) and HOC has 4 items following Lee et al. (2016). The Internal Integration scale was based on Narasimhan and Kim (2002), Supply Chain Performance (SCP) on Qrunfleh and Tarafdar (2014) and Operational Performance (FP) on Lee et al. (2016). To measure the IT Department Size, we simply considered the number of employees of the IT Department. Finally, we included the Firm Size as a control variable, which was measured considering the total number of employees.

3.2. Data collection

To achieve the study objective, we conducted a survey in a sample of Egyptian companies belonging to different industries, containing manufacturing, wholesaling, retailing, and shipping services companies, using a government agency database which included a total of 1,264 companies. On the one hand, as opposed to most of the research in the SCM area, focused in either European or North American settings, this study is based on the Egyptian market, a developing economy which represents a pure market in the field of SCM literature. Further, considering a sample of different industries helps to improve both the observed variance as well as the generalizability of results (Morgan et al., 2004).

Data collection used structured questionnaires based on a literature review that were distributed (either by e-mail, phone, and personal interview) to the senior managers of the selected firms with responsibilities in the field of SCM, considering the significance of selecting as key informants those managers involved in the decision domain of SCM, to ensure reliability of the data and to diminish the potential for random and systematic sources of error (Hambrick, 2007; Huber & Power, 1985). The obtained sample after removing non-valid questionnaires (205 companies) showed the following profile: company ownership (11.2% state-owned, 64.4% private owned, and 24.4% foreign-controlled), firm industry (58% manufacturing and 42% service), and manager position (58.0% supply chain-operations manager, 24.4% general manager, and 17.6% other managerial positions), with an average size of 607 employees.

Finally, to analyse the non-response bias, we checked for significant differences between first 75% and late 25% questionnaires based on the guidelines of Armstrong and Overton (1977) and Weiss and Heide (1993), and the results of t-tests performed on several firm characteristics showed that non-response bias was not a problem. Moreover, to test the existence of common method bias (CMB), first, a single factor in an exploratory factor analysis did not retain for most variance (only 36.07%), and second, a new model with all the items loading on a single factor was re-estimated, and the outcomes did not achieve the required values (Chi-square = 3,472.07; df = 560; RMSEA = .160; CFI = .409), so CMB was not a problem in this study (Podsakoff et al., 2003).

3.3. Data analysis approach

Following the guidelines of Gerbing and Anderson (1988), Hu and Bentler (1999), and Hair et al. (2019), we assessed convergent validity, discriminant validity, and reliability using Confirmatory Factor Analysis (CFA). Table 1 below shows the results from CFA estimation, and the measures of fit are all within the required values (Vandenberg & Lance, 2000), so that we consider the estimated model as appropriate.

Table 1. Confirmatory factor analysis: model fit, reliability, validity, and correlations between constructs and AVE description (source: author's own work)

	CR	CA	AVE	1	2	3	4	5	6	7
1. TMS	.825	.810	.616	.785						
2. HOC	.823	.817	.610	.390	.781					
3. II	.837	.823	.633	.342	.313	.796				
4. SCP	.811	.797	.593	.229	.283	.379	.770			
5. OP	.924	.924	.673	.471	.369	.437	.337	.820		
6. ITSIZE	---	---	---	.194	.217	.262	.293	.491	---	
7. SIZE	---	---	---	.284	.243	.211	.341	.480	.733	---
MODEL FIT SUMMARY Chi-square = 201.278, df = 145; $\chi 2/gl = 1.389$ CFI = .976; IFI = .976; TLI = .968; RMSEA = .044										

Note: CR: Composite Reliability. CA: Cronbach Alpha. AVE: Average Variance Extracted. Diagonal reflects AVE's square root. TMS: Top Management Support. HOC: Hierarchical Organizational Culture. II: Internal Integration SCP: Supply Chain Performance; OP: Operational Performance; ITSIZE: IT-Department Size. SIZE: Firm Size.

Regarding reliability, all constructs used obtained satisfactory levels of composite reliability coefficient (CR), Cronbach's alpha coefficient (CA), and average variance extracted (AVE) for all the constructs considered, exceeding the suggested cut-off values of .60, .70, and .50 (Bagozzi & Yi, 1988; Nunnally, 1978). Also, considering convergent validity, the individual loadings were large and significant, and all items were associated to their specified constructs (Anderson & Gerbing, 1988; Hair et al., 2019). Finally, with regards to discriminant validity, the correlations between constructs were considerably different from 1 and were lower than the square root of AVE (Fornell & Larcker, 1981; Hair et al., 2019). Therefore, the results indicate that the measurement model is acceptable in terms of validity and reliability (Bollen, 1989).

To test the abovementioned hypothesis, and considering the complexity of the suggested model, we consider the use of structural equation modelling to test simultaneously the offered hypotheses. The following Table 2 shows our results.

First, we consider the acceptability of the model by examining the fit indexes which are inside the recommended threshold values (Vandenberg & Lance, 2000), so the proposed model was acceptable. The estimated coefficients showed that IT-department size (ITSIZE) was positively connected to internal integration (.185; $p < .05$), that top management support (TMS) was positively related to internal integration (.240; $p < .01$), and hierarchical organizational culture (HOC) was also positively related to internal integration (.175; $p < .05$), thus

Table 2. Structural equation model (source: author's own work)

HYPOT.	RELATIONSHIPS	STAND. COEFF.		TEST
H1	ITSIZE → II	.185	*	Supported
H2	TMS → II	.240	**	Supported
H3	HOC → II	.175	*	Supported
H4	HOC → SCP	.202	*	Supported
H5	II → SCP	.350	***	Supported
H6	SCP → OP	.241	***	Supported
	CONTROL: *SIZE*	.415	***	
Model Fit Summary. Chi-square = 262.621, df = 153; $\chi 2/gl = 1.716$ CFI = .953; IFI = .954; TLI = .942; RMSEA = .059				

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; *ns* = not significant. ITSIZE: IT-Department Size; TMS: Top Management Support; HOC: Hierarchical Organizational Culture; II: Internal Integration; SCP: Supply Chain Performance; OP: Operational Performance; SIZE: Firm Size.

supporting H1, H2, and H3. In addition, the estimated coefficients also confirm that HOC was positively related to SCI (.202; $p < .05$), that internal integration was positively related to supply chain performance (SCP) (.350; $p < .001$), and, finally, that SCP was also positively related to operational performance (OP) (.241; $p < .001$), thus giving support for H4, H5, and H6. Lastly, regarding the control variable, ITSIZE was also significantly and positively related to OP (.415; $p < .001$).

Finally, Table 3 presents indirect total effects of the different internal enablers on SCP and OP through internal integration, tested by means of bootstrapping.

Table 3. Indirect effects of internal enablers on SCP and OP via internal integration (II) (source: author's own work)

PATH	UNSTAND. COEFF.	LCI	UCI	P	TEST
IE1: ITSIZE → II → SCP	.008	.002	.019	.003	**
IE2: TMS → II → SCP	.066	.011	.157	.016	*
IE3: HOC → II → SCP	.069	.008	.187	.018	*
TOTAL INDIRECT EFFECTS *(SCP)*	.142	.052	.280	.000	***
IE1: ITSIZE → II → SCP → OP	.002	.000	.007	.006	**
IE2: TMS → II → SCP → OP	.020	.003	.065	.014	*
IE3a: HOC → II → SCP → OP	.020	.002	.074	.018	*
IE3b: HOC → SCP → OP	.067	.005	.184	.027	*
IE3t: HOC → II → SCP → OP	.088	.016	.219	.007	**
TOTAL INDIRECT EFFECTS *(OP)*	.110	.023	.257	.006	**

Note: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; *ns* = not significant. Bootstrap confidence intervals (95% – (5,000 samples). ITSIZE: IT-Department Size; TMS: Top Management Support; HOC: Hierarchical Organizational Culture; II: Internal Integration; SCP: Supply Chain Performance; OP: Operational Performance; SIZE: Firm Size.

As shown, the confidence intervals for all the effects estimated by bootstrapping excluded the zero value, so all the considered indirect effects (partial and total) were significant and positive for SCP and OP. Collectively, this means that internal enablers (ITSIZE, TMS, and HOC) have a positive significant effect on SCP and OP, in this case, fully mediated via internal integration (and partially mediated in the case of the relationship of HOC on SCP).

4. Discussion

This research offers significant contribution to the SCM literature and practice. Thus, grounded in the RBV, OST, CVF, and IPT theories, this research shows the key role of internal enablers on internal SCI, finding that IT-infrastructure, top management support (TMS), and hierarchical organizational culture (HOC) are beneficial for internal integration. Additionally, this study advances the SCM-arena by taking into account the helpful influence of internal integration on SCP and OP. Moreover, the findings also support the notion that HOC is necessary for firms, as it helps and facilitates both the internal integration process as well as SCP. Lastly, this study is, as far as authors know, the first considering these relations in the Egyptian emerging market. Considering the emergent and increasing economic base of Egypt, our outcomes have interesting implications for both supply chain practitioners and scholars.

Preceding studies have focused on the link between IT-infrastructure and external integration (Bruque-Cámara et al., 2016), and the key role of IT-infrastructure as an enabler of SCI (Atadeniz et al., 2021). Nevertheless, this work contributes by showing the importance of such IT-infrastructure for developing an internal integration in SCM. Also, although TMS has been inclusively and globally studied (Swink et al., 2007), this research also makes a contribution by providing support for the key role of TMS in reinforcing a sound internal environment for fostering successful internal integrated systems (Ke & Wei, 2008).

Moreover, the outcomes also contribute to the organizational culture (OC) and SCI- research literature. HOC has not been considered substantially in SCM-research, and some studies have even found that it was negatively related to internal integration (Braunscheidel et al., 2010; Cao et al., 2015). Conversely, our findings demonstrate the relevance of developing an OC pivoted on internal processes, and a structure of stability and control as a way to facilitate internal integration (Cao et al., 2015). Additionally, because the findings show that HOC also has a direct influence on SCP, this work explores the complementary roles of HOC from an internal viewpoint.

Finally, although there are some studies centered on understanding the advantages of internal integration on OP (Flynn et al., 2010; Huo, 2012), very few works have addressed the specific effect of internal integration on operational performance (OP) and supply chain performance (SCP) (Germain & Iyer, 2006; Stank et al., 2001). This way, based on a strong multi-theoretical approach, this study provides insights into a missing variable (internal supply chain integration/internal integration) that may help to clarify discrepancies in the outcomes of previous research. Moreover, it supports the key function of internal enablers in fostering this variable.

5. Study implications

5.1. Theoretical implications

This study reveals that internal integration has an effect on business performance because, when firms are embedded in collaborative processes, the knowledge exchanged can allow for better and faster reactions to market demand changes, to generate more value for the clients and also to reduce costs, which, in turn, strengthen the firm's OP. A correct comprehension of how SCI helps firms to improve OP is a key issue for supply chain managers at present times (Huo, 2012).

We also examined the internal enablers of internal integration. Considering a business-like angle, this study gives executives evidence of the paybacks of internal integration as a precursor of SCI. To gain more from SCI, top managers need to support the integration and the information technology or software system that facilitate SCI by providing, for example, resources required for developing such a strong and stable IT-system. Also, the organizational culture is revealed to be a relevant issue to facilitate internal integration. In particular, sharing values and guiding employees generates stability and better control that eases the internal processes and internal SCI.

As indicated, the results of this work add better comprehensiveness and enrich the SCI research arena. This study not only provides insights that may possibly assist in explaining prior contradictory findings of studies regarding the performance of SCI, but also can help to determine whether internal integration and SCI need to be considered as a basis of competitive advantage in the marketplace. The theoretical framework offered here aids to provide parsimony and to differentiate among three enablers of this internal integration.

By improving their internal integration, companies in the supply chain might achieve a superior competitive advantage. In this regard, managers must pay particular attention to IT, offer support, and seek for a good hierarchical organizational culture (HOC) to achieve all the performance potential that SCI is capable of in order to improve SCP and OP. The findings demonstrate that if a firm accomplishes internal integration, this will impact on the SCP and OP.

5.2. Practical implications

Besides, these findings offer applied implications for business. Supply chain executives need to understand how SCI helps firms to improve their business performance (i.e., SCP and OP). Thus, our results have several practical implications that offer valuable insights for manufacturing, retailers, wholesalers, and freight forwarders firms and organizations, as they offer guiding principles for managers and executives to direct internally their actions for achieving successful OP through internal integration. The findings reported provide guidelines for concentrating firm's scarce resources on achieving better internal integration among departments. Investing in IT can enhance SCI as it eases information exchange which, in turn, increases knowledge creation and learning. Also, if top managers support and signal the relevance of integration to the whole organization and its employees and orient the organization to focus on controlling business processed will improve the efficiency of the chain, leading to better competitive advantages and performance.

Also, as top management support (TMS) and IT-department size (ITSIZE) have a positive impact on internal integration, it is critical for managers to create the right conditions for fostering internal integration. In addition, top managers need to provide the resources required for developing strong and stable IT-infrastructures and offer continuous support to the supply chain managers by reinforcing its strategic role. By concentrating resources aiming to accomplish superior internal integration among departments leads to improved SCP, as knowledge creation and learning offers competitive advantages. On the other hand, our results offer insights for executives on how to enhance internal integration and improve SCP from the perspective of an appropriate organizational culture. Improving internal integration and SCP requires the support of hierarchical organizational culture (HOC). Consequently, firm executives who are coping with complications with internal integration and OP, or who want to accelerate internal integration and SCP, need to adopt a HOC-approach.

Moreover, from a manager's applied perspective, this investigation gives managers confirmation of the benefits of internal integration as an enabler of SCP and OP. Internal integration may enhance information exchanges, in turn having a positive impact on inventory control, production scheduling, and distribution plans of the members of the supply chain. This improves cross-functional collaboration and internal coordination along supply chain operations, including planning, manufacturing, logistics, and purchasing by sharing of information, leading to benefits in terms of delivery, performance, efficiency, manufacturing flexibility, agility, and, ultimately, SCP. Companies working in a progressively more competitive and dynamic business environment should put more stress internally on the development and preservation of internal integration to gain superior SCP and OP. Because SCP fully mediates the internal integration–OP link, it is mandatory for companies to recognize the significance of internal integration in reinforcing SCP to ultimately raise business performance and OP.

Conclusions

Supply chain integration (SCI) has obtained growing relevance from both the academy and the managerial sides. The reported advantages include enhancements in business performance. However, there are inconsistencies and a lack of agreement in the field of SCI, so that recent calls for research entail a logical framework to consistently define and operationalize SCI and its dynamics, considering its enablers and effects at a given specific level or scope.

Our results address the research question of this work by finding that the internal enablers considered (OC, HOC, and ITSIZE) are beneficial for internal integration and business performance, both considering their direct and indirect effects. Indeed, these findings are relevant for existing literature in the field in a number of ways. First, this study applies SCI at an internal level, and enlarges existing knowledge regarding the key internal enablers of SCI, and their direct and indirect effects on business performance, but focusing on internal integration, due to its preceding role to external integration in the so-called "arc of integration". In addition, by testing the connection of internal integration and supply chain performance (SCP), this study highlights the critical role of SCP in linking internal integration to operational performance (OP), providing better understanding and depth to the SCI

literature at an internal level. Thus, the study contributes to filling the gap that remains in the associations among internal enablers of SCI, internal integration, SCP, and OP, showing the effects of internal integration between those internal enablers and SCP.

This study provides practical insights into how SCI may improve firms' business performance (i.e., SCP and OP), It also offers practical insights into the relevance of prioritizing firm's efforts on achieving enhanced internal integration based on internal enablers (OC, HOC, and ITSIZE) to improve competitive advantages and performance in the marketplace.

Even though this work makes substantial contributions to the scholar and practical comprehension of key internal enablers of internal integration, as well as on how this variable contributes to SCP and OP, we also identify limitations that create future avenues of research. Firstly, the data considers a single respondent manager's self-perception. Even though most respondents were senior managers in supply chain functions, some bias may still arise from respondent subjectivity and misunderstandings. Also, respondents did not hold the same position or business function, this fact incorporates multiple perspectives, but it might introduce extraneous variance in the data too. Conversely, by having several respondents for each firm, the reliability of the study might be increased.

In addition, this study addresses the influence of three key internal enablers (ITSIZE, TMS, and HOC) on the development of internal integration. However, future research should address the specific nature of those variables for fostering internal integration, such as the type of IT-resources and capabilities needed, the development of specific management support, or the influence of other organizational cultures with an internal focus (e.g., clan culture). Moreover, given the inconsistencies in the influence of some of these variables and the fact that data was only collected from Egyptian organizations, future research should investigate these relationships in different countries and industrial environments.

Finally, the results reported cannot solve all the inconsistencies regarding the relations between internal integration and SCP. Thus, there is a need for future research to deepen in the study of the effect of internal integration on SCP by focusing on the links between internal integration and the other dimensions of SCI (supplier and customer), as well as with the external side of SCP. This work has paid attention to the direct and indirect effects of internal integration on SCP and OP, but in the future, research on this arena should address the role of other mediating and moderating factors in the internal supply chain integration-performance links, as well as its complementary dynamics, such as innovation capabilities, supply chain risk management or agility.

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Author contributions

E. Ruzo-Sanmartín, A. Abousamra, C. Otero-Neira and G. Svensson were responsible for the study conception and design. E. Ruzo-Sanmartín and A. Abousamra were responsible for data collection. E. Ruzo-Sanmartín, A. Abousamra, C. Otero-Neira and G. Svensson

were responsible for data analysis and interpretation. E. Ruzo-Sanmartín, A. Abousamra, C. Otero-Neira and G. Svensson discussed the results and contributed to the final manuscript.

Disclosure statement

The authors have no competing financial, professional, or personal interests from other parties that are related to the subject of this paper.

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