An empirical re-evaluation of the impact of supply chain integration on firm performance

Frank Wiengarten (frank.wiengarten@esade.edu)
ESADE Business School

Huashan Li
The University of Melbourne

Prakash J. Singh
The University of Melbourne

Abstract

This paper conducts a replication and extension study of Frohlich and Westbrook's (2001) (FW2001 hereafter) paper with multiple quasi-independent datasets to test the impact of SCI on firm performance. The results only provide partial support for the benefits of SCI. Our ANOVA approach generally indicates that the levels of integration are positively related to operational performance, such as quality, delivery, flexibility, and cost. However, greater integration does not necessarily lead to superior financial performance, such as sales and profitability. Furthermore, the regression results do not show a universal linear or curvilinear relationship between SCI and firm performance indicators.

Keywords: Supply chain integration, theory development, non-linear relationships

Introduction

The relationship between supply chain integration (SCI) and firm performance has been intensively debated (Leuschner et al., 2013; Mackelprang et al.,2014). The general view from the supply chain literature is that increased integration leads to improved firm performance (Frohlich and Westbrook, 2001). Researchers have extensively applied theories, such as the RBV, and argued that SCI can be a source of lasting competitive advantage and the more companies integrate the higher their potential performance benefits (Schoenherr and Swink, 2012). However, this proposition has been challenged, as many empirical research find contradictory results (Leuschner et al., 2013; Mackelprang et al.,2014). The mixed results present a need for our proposed replication study that would help researchers and foremost practitioners to understand the performance implications of their company's SCI initiatives. This paper aims to explore the following objectives: (1) Review and synthesize the prominent literature on SCI and firm performance and, (2) provide a comprehensive re-evaluation and assessment of the SCI-firm performance relationship.

Literature review and hypotheses

SCI has been defined from different perspectives in terms of the direction of integration, whether it being external integration with customers and suppliers and internal integration between departments (Flynn et al. 2010; Wong et al. 2011) and in terms of the depth of the relationship, being it at the operational information exchange level or at the strategic level (Wiengarten and Longoni, 2015). Resource-based view (RBV) proposes that companies obtain access to essential complementary resources that are outside their company boundaries. Thus, through practicing SCI firms get access to additional resources that are rare, valuable, inimitable and non-substitutional (Barney 1991), which may lead to sustainable competitive advantages and thus improve firm performance.

The relationship between SCI and performance has been extensively examined, but the results are still relatively inconclusive when considering the selected dimensions of integration and performance. Research has found positive (Droge et al. 2004; Frohlich and Westbrook 2001; Jitpaiboon et al. 2013; Schoenherr and Swink 2012; Zhang and Huo 2013), insignificant (Devaraj et al. 2007; Gimenez and Ventura 2005; Stank et al. 2001; Yu et al. 2013), and non-linear relationships (Das et al. 2006; Terjesen et al. 2012; Zhao et al. 2015). A review of prior SCI literature indicates that research has either treated SCI as a single construct (Huang et al. 2014; Terjesen et al. 2012) or decomposed it into supplier integration, customer integration, and internal integration (Flynn et al. 2010; Wong et al. 2011). In terms of performance, prior research has examined performance considerations from both an operational performance and financial perspective. Furthermore, operational performance has been conceptualised as a single construct or through its widely known sub-dimensions (i.e., such as quality, delivery, flexibility, and cost). Financial performance has been frequently conceptualised through firm level indicators such as return on investments, return on assets, sales, and return on sales. Financial performance has been frequently viewed as a secondary performance outcome, which is affected by the primary performance outcome operational performance.

This article aims at replicate and extent FW2001, and hence, consistent with FW2001, we hypothesize more integration will lead to higher performance. Schoenherr and Swink (2012) retested FW2001 for cross-validation and extension purposes. They extended the original arcs of integration work by including internal integration as a moderator and testing multiple performance dimensions (i.e., cost, quality, flexibility, delivery). They confirmed FW2001 in that greater arcs of supplier and customer integration are associated with greater levels of quality, delivery, flexibility and cost performance. In general, performance scores improved with an increase in the arcs of integration (i.e., moving from an inward-facing strategy (low supplier and customer integration) to an entirely outward-facing strategy (high supplier and customer integration). Based on these theoretical reasoning and results we propose the following hypothesis for replication purposes:

H1. Companies with the greatest arcs of supply chain integration (i.e., supplier and customer integration) will have the largest rates of performance improvement (i.e., operational and financial performance).

The majority of the more recent studies that followed FW2001 have however employed a slightly different methodological approach. Instead of conducting an ANOVA approach, as implied by H1, they have tested this relationship through multiple regression (e.g., Wiengarten and Longoni (2015). Subsequently, we also propose:

H2. Supply chain integration (i.e., supplier and customer integration) has a positive impact on performance (i.e., operational and financial performance).

Thus, we will employ a two-stage approach, for revalidation purposes and to further explore the SCI – performance relationships. Therefore, other than conducting ANOVAs, we also conduct multiple regression analyses to test the proposed linear relationship.

Method

In this paper, we use the seminal arcs of integration framework by FW2001 as a base to retest the SCI – firm performance relationship using the original dataset from the second International Manufacturing Strategy Survey (IMSS) round and all other subsequent IMSS survey rounds that included SCI items. The IMSS surveys were conducted in different countries through a collaborative research network of partners. The questions were designed mainly using a five-point Likert scale, along with some objective measures that are absolute or percentages. The surveys were conducted at the plant level in manufacturing industries. Participants were manufacturing managers (or equivalent) of each plant deemed to be the most knowledgeable informants to answer the survey questions. The IMSS datasets have been widely used to conduct SCI research. For example, the FW2001 is based on IMSS data (IMSS-II, year 1996). Also, later rounds of the IMSS dataset were used in studies by Wiengarten et al. (2014) and Vanpoucke et al. (2014). Thus, we will test our hypotheses using IMSS II and subsequent rounds of the survey including IMSS-III (year 2000), IMSS-IV (year 2005), IMSS-V (year 2009) and IMSS-VI (year 2014).

To explore the relationships between SCI and performance, we follow a two-stage approach. In the first stage, we repeat FW2001 approach by operationalising the patterns of integration and comparing the performance outcomes of different patterns of integration based on the one-way ANOVA. In the second stage, we conduct regression analyses to examine how customer integration and supplier integration impact on multiple performance indicators through multiple models. In addition, we include the squared terms of supplier integration and customer integration to explore the possibility of non-linear relationships between SCI and performance (Das et al. 2006; Terjesen et al. 2012).

Results

Our ANOVA approach generally indicates that higher levels of integration are positively related to higher levels of operational performance, such as quality, delivery, flexibility, and cost. However, greater integration does not necessarily lead to superior financial performance, such as sales and profitability.

Table 1. Summary of the ANOVA results

Performance Differences	IMSS II	IMSS III	IMSS IV	IMSS V	IMSS VI
Quality	Supported	Supported	Supported	Supported	Supported
Delivery	Supported	Supported	Supported	Supported	Supported
Flexibility	Supported	Supported	Supported	Supported	Supported
Cost	Supported	Supported	Supported	Supported	Supported
Sales	Not Tested	Supported	Not Supported	Not Supported	Supported
Profitability	Supported	Not Supported	Not Supported	Not Supported	Supported

The regression approach also shows that the relationship between SCI and performance is inconclusive. Table 2 presents the regression coefficients of the IMSS-III. Regarding the main effects, the results show that supplier integration is positively related to quality performance ($B=0.096$, $p<0.05$), delivery performance ($B=0.116$, $p<0.05$), flexibility performance ($B=0.169$, $p<0.001$), and cost performance ($B=0.170$, $p<0.001$). However, supplier integration is not related to financial performance in terms of sales and profitability. In addition, the relationship between customer integration and all performance indicators are not significant. Thus, we conclude that H2 is only partially

supported. In the IMSS-III, the squared terms of both supplier integration and customer integration are not significantly related to all performance indicators. This indicates that SCI is not associated with firm performance in a non-linear relationship.

Table 2. Regression coefficients of IMSS-III

	Model 6 Quality	Model 7 Delivery	Model 8 Flexibility	Model 9 Cost	Model 10 Sales	Model 11 Profitability
Firm size	0.014	0.006	0.031	-0.002	0.961***	-0.011
	(0.522)	(0.171)	(0.934)	(-0.052)	(16.418)	(-0.017)
GDPG	0.019	-0.004	0.001	0.018	0.036	0.844
	(1.191)	(-0.209)	(0.064)	(1.037)	(1.032)	(1.931)
GDPPC	-0.104**	-0.119*	-0.055	0.020	0.865***	1.375
	(-2.791)	(-2.517)	(-1.224)	(0.502)	(10.188)	(1.549)
SupInt	0.096*	0.116*	0.169***	0.170***	0.126	-0.448
	(2.493)	(2.358)	(3.629)	(4.049)	(1.528)	(-0.464)
CusInt	0.061	-0.008	-0.026	0.032	-0.137	0.324
	(1.570)	(-0.155)	(-0.554)	(0.759)	(-1.647)	(0.338)
$SupInt^2$	0.022	0.044	0.048	0.029	-0.078	-0.251
	(0.808)	(1.296)	(1.503)	(0.987)	(-1.354)	(-0.345)
$CusInt^2$	-0.001	0.002	-0.052	0.021	0.022	0.622
	(-0.026)	(0.040)	(-1.431)	(0.641)	(0.334)	(0.795)
R^2	0.092	0.045	0.064	0.089	0.621	0.033
Adj-R^2	0.073	0.025	0.044	0.070	0.611	-0.001
F-value	4.893	2.244	3.281	4.692	61.589	0.976

Notes: 1. t-statistics are in parentheses below the coefficients; 2. *p<0.05; **p<0.01; ***p<0.001.

Table 3 presents the results for IMSS-IV. The results indicate that supplier integration is positively related to flexibility performance (B=0.116, p<0.01) and cost performance (B=0.109, p<0.01). The squared term of supplier integration is positively related to delivery performance (B=0.062, p<0.05). However, further tests indicate that the 95% confidence interval of the turning point is out of the data range, which refutes the U-shaped relationship between supplier integration and delivery performance. In addition, the squared term of supplier integration is negatively related to sales (B=-0.094, p<0.05), proposing a potential inverted U-shaped relationship. Further tests also confirmed this finding since the slope is positive at the lower bound and negative at the upper bound. Also, the 95% confidence interval of turning point is within the data range. These results suggest that both low and high levels of supplier integration might jeopardize sales.

Table 4 illustrates the regression result of the IMSS-V. In terms of the main effects, supplier integration is positively related to delivery (B=0.098, p<0.05), flexibility (B=0.115, p<0.01), and cost performances (B=0.141, p<0.001). In addition, the relationship between supplier integration and sales is not significant, while the squared term of supplier integration is negatively related to profitability (B=-0.087, p<0.05). Further tests also reveal that supplier integration has an inverted U-shaped impact on profitability. The results indicate that either insufficient or excessive implementation of supplier integration might curtail profitability. By contrast, the relationships between customer integration and all performance indicators are not significant, indicating a lack of support for H2.

Table 3. Regression coefficients of IMSS-IV

	Model 12 Quality	Model 13 Delivery	Model 14 Flexibility	Model 15 Cost	Model 16 Sales	Model 17 Profitability
Firm size	-0.034	0.012	-0.012	0.024	-0.022	-0.060
	(-1.406)	(0.407)	(-0.521)	(1.057)	(-0.548)	(-1.529)
GDPG	0.004	0.007	-0.005	-0.013	0.001	0.017
	(0.330)	(0.495)	(-0.370)	(-1.073)	(0.058)	(0.832)
GDPPC	-0.131**	-0.127*	-0.066	-0.045	-0.232**	0.107
	(-2.857)	(-2.381)	(-1.466)	(-1.056)	(-3.216)	(1.495)
SupInt	0.062	0.086*	0.116**	0.109**	-0.019	-0.011
	(1.708)	(2.038)	(3.299)	(3.255)	(-0.334)	(-0.196)
CusInt	0.141***	0.137**	0.081*	0.091**	0.074	0.089
	(3.856)	(3.206)	(2.264)	(2.691)	(1.266)	(1.501)
$SupInt^2$	0.013	0.062*	0.024	0.021	-0.094*	-0.019
	(0.563)	(2.261)	(1.055)	(0.993)	(-2.560)	(-0.518)
$CusInt^2$	0.018	-0.004	0.018	0.016	0.071	0.088*
	(0.711)	(-0.133)	(0.723)	(0.678)	(1.645)	(2.027)
R^2	0.117	0.112	0.073	0.077	0.068	0.024
Adj-R^2	0.106	0.101	0.061	0.065	0.055	0.010
F-value	10.586	10.075	6.297	6.624	5.334	1.686

Notes: 1. t-statistics are in parentheses below the coefficients; 2. *p<0.05; **p<0.01; ***p<0.001.

Table 4. Regression coefficients of IMSS-V

	Model 18 Quality	Model 19 Delivery	Model 20 Flexibility	Model 21 Cost	Model 22 Sales	Model 23 Profitability
Firm size	-0.004	-0.036	-0.023	-0.005	0.012	-0.024
	(-0.175)	(-1.565)	(-1.049)	(-0.251)	(0.328)	(-0.797)
GDPG	0.046**	0.029	0.031	0.060***	0.059*	0.046*
	(2.781)	(1.716)	(1.923)	(4.018)	(2.134)	(2.061)
GDPPC	-0.070	-0.096	-0.056	-0.001	-0.212*	-0.014
	(-1.159)	(-1.533)	(-0.936)	(-0.019)	(-2.097)	(-0.166)
SupInt	0.060	0.098*	0.115**	0.141***	-0.018	0.009
	(1.424)	(2.245)	(2.759)	(3.737)	(-0.252)	(0.161)
CusInt	0.014	0.036	-0.022	0.011	0.006	-0.036
	(0.341)	(0.827)	(-0.534)	(0.285)	(0.085)	(-0.640)
$SupInt^2$	0.038	0.015	0.004	0.039	-0.009	-0.087*
	(1.219)	(0.467)	(0.135)	(1.362)	(-0.175)	(-2.062)
$CusInt^2$	0.006	0.010	0.026	0.017	-0.097	0.022
	(0.184)	(0.265)	(0.758)	(0.532)	(-1.670)	(0.487)
R^2	0.057	0.056	0.044	0.100	0.054	0.028
Adj-R^2	0.044	0.043	0.031	0.088	0.041	0.013
F-value	4.451	4.377	3.386	8.256	4.126	1.935

Notes: 1. t-statistics are in parentheses below the coefficients; 2. *p<0.05; **p<0.01; ***p<0.001.

Table 5 shows the relationship between integration and performance indicators in the IMSS-VI dataset. Supplier integration has a positive impact on operational performance in terms of quality (B=0.106, p<0.05), delivery (B=0.105, p<0.05), flexibility (B=0.095,

p<0.05), and cost performances (B=0.128, p<0.01). However, supplier integration does not have a significant impact on financial performance, in terms of sales and profitability. In contrast, customer integration is positively related to flexibility performance (B=0.117, p<0.01), sales (B=0.105), and profitability (B=0.127, p<0.01). The squared terms of both supplier integration and customer integration are not significantly related to all performance indicators, indicating that the relationships are linear.

Table 5. Regression coefficients of IMSS-VI

	Model 24 Quality	Model 25 Delivery	Model 26 Flexibility	Model 27 Cost	Model 28 Sales	Model 29 Profitability
Firm size	0.001	0.001	-0.010	-0.000	0.052*	0.030
	(0.032)	(0.077)	(-0.618)	(-0.005)	(2.475)	(1.423)
GDPG	-0.002	-0.008	-0.025*	0.014	0.006	0.011
	(-0.139)	(-0.732)	(-2.537)	(1.332)	(0.427)	(0.855)
GDPPC	-0.169***	-0.201***	-0.111***	0.100**	-0.065	0.000
	(-5.259)	(-6.073)	(-3.761)	(3.191)	(-1.676)	(0.004)
SupInt	0.106*	0.105*	0.095*	0.128**	-0.015	0.037
	(2.569)	(2.462)	(2.499)	(3.186)	(-0.310)	(0.767)
CusInt	0.075	0.073	0.117**	0.044	0.105*	0.127**
	(1.808)	(1.725)	(3.086)	(1.087)	(2.128)	(2.589)
$SupInt^2$	-0.024	0.011	0.008	0.029	-0.029	-0.031
	(-0.892)	(0.397)	(0.325)	(1.104)	(-0.906)	(-0.971)
$CusInt^2$	-0.013	-0.022	-0.003	-0.044	0.032	0.013
	(-0.422)	(-0.723)	(-0.110)	(-1.522)	(0.905)	(0.366)
R^2	0.115	0.119	0.089	0.044	0.034	0.038
Adj-R^2	0.107	0.111	0.080	0.035	0.025	0.029
F-value	14.360	15.001	10.791	5.099	3.726	4.112

Notes: 1. t-statistics are in parentheses below the coefficients; 2. *p<0.05; **p<0.01; ***p<0.001.

In conclusion, after controlling for economic condition and plant size, the results of the regression approach in different rounds of IMSS suggest that the support for "more integration is associated with improved performance" is quite divergent (Table 6). While some relationships gain general support, such as how supplier integration impact on delivery, flexibility, and cost, other relationships gain less support, such as supplier integration and financial performance, and customer integration on operational performance and financial performance.

Discussion

Theoretical implication

Our literature review has identified multiple possible reasons for the inconsistencies on the SCI – firm performance relationship in terms of differences in conceptualising SCI, performance, and unrecognised contingency effects. Building on this we have explored these conceptual inconsistencies and results through conducting a comprehensive empirical analysis through a quasi-longitudinal research design that was modelled around the initial seminal work of SCI by FW2001. The majority of our tests revealed that SCI in terms of customer and supplier integration does not improve firm performance (see Table 6), especially the customer side of SCI does not seem to affect firm performance. Furthermore, in terms of the type of the dependent variable, it seems that SCI does not

improve financial performance, conceptualised through sales and profitability. These results confirm somewhat our findings of the literature review – SCI does not consistently improve firm performance (Das et al. 2006; Terjesen et al. 2012). We postulated that the inconsistencies might be due to differences in the conceptualisation of the SCI and firm performance constructs (Leuschner et al. 2013; Mackelprang et al. 2014), contextual factors (Huang et al. 2014; Liu et al. 2016; Wiengarten et al. 2014), or a general false assumption of the more integration equals to higher performance equation (Villena et al. 2011). We propose that these causes are somewhat interrelated through the common nominator in the form of theory.

Table 6. Summary of linear relationship testing

Performance Relationships	**IMSS II**	**IMSS III**	**IMSS IV**	**IMSS V**	**IMSS VI**
Supplier Integration – Quality Performance	Not Supported	Supported	Not Supported	Not Supported	Supported
Supplier Integration – Delivery Performance	Not Supported	Supported	Supported	Supported	Supported
Supplier Integration – Flexibility Performance	Not Supported	Supported	Supported	Supported	Supported
Supplier Integration – Cost Performance	Not Supported	Supported	Supported	Supported	Supported
Supplier Integration – Sales	Not Tested.	Not Supported	Not Supported	Not Supported	Not Supported
Supplier Integration – Profitability	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Customer Integration – Quality Performance	Not Supported	Not Supported	Supported	Not Supported	Not Supported
Customer Integration – Delivery Performance	Not Supported	Not Supported	Supported	Not Supported	Not Supported
Customer Integration – Flexibility Performance	Not Supported	Not Supported	Supported	Not Supported	Supported
Customer Integration – Cost Performance	Not Supported	Not Supported	Supported	Not Supported	Not Supported
Customer Integration – Sales	Not Tested	Not Supported	Not Supported	Not Supported	Supported
Customer Integration – Profitability	Not Supported	Not Supported	Not Supported	Not Supported	Supported

Previous SCI research has applied multiple theories to support the proposition that higher levels of integration lead to an increase in firm performance with the RBV, IPT and TCE being amongst the most prominent once. However, from a resource based perspective it is questionable whether or not the relationship between supply chain partners is a source of performance improvements on its own or a means to gain excess to resources that lead to performance improvements. Furthermore, the lasting (i.e., sustainable) performance improvements have largely been overlooked in SCI research applying the RBV (Wiengarten and Longoni 2015). Additionally, the transaction cost based view has also largely been loosely applied to fit the SCI – performance proposition. Rather than investigating the benefit of SCI from a transaction cost perspective many researchers have focused on the performance implication (Devaraj et al. 2007; Zhao et al. 2015). Furthermore, with regards to adopting IPT, research has suggested that information exchange among supply chain partners could help firms to increase information processing capabilities and thus reduce uncertainty (Flynn et al. 2016; Wong et al. 2011). However, this stream of research has largely neglected the risk of knowledge

spill-over. Supply chain partners might take advantage of this information to increase their bargain power (Mesquita et al. 2008).

Thus, from a conceptual perspective the development of a specific supply chain theory could push our research efforts further forward in identifying some of the more specific causes of the contingency, measurement and linearity proposition discussed below that impact on the SCI – performance relationship. Previous research has already suggested and started to further explore the impact and importance of contextual factors on the efficacy of SCI. Contingency factors might occur at various levels of analysis. Some studies have started investigating these factors at the organizational and country level (Huang et al. 2014; Wiengarten et al. 2014; Wong et al. 2011).

The contradictory findings might also stem from the assumption that more SCI leads to higher firm performance gains. This *"more is always better"* approach has been predominantly concluded in previous research. However, this assumption has been challenged by empirical findings. For example, based on contingency theory and differentiation-integration duality, Terjesen et al. (2012) argued that firms with both insufficient and excessive levels of SCI may not achieve returns from the implementation of SCI, and therefore, the relationship between SCI and performance is inverse U-shaped; this is testified using a sample of 261 manufacturing firms. Villena et al. (2011) also identified an inverted curvilinear relationship between collaborative buyer-supplier relationships, conceptualised through social capital, and performance. They concluded that either too little or too much social capital in supply chain relationships cannot lead to performance improvements. We have also explored this avenue by including the square terms of both supplier and customer integration in our regression models. However, the results only show minor support for the curvilinear relationship between SCI and performance (as summarized in Table 7).

Table 7. Summary of curvilinear relationship testing

Performance Relationships (squared terms)	**IMSS II**	**IMSS III**	**IMSS IV**	**IMSS V**	**IMSS VI**
Supplier Integration – Quality Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Supplier Integration – Delivery Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Supplier Integration – Flexibility Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Supplier Integration – Cost Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Supplier Integration – Sales	Not Tested	Not Supported	Inverted U-shaped	Not Supported	Not Supported
Supplier Integration – Profitability	U-shaped	Not Supported	Not Supported	Inverted U-shaped	Not Supported
Customer Integration – Quality Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Customer Integration – Delivery Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Customer Integration – Flexibility Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Customer Integration – Cost Performance	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Customer Integration – Sales	Not Tested	Not Supported	Not Supported	Not Supported	Not Supported
Customer Integration – Profitability	Not Supported	Not Supported	U-shaped	Not Supported	Not Supported

Furthermore, as mentioned previously, some of the contradicting results are also augmented by the various definitions and conceptualisations of what constitutes SCI. In the literature review, we have highlighted that SCI has been conceptualised in terms of cooperation and collaboration (Ahmed and Pagell, 2012). Whilst some of the items that constitute SCI fall into either of these categories some authors have mixed both categories into a single integration dimension. The IMSS survey, that provides the base for many of the conclusions drawn on SCI, also mixes operational and strategic aspects of SCI. We conclude that the type of information that is exchanged between the supply chain partners can be operational (e.g., stock levels) and has been mixed with strategic practices such as supplier development or risk/revenue sharing. However, both types of information have very different implications for performance. Wiengarten and Longoni (2015) have proposed that in addition to analyse the direction of the arcs of integration (e.g. inward vs. outward) the depth of integration (i.e., coordination and collaboration practices) has been largely overlooked in previous research and might shed light on some of the contradictory findings. Besides others they identified that different levels of SCI depth lead to different operational and sustainability performance outcomes. We propose that future research should be more careful in conceptualising SCI.

Practical implications

Whilst our paper is mainly focused on theoretical contributions of the topic itself, our study and results make multiple important managerial contributions that need to be highlighted. Managers need to be aware that SCI does not univocally improve performance. Some dimensions such as supplier integration might improve operational performance but do not necessarily improve a firm's financial performance suggesting that instead it may come at a significant financial cost. In addition, the results regarding the slope of the regression curve indicate that some relationships are not strictly linear. Thus, managers need to be aware that more integration does not necessarily always lead to higher performance gains. SCI is a resource that comes at a cost which might diminish some of its initial returns. Thus, depending on the sourcing needs and situation, managers need to take a more differentiated approach to supplier and customer integration.

Furthermore, the results of this replicative longitudinal study provide further indications of the importance of contextual factors. The contradictory results that have been identified and replicated throughout the different years and could be viewed as further evidence that managers need to take certain contextual factors (e.g., firm size, culture, industry, purchasing items) into consideration when making supply chain relationship design decisions and when evaluating the efficacy of SCI.

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