Supplier, Customer and Collaboration Orientations: A Longitudinal Perspective

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Abstract: Market success requires companies to offer a compelling value proposition and then develop the efficient processes needed to deliver to promise. Yet, findings from a multi-method, longitudinal research study show that strong functional orientations promote silo thinking, which leads to counterproductive decision-making. The failure to align supply- and demand-side processes creates gaps, undermines value creation, and hinders a company's ability to meet customer needs. However, establishing a collaboration orientation can help bridge these service gaps and improve operational performance. This research shows that companies can develop a collaboration orientation to mitigate dysfunctional silo effects. As companies do so, they are able to deliver higher levels of customer value and business performance. Approaches to cultivating such a collaboration orientation are also discussed.

Key Words: Collaboration, Market Orientation, Resource-based View, Multi-method, Multi-period study

Introduction

To achieve superior market performance, companies must coordinate value-added activities across both internal and external boundaries to build non-imitable competencies and deliver unique customer value (Barney, 2001; Ketchen, Hult, and Slater, 2007). However, achieving the coordination necessary to improve business performance remains a pervasive challenge (Johnson and Borger, 1977; Ellinger, Keller, and Hansen, 2006). Stevens (1989) identifies a fundamental issue underlying the challenge as follows "The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to affect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit costs."

Conflicting goals are found throughout the supply chain. Stevens's example highlights the dilemma that occurs within a firm: marketing's quest for outstanding customer service conflicts with logistics' mandate to minimize inventory and transportation costs. As these two functions pull in different directions, relationships are strained and tensions build (Ellinger et al., 2006). Similarly, across the supply chain, customers' efforts to lower prices collide with suppliers' desire to protect margins, diminishing trust and the willingness to work together (Fawcett, Magnan, and Williams, 2004). Because these conflicts arise from traditional organizational structures and cultures, they are pervasive. Bowersox, Closs, and Stank (1999) called the conflict between the downstream, customer-oriented functions and the upstream, supplier-oriented functions within a firm the "great divide." Fawcett and Magnan (2002) noted that the prevalence of gaps among supply chain members make meaningful collaboration among "partners" the exception rather than the rule. The reality is that wherever conflicting goals are found, they lead decision makers to compete rather than to combine efforts (Churchman, 1971; Min, Mentzer, and Ladd, 2007; Narver and Slater, 1990).

Unfortunately, the counterproductive competition that often accompanies conflicting goals threatens to diminish both firm and supply chain performance—a potentially dangerous outcome in a "flat" world (Friedman, 2006). The question thus emerges, How can modern supply chain managers mitigate inter-functional and supply chain conflict? Several researchers have identified a collaborative orientation as the "missing" mechanism that is needed to bridge existing gaps across functions and among firms (Barratt, 2004b; Ellinger et al., 2006; Moberg, Speh, and Freese, 2003; Nicovich, Dibrell, and Davis, 2007). To explore collaboration's role as a bridge, we collected data in two time periods, six years apart, to assess how effectively companies are learning to collaborate and improve their ability to create value across organizational boundaries. Elements of internal (cross-functional) and external (supply chain) collaboration were incorporated into a multi-faceted measure of collaboration orientation.

Organizational Orientations and Value Creation: A Conceptual Model

Constituency Based Theory (CBT) suggests that companies organize along functional lines to take advantage of in-depth knowledge and skills that arise from specialization (Anderson, 1982). CBT also warns that "specialist" functions (e.g., marketing and logistics) tend to pursue their own goals because they are rewarded on disparate metrics, operate with distinct reporting structures, and are often located in physically separated work areas. Although this functional-orientation allows each function to perform well according to its respective metrics,

tension and conflict are likely to occur, leading to sub-optimal performance for both the firm and the supply chain (Fawcett, Magnan, and Ogden, 2007).

Forrester (1958) recognized the counterproductive nature of functional organizations—that is, functional orientations impose costs and disruptions that impede value creation—and predicted the emergence of process-driven organizations. The fulfillment of his prediction has yet to be realized. Despite its drawbacks, the functional organization structure persists because companies need "groups" with specific and deep skills to take responsibility for managing specific tasks. Even so, as value-creation processes have become more complex and intertwined, the costs imposed by functional orientations have increased. Managers thus face a dilemma: How can they obtain the deep skills associated with functional specialization while avoiding the costs imposed by conflicting goals and metrics? A mechanism is clearly needed to mitigate the downsides of functional organizations (Ellinger et al., 2006).

Because companies struggle to combine deep functional skills to build a valued competency, the resource-based (RB) view of competition provides a useful lens for defining such a mechanism (Ketchen et al., 2007). The underlying principle of RB theory is that a firm's (or a supply chain's) resources do not determine competitiveness; rather, it is *how* managers exploit resources across functions (or the supply chain) that leads to the creation of non-imitable competencies (Barney, 1991; Newbert, 2007; Wernerfelt, 1984). Prahalad and Hamel (1990) focused on the "how," noting that "core competencies are the *collective* learning in the organization, especially how to *coordinate* diverse production skills and *integrate* multiple streams of technologies." Stalk, Evans, and Schulman (1992) further emphasized the collaborative nature of a valued competency: "Critical capabilities are *collective* and *cross-functional*—a small part of many people's jobs, not a large part of a few." It is the *collaborative* aspect of competencies that enables them to create unique customer value and makes them hard to replicate. RB theory thus suggests that a collaboration orientation may be the vital ingredient needed to bridge the gaps created by entrenched functional orientations.

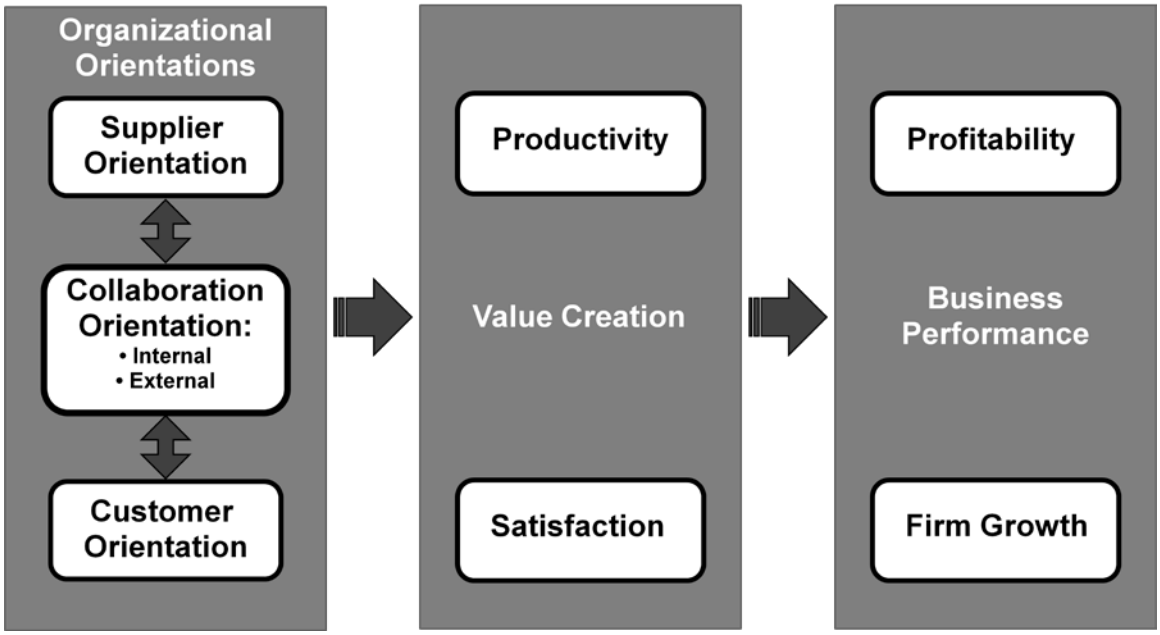
The conceptual model shown in Figure 1 integrates essential elements of CBT and RB theories. The model consists of four basic elements—functional orientations, a collaboration orientation, value creation, and business performance. Specifically, functional orientations are represented by supplier and customer orientations. At most organizations, supply management is the process owner for upstream supplier relationships (Fawcett et al., 2007; Monczka, Handfield, Giunipero, and Patterson, 2008). Similarly, marketing acts as the interface and gatekeeper for downstream customer relationships (Lusch, 2007; Mentzer, Stank, Esper, 2008; Ringold and Weitz, 2007). The conceptual model suggests that capabilities housed in these functions not only create value but also provide the building blocks for collaboration. As a collaboration capability emerges, the counterproductive impact of strong functional orientations are mitigated. That is, Figure 1 highlights three core propositions:

Proposition 1: *Strong functional orientations are needed to build the deep skills necessary to create and deliver high levels of customer value.*

Proposition 2: *A collaborative orientation incorporates deep functional skills to build unique competencies while simultaneously mitigating conflicts among functions that diminish value creation.*

Proposition 3: *Unique value creation capabilities can provide a non-imitable competency that leads to superior business performance.*

Figure 1
A Resource-Based Perspective of Organizational Orientations and Firm Performance



The Role of Functional Orientations

Extensive research (e.g., the market orientation literature) suggests that companies must develop two functional orientations to effectively create customer value (Heikkila, 2002; Hendricks and Signhal, 2005; Jaworski and Kohli, 1993; Kohli and Jaworski, 1990; Ireland and Webb, 2007; Slater and Narver, 1994). First, companies must seek to understand customer desires and expectations—represented in this research by a customer orientation (Hult, Ketchen, and Slater 2005). Second, companies need to establish efficient processes that are capable of creating and delivering the value customers desire—evaluated here via a supplier orientation. Competitive success requires bringing customer and supplier orientations together. The question is, How? To set the stage for exploring the role of collaboration in bringing these two distinct orientations together, it is important to briefly discuss the nature and influence of customer and supplier orientations.

A Customer Orientation. The first step in consistently satisfying the real needs of customers is to understand those needs (Drucker, 2001; Mentzer et al., 2001; Ohmae, 1988; Zokaei and Hines, 2007). Typically, this task falls to the marketing function within a firm. To be effective, marketing must span boundaries. Focusing downstream, marketing is best positioned to understand customer needs when it builds close customer relationships (Fassnacht and Kiose, 2006; Green, McGaughey, and Casey, 2006; Grzeskowiak, Blut, and Kenning, 2007; Javalgi, Martin, and Young, 2006; Yim, Anderson, and Swaminathan, 2004). For example, by seeking customer feedback and establishing dedicated customer account teams, a company can refine its value proposition and justify the development of a flexible and rapid customer response capability (Bowersox et al., 1999; Fawcett et al., 2007). Turning upstream, marketing can use

its intimate customer knowledge to influence internal process design and management (Min et al., 2007). To the extent that the marketing function builds these skills, firm performance should improve. These expectations establish the foundation of this study's first hypothesis.

Hypothesis 1: *A customer orientation is positively related to a firm's value creation capability as measured by customer satisfaction and productivity.*

A Supplier Orientation. The second step in winning the competitive battle is to establish efficient processes, which is the responsibility of a company's operations and supply function. Because externally sourced products and services account for 55% of every revenue dollar, the supply function must effectively bridge boundaries to upstream members of the supply chain (Monczka et al., 2008). At most companies, a desire to drive productivity up and costs down dominates a supplier orientation (Attaran and Attaran, 2004; Daugherty, Richey, Genchev, and Chen, 2005; Ferdows, Lewis, and Machuca, 2004; Hult, Ketchen, and Slater, 2004; Lee, 2004). However, the ability to consistently deliver innovative, high-quality products on time is also part of a supplier orientation (Cook and Garver, 2002; Fawcett et al., 2007). Removing process variability and eliminating waste both within the firm and in the supply base is vital to achieving these goals (Friedman, 2005; Trent and Monczka, 2005). In effect, supply managers not only manage purchase transactions but also the capacity and capabilities of suppliers worldwide. To summarize, although the primary influence of a supplier orientation is expected in the area of productivity, some customer satisfaction benefits are likewise expected. These performance expectations are captured by our second hypothesis.

Hypothesis 2: *A supplier orientation is positively related to a firm's value-creation capability as measured by customer satisfaction and productivity.*

The Role of a Collaboration Orientation

Although both customer and supplier orientations are needed for success, their different focal points create potential conflicts. Specifically, as a profit center, marketing's job is to find a way to maximize revenue by increasing perceived value and customer satisfaction. But if marketers make promises to customers without adequate coordination with their supply management counterparts, these promises may actually have a negative impact on both the productivity and profitability of the firm (Fawcett, Ellram, and Ogden 2006). Similarly, because supply management is a cost center, decision makers focus on price reduction and cost minimization to meet efficiency standards. As a result, decisions made by supply managers may undermine the value proposition being communicated by the marketing function, reducing customer benefits.

A collaboration orientation offers the potential to bridge the gaps created by functional organizations and orientations (Eng, 2005; Eng, 2006; Fawcett et al., 2006; Green, McGaughey, and Casey, 2006; Min et al., 2007). Collaboration mitigates silo thinking by promoting goal alignment, more frequent and open information sharing, higher levels of managerial interaction, the exchange of expertise and resources, and a willingness to share risks and rewards (Min et al., 2007; Stonebraker and Afifi, 2004). Such efforts are needed both within the firm and among members of the extended supply chain; that is, customers and suppliers (Barratt, 2004a; Moberg et al., 2003; Morgan, 1997; Tyndall, Gopal, Partsch, and

Kamauff, 1998). Thus a fully developed collaboration orientation should be multi-dimensional, consisting of both internal and supply chain-oriented facets.

By helping customer- and supplier-oriented sides of the company work together, a collaboration orientation should lead to improved process effectiveness and efficiency (Barratt, 2004b; Moberg et al., 2003). Simultaneous integration with both upstream and downstream supply chain members has also been associated with the largest rates of significant performance improvement (Frohlich and Westbrook, 2001). Potential performance benefits include better quality, lower inventory levels, faster new product development cycles, higher productivity, lower materials and manufacturing costs, and shorter delivery lead times (Ferdows et al., 2004; Frohlich and Westbrook, 2001; Hult et al., 2004; Ireland and Webb, 2007; Lee, 2004). Higher levels of customer satisfaction have also been seen when levels of collaboration are high (Fawcett et al., 2007; Frohlich and Westbrook, 2001). Our third hypothesis thus states,

Hypothesis 3: *A collaboration orientation is positively related to a firm's value creation capability as measured by customer satisfaction and productivity.*

The relationship between functional orientations and a collaboration orientation is likely interactive and iterative (thus, the two-way arrows in Figure 1). Constituency theory (Anderson, 1982) and resource-based theory (Barney, 1991; Ketchen et al., 2007; Newbert, 2007) suggest that the deep capabilities that are built in the presence of strong functional orientations are vital inputs into a collaboration capability. Without strong functional capabilities, a company does not have the necessary building blocks to create value through collaboration (Prahalad and Hamel, 1990; Stalk et al., 1992). In other words, the functional orientations have nothing of real value to bring to the collaboration. Yet, the relationship among these orientations does not end as deep skills are brought together. The interaction that takes place throughout the collaboration process likely influences its participants. As they collaborate, they learn more about the value-added contributions of other functions, build relationships of trust, and begin to view colleagues from other areas as resources rather than simply as competitors (Barratt, 2004a; Fawcett et al., 2007; Moberg et al., 2003). Investing in the open communication, goal alignment, and risk/reward sharing that are components of a collaboration orientation should help foster the development of the right "deep" functional capabilities, mitigating the counterproductive aspects of functional orientations.

Moreover, a collaboration orientation has been shown to mediate the relationship between functional orientations and performance (Min et al., 2007). That is, the collaborative ability to capture and amplify functional capabilities that reside in diverse functions and supply chain members enables the development of inimitable competencies that influence value creation. Our fourth hypothesis addresses this mediating role of a collaboration orientation:

Hypothesis 4: *A collaboration orientation mediates the relationship between functional orientations (customer and supplier) and a firm's value creation capability as measured by customer satisfaction and productivity.*

Value Creation's Influence on Business Performance

A generally accepted principle is that unique competencies that customers value and that competitors cannot copy lead to better market performance and higher profitability (Barney, 1991; Barney, 2001; Newbert, 2007; Prahalad and Hamel, 1990; Wernerfelt, 1984; Wernerfelt, 1995). Therefore, an improved customer satisfaction capability coupled with higher productivity levels should lead to better overall organizational performance. Such performance is often measured via two profit-statement effects: top-line growth and bottom-line profitability. Companies that grow the top line while keeping costs in line so that margins are at or above industry averages tend to perform well over time. Our final hypothesis tests the relationship between our value-creation indicators (customer satisfaction and productivity) and overall organizational performance.

Hypothesis 5: *A firm's value-creation capability as measured by customer satisfaction and productivity is positively related to organizational performance as measured by profitability and market growth.*

The Evolution of a Collaboration Orientation over Time

As noted in the introduction, one of the goals of this research is to assess whether, over time, companies are learning to collaborate and improve their ability to create value across organizational boundaries. Specifically, although Constituency and Resource-based theories are the foundation for the conceptual model, Resource-Advantage (R-A) Theory raises an additional and very important question (Hunt and Davis, 2008). R-A theory extends RB theory by looking at it through the lens of heterogeneous-demand theory. In essence, R-A theory evaluates how the process of competition contributes to organizational learning, emphasizing the importance of innovation and learning in the creation and maintenance of inimitable competencies. From this perspective, R-A theory raises the question, If a collaboration orientation influences competence development, has the competitive process led companies to learn how to collaborate more effectively? By collecting data at two different points in time, our study provides a unique opportunity to examine this question.

Given the recent emphasis on cross-functional as well as supply chain collaboration, we expect to find that collaboration orientation has strengthened in recent years. However, it is not clear how increased collaboration orientation would affect the other relationships in the proposed model, including the relative strength of functional orientations over time. Further, the myriad factors that affect overall firm performance in a dynamic marketplace make it difficult to hypothesize how changing orientations influence performance over time. We therefore approach this aspect of the study from an exploratory perspective.

Research Methods

Survey Data Collection

The cross-functional and inter-organizational nature of a collaboration orientation together with the desire to perform the study at different intervals over time required careful and consistent selection of the survey's key informants. The preliminary interviews and advisory board

discussions suggested that participants be limited to senior-level managers with broad organizational accountability, cross-functional interactions, and access to overall firm-level performance data.

In each time period, the mailing list was compiled with the assistance of three supply chain oriented professional associations: the Council for Supply Chain Management Professionals, the Institute for Supply Management, and APICS. Working with each association, senior-level managers (e.g., *director, vice-president, CEO, etcetera)* were randomly selected from industries actively involved in SCM. The random samples Periods 1 and 2 were designed to mirror each other in terms of geography, industry, and management position. The research team then went through each list to remove contact information for managers who did not meet the selection criteria. This process yielded a list of seasoned managers who were likely to have experience 1) with the challenges of managing across functional silos and 2) as members of cross-functional and supply chain teams.

Table 1
Survey Response Rates

	Period 1			**Period 2**		
Professional Association	Completed Surveys	Response Rate	*Percent of Total P1 Sample*	Completed Surveys	Response Rate	*Percent of Total P2 Sample*
APICS	171	12.1%	*36%*	159	17.9%	*31%*
ISM	138	10.6%	*29%*	156	19.0%	*31%*
CSCMP	166	11.6%	*35%*	190	19.3%	*38%*
Overall	475	11.4%	*100%*	505	16.7%	*100%*

In both time periods, the survey process followed Dillman's Total Design Method; that is, three mailings of a cover letter, an instruction sheet, and the survey. To increase the response rate, pre-notification phone calls were made to invite managers to participate. Managers were also offered a copy of the study findings and the opportunity to be entered into a drawing for one of several iPod Nanos. Overall, 980 usable surveys were returned for a response rate of 14.13%. Table 1 provides detailed response rates broken down by time period and professional organization. Importantly, the relative sample sizes and proportions from each of the three professional associations were consistent across the two time periods suggesting sample equivalence. Further, an independent t-test was performed on the control variable of firm size as measured by number of employees. No significant difference was found, which again indicates sample comparability.

Non-response bias was evaluated in both time periods. Two methods were used. First, a comparison of early versus late responses revealed no problematic response patterns (Armstrong and Overton, 1977). Second, to more clearly verify that the respondents and non-respondents were not uniquely different, the demographic profiles of the two groups were compared. In Period 1, because responses were anonymous, we called managers on the mailing list until we had spoken with 300 non-respondents (100 from each managerial group) to ask why they had not participated and to gather basic demographic data so that respondent and non-respondent profiles could be compared. Interestingly, three primary reasons were given for not participating: 1) managers were too busy to spend time filling out surveys, 2) they received so many surveys that it no longer made sense to participate, and 3) their companies

had instituted policies against survey participation. No significant differences in demographic profile were found. Finally, non-respondent managers were also asked to respond to the first question on the survey, which examined managerial perceptions of the importance of supply chain management strategies. No significant differences were found between respondents and non-respondents.

In Period 2, respondents were tracked so that mailing and survey administration costs could be minimized. Non-respondents could also therefore be identified. Demographic profiles for 100 randomly selected non-respondents were developed using Dun and Bradstreet databases. These profiles were compared to those of the respondents. No significant differences were found.

Finally, since respondents from different associations may have different functional perspectives based on their training and experience, we needed to verify that the survey responses could be pooled for data analysis. Therefore, invariance of the structural weights was tested within a multi-group Structural Equation Model (SEM). That is, a multi-group SEM was constructed to test for variability in the estimated marginal effects associated with each of the three sample groups for each time period. The baseline model allowed effects to vary across groups and periods. Each estimated marginal effect was then constrained to be equal across the three groups and a Chi-Square CMIN difference test was conducted to determine if the fit of each constrained (nested) model differed significantly from that of the unconstrained (reference) model. For example, in one test the direct effect of customer orientation on productivity in the first period was held equal across all three groups. The fit of this constrained model was compared to that of the baseline model in which the unique effect of customer orientation on productivity was estimated in that period for each of the sample groups. The individual tests are conservative since they are not adjusted for multiple comparisons. Results showed no significant difference between the various constrained models and the unconstrained model at $p < .01$. Together, the balanced composition of the overall sample and the results of Chi-Square difference tests provided sufficient justification to pool survey responses from all three groups.

Analysis: Construct Evaluation and Model Fit

To test the hypothesized relationships, survey questions, and subsequently, constructs were developed based on the literature review and feedback from the advisory board. Table 3 reports descriptive statistics for the purified constructs as well as the individual measures that comprise them. The Bonferroni adjusted *p*-values for multiple independent-sample *t*-tests of mean differences across samples reveal that companies are making significant improvements in the areas of *External Collaboration*, *Customer Satisfaction*, *Productivity*, and *Profitability*. No significant change in construct score was found for *Firm Growth*, *Internal Collaboration Orientation*, and *Supplier Orientation*. Interestingly, the *Customer Orientation* score decreased significantly. We comment in detail on changes in construct scores below. Standardized measures were used in the confirmatory factor analysis (CFA) and structural modeling (SEM).

Table 3
Descriptive Statistics: Means and Differences Across Periods

Questions/Measures	P1 [n=475] Mean (SD)	P2 [n=505] Mean (SD)	Sig. Diff.*
Orientations:[1]			
Customer Orientation[2]	**5.36 (1.06)**	**5.09 (1.08)**	**0.00**
My firm is flexible in terms of accommodating customers' special requests	5.49 (1.23)	5.44 (1.19)	1.00
My firm uses dedicated customer account teams to support its best customers	5.36 (1.39)	5.08 (1.58)	0.01
My firm aggressively and frequently solicits customer feedback	5.23 (1.31)	4.71 (1.50)	0.00
Supplier Orientation[1]	**4.38 (1.13)**	**4.42 (1.25)**	**0.57**
My firm aggressively shares resources to help suppliers improve their capabilities	3.69 (1.47)	4.20 (1.39)	0.00
Supplier performance is closely monitored and is the basis for future business	4.62 (1.39)	4.59 (1.46)	1.00
Supplier scorecards are used to communicate expectations for performance levels	4.83 (1.40)	4.47 (1.73)	0.00
External Collaboration Orientation[1]	**4.17 (1.26)**	**4.78 (1.04)**	**0.00**
Frequent, open information sharing among supply chain members	4.59 (1.57)	5.21 (1.22)	0.00
Efforts to establish common goals among supply chain members	4.30 (1.58)	4.84 (1.30)	0.00
Senior level managerial interaction among supply chain members	4.20 (1.65)	4.77 (1.45)	0.00
Sharing of technical expertise with customers and suppliers	4.24 (1.41)	4.79 (1.26)	0.00
A defined and accepted approach to sharing risks and rewards	3.83 (1.58)	4.40 (1.37)	0.00
Use of clear guidelines to manage supply chain relationships	3.85 (1.56)	4.65 (1.37)	0.00
Internal Collaboration Orientation[1]	**4.38 (1.00)**	**4.44 (1.08)**	**0.37**
Information applications are highly integrated w/in the firm & the supply chain	3.45 (1.41)	3.78 (1.49)	0.00
Middle managers are more empowered to make operating decisions than 5 years ago	4.70 (1.41)	4.50 (1.46)	0.14
More process oriented performance measures are tracked today than 5 years ago	5.08 (1.33)	4.99 (1.36)	1.00
Our company culture promotes collaboration across functional areas	4.54 (1.17)	4.40 (1.50)	0.50
Workers are more empowered to make operating decisions than 5 years ago	4.11 (1.40)	4.52 (1.41)	0.00
Mediators: Value Creation and Delivery			
Productivity[3]	**4.10 (1.10)**	**4.31 (1.01)**	**0.02**
Cost of purchased items	4.57 (1.46)	4.58 (1.30)	1.00
Overall product and supply chain costs (productivity)	4.34 (1.20)	4.59 (1.15)	0.01
Overall product quality	4.14 (1.48)	4.32 (1.38)	0.22
New product development capability (e.g., cost, time, uniqueness)	3.61 (1.35)	3.93 (1.45)	0.00
Transportation Costs	3.87 (1.56)	4.13 (1.35)	0.03
Customer Satisfaction[4]	**4.66 (1.24)**	**4.86 (1.07)**	**0.08**
Responsiveness to customer requests or unexpected challenges	4.68 (1.36)	4.86 (1.18)	0.09
On-time delivery/Due-date performance	4.67 (1.45)	4.81 (1.31)	0.31
Overall customer satisfaction	4.64 (1.36)	4.90 (1.16)	0.00
Outcomes: Business Performance			
Firm Growth[3]	**4.87 (1.13)**	**4.91 (1.06)**	**0.52**
Sales growth in the last three years	4.98 (1.31)	5.02 (1.19)	1.00
Market share growth in the last three years	4.85 (1.30)	4.90 (1.19)	1.00
Growth in Return on Assets (ROA) in the last three years	4.77 (1.28)	4.82 (1.21)	1.00
Profitability[3]	**4.50 (1.37)**	**4.65 (1.20)**	**0.02**
Firm profitability	4.50 (1.37)	4.65 (1.20)	0.08

* T-Tests assume equal variance. Bonferroni p-value adjustments applied to raw measures within constructs. P-values for summated construct are unadjusted.
[1] Mean (SD) for composite measures calculated for summated constructs.
[2] Indicate the extent to which you agree with each of the following statements as they relate to your firm's supply chain: (1=Strongly Disagree; 7=Strongly Agree).
[3] To what extent has SC integration improved your firm's performance in the following areas? (1= Not a Facilitator; 7=Effective Facilitator)
[4] Indicate your firm's position relative to leading competitors in your primary industry along the following dimensions: (1=Much Less; 7=Much Greater)

Construct Evaluation

Construct acceptability was evaluated using reliability/validity tests proposed by Fornell and Larcker (1981). Table 4 reports the key statistics. First, the Composite Reliability Rho was calculated to assess construct reliability. Thirteen of the 14 reliability scores exceeded the recommended threshold of .70. The one exception was *Customer Orientation* in Period 2 (.62).

Table 4
Factor Loadings and Measurement Properties of Predictive Latent Constructs and Summated Indices

Construct / Item	CFA Std. Loadings		Average Variance Extracted		Reliability ρ		Average Variance Shared γ^2	
	P1	P2	P1	P2	P1	P2	P1	P2
Market Orientation								
Customer Orientation			**0.50**	**0.36**	**0.75**	**0.62**	**0.11**	**0.24**
My firm is flexible in terms of accommodating customers' special requests	0.75	0.52						
My firm uses dedicated customer account teams to support its best customers	0.63	0.58						
My firm aggressively and frequently solicits customer feedback	0.73	0.68						
Supplier Orientation			**0.50**	**0.53**	**0.75**	**0.77**	**0.25**	**0.29**
My firm aggressively shares resources to help suppliers improve their capabilities	0.52	0.61						
Supplier performance is closely monitored and is the basis for future business	0.78	0.85						
Supplier scorecards are used to communicate expectations for performance levels	0.79	0.71						
External Collaboration Orientation			**0.59**	**0.54**	**0.90**	**0.88**	**0.25**	**0.16**
Frequent, open information sharing among supply chain members	0.75	0.72						
Efforts to establish common goals among supply chain members	0.82	0.78						
Senior level managerial interaction among supply chain members	0.71	0.66						
Sharing of technical expertise with customers and suppliers	0.72	0.67						
A defined and accepted approach to sharing risks and rewards	0.79	0.77						
Use of clear guidelines to manage supply chain relationships	0.81	0.81						
Internal Collaboration Orientation			**0.45**	**0.46**	**0.80**	**0.81**	**0.26**	**0.28**
Information applications are highly integrated w/in the firm & the supply chain	0.54	0.57						
Middle managers are more empowered to make operating decisions than 5 years ago	0.68	0.75						
More process oriented performance measures are tracked today than 5 years ago	0.67	0.68						
Our company culture promotes collaboration across functional areas	0.76	0.65						
Workers are more empowered to make operating decisions than 5 years ago	0.70	0.75						
Operational Performance								
Productivity			**0.54**	**0.48**	**0.85**	**0.82**	**0.30**	**0.31**
Cost of purchased items	0.65	0.71						
Overall product and supply chain costs (productivity)	0.89	0.83						
Overall product quality	0.76	0.67						
New product development capability (e.g., cost, time, uniqueness)	0.74	0.69						
Transportation Costs	0.61	0.55						
Customer Satisfaction			**0.69**	**0.66**	**0.87**	**0.85**	**0.31**	**0.32**
Responsiveness to customer requests or unexpected challenges	0.83	0.76						
On-time delivery/Due-date performance	0.81	0.81						
Overall customer satisfaction	0.85	0.86						
Business Performance								
Growth			**0.68**	**0.71**	**0.86**	**0.88**	**0.03**	**0.08**
Sales growth in the last three years	0.92	0.92						
Market share growth in the last three years	0.93	0.93						
Growth in Return on Assets (ROA) in the last three years	0.59	0.64						
Profitability (Single item construct omitted from CFA)								

χ^2 (d.f.) = 1789.294 (658); N =1182; CFI = .92; IFI = .92
N Period 1 (P1) = 475, N Period 2 (P2) = 505
NCP (90% CI) = 113.294 (1009.358 – 1260.855)
RSMEA (90% CI) = .042 (.040 - .044)
All loadings significant at p < .001
Reduced Balanced Dataset

Table 5
Coefficients for Nomological Relationships
Market Orientations, Mediating Effects and Business Performance

Variables	Period 1		Period 2		χ2 Difference P1 vs. P2	R^2	
	Estimate	Significance	Estimate	Significance		P1	P2
Unmediated Model:							
Customer Orientation ⇨ Productivity	0.00	ns	0.10	p ≤ .05	p = .10	***0.27***	***0.28***
Supplier Orientation ⇨ Productivity	0.51	p ≤ .01	0.38	p ≤ .01	p ≤ .05		
Customer Orientation ⇨ Satisfaction	0.18	p ≤ .01	0.14	p ≤ .01	ns	***0.54***	***0.48***
Supplier Orientation ⇨ Satisfaction	0.11	p ≤ .05	0.14	p ≤ .01	ns		
Productivity ⇨ Satisfaction	0.71	p ≤ .01	0.56	p ≤ .01	p ≤ .01		
Productivity ⇨ Profitability	0.72	p ≤ .01	0.76	p ≤ .01	ns	***0.51***	***0.52***
Satisfaction ⇨ Profitability	0.19	p ≤ .01	0.13	p ≤ .01	ns		
Productivity ⇨ Growth	0.05	ns	0.22	p ≤ .01	p = .05	***0.04***	***0.10***
Satisfaction ⇨ Growth	0.15	p ≤ .01	0.14	p ≤ .01	Ns		
Mediated Model (Structural Level):							
Customer Orientation ⇨ Productivity	-0.14	p ≤ .01	-0.10	ns	ns	***0.49***	***0.44***
Supplier Orientation ⇨ Productivity	0.09	ns	0.07	ns	ns		
Collaboration Orientation ⇨ Productivity	0.82	p ≤ .01	1.15	p ≤ .01	ns		
Customer Orientation ⇨ Satisfaction	0.06	ns	-0.06	ns	p = .10	***0.62***	***0.62***
Supplier Orientation ⇨ Satisfaction	-0.10	ns	-0.11	ns	ns		
Collaboration Orientation ⇨ Satisfaction	0.64	p ≤ .01	1.30	p ≤ .01	p ≤ .05		
Productivity ⇨ Satisfaction	0.47	p ≤ .01	0.31	p ≤ .01	ns		
Productivity ⇨ Profitability	0.72	p ≤ .01	0.76	p ≤ .01	ns	***0.51***	***0.52***
Satisfaction ⇨ Profitability	0.19	p ≤ .01	0.13	p ≤ .01	ns		
Productivity ⇨ Growth	0.05	ns	0.22	p ≤ .01	p = .05	***0.04***	***0.10***
Satisfaction ⇨ Growth	0.15	p ≤ .01	0.14	p ≤ .01	ns		
Mediated Model (Measurement Level):							
Collaboration Orientation ⇨ External Collaboration	1.00 (Fixed)		1.00 (Fixed)			***0.52***	
Collaboration Orientation ⇨ Internal Collaboration	.78	p ≤ .01	1.35	p ≤ .01	p ≤ .01		

Unmediated Model:
χ2 (d.f.) = 59.419 (10)
N Period 1 = 475, N Period 2 = 505
CFI = .975, IFI = .975;
NCP (90% CI) = 49.419 (28.797 – 77.545)
RMSEA (90% CI) = .071 (.054 - .089)

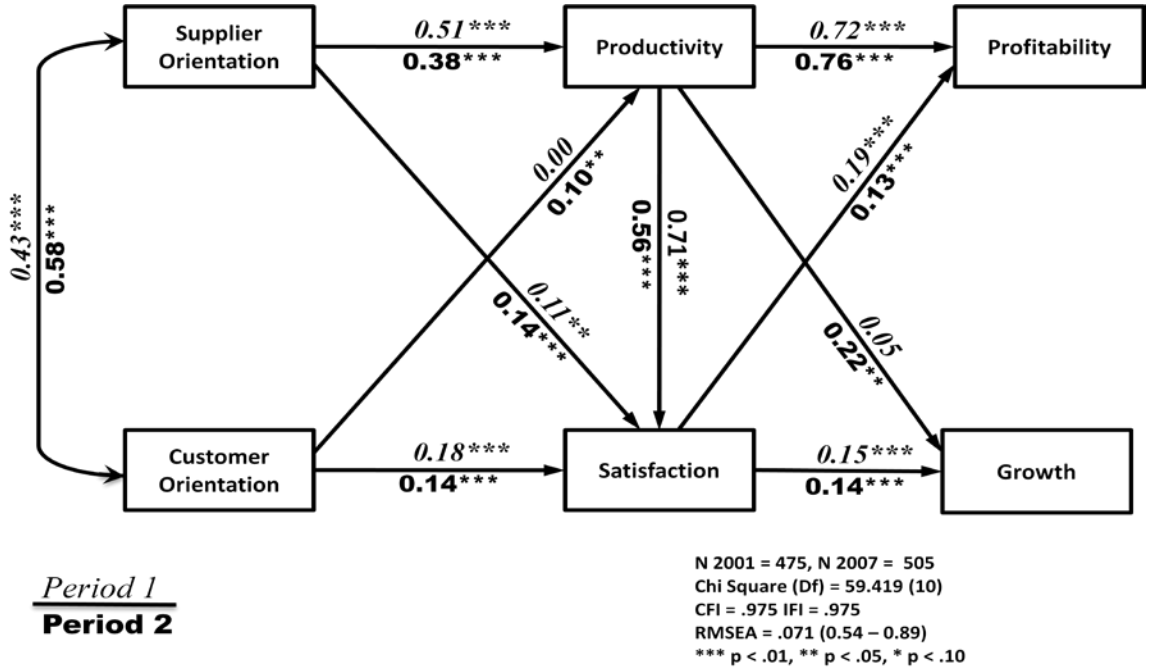
Mediated Model:
χ2 (d.f.) = 84.467 (24)
N Period 1 = 475, N Period 2 = 505
CFI = .979, IFI = .979;
NCP (90% CI) = 60.467 (36.170 – 92.355)
RMSEA (90% CI) = .051 (.039 - .063)

Of note, scores above .60 are considered acceptable for exploratory research (Nunnally 1978; Churchill 1979). Given *Customer Orientation's Rho* score of .75 in Period 1, the lower Period 2 reliability does not appear to be sufficiently low to affect interpretation of the results.

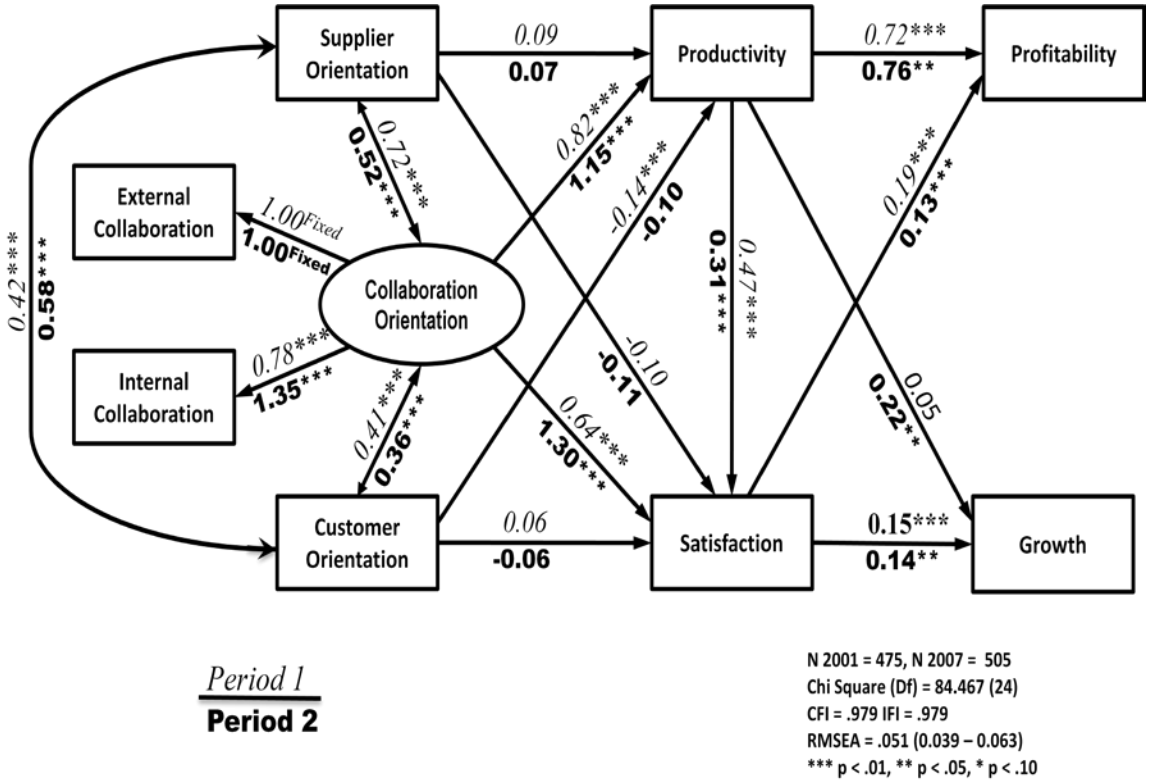
Second, Confirmatory Factor Analysis (CFA) was used to evaluate construct validity. The standardized loadings were all significant and relatively large, exceeding the .50 threshold. Likewise, the average variance extracted exceeds .50 for 10 of the 14 constructs. The exceptions were *Customer Orientation* in Period 2 (.36), *Internal Collaboration Orientation* in both time periods (P1=.45; P2=.46), and Productivity in Period 2 (.48). However, the average shared variance scores were all relatively small and did not exceed average variance extracted for any of the modeled constructs. Moreover, the overall CFA model statistics (CFI = .92, IFI =

Figure 2
Estimated Model of Organizational Orientations, Value Creation, and Firm Performance

Panel A: Unmediated Model



Panel B: Mediated Model



.92 and RSMEA = .04) suggest that the construct structure fits the data well. To summarize, the constructs are theoretically unique and possess good reliability as well as adequate convergent and discriminant validity. We can be reasonably confident that the measured items reflect the theoretical constructs they are designed to measure. Further, the use of rigorous tests to establish convergent and discriminant validity that show the factors to be distinct and unique allows us to conclude that common methods bias does not unduly affect the interpretability of the findings (Podsakoff, MacKenzie, Lee, and Podaskoff, 2003).

Model Fit and Estimates

To test the hypothesized relationships across the two time periods, a set of multi-group Structural Equation Models (SEM) was used. Results of the analysis are reported in Table 5 and shown graphically in Figure 2. The proposed unmediated model fits the data well (CFI = .98, IFI = .98, RMSEA = .07). To test the mediation effect of collaboration on value creation, the latent collaboration construct was included in the estimation (see Panel B in Figure 2). The proposed mediated model also fits the data well (CFI = .98, IFI = .98, RMSEA = .05). Chi Square differences between the mediated and unmediated models were highly significant (CMIN = 863.382, 12 d.f., $p < .001$), validating the importance of specifying a latent collaboration orientation within the model. A comparison of the models for both periods clearly shows *Supplier Orientation* and *Customer Orientation* effects on Productivity and Satisfaction to be mediated through the *Collaboration Orientation*. Finally, differences in each of the hypothesized relationships within the model (as measured by the β coefficient) were evaluated across periods evaluated using a Chi-Square difference tests. P-values from the tests are reported in Table 5. Four of the reported effects differ significantly from Period 1 to Period 2. All other effects are consistent across periods.

Discussion of Hypotheses

Customer Orientation's Influence

Hypothesis 1 examined the relationship between a firm's customer orientation and its value-creation capability as measured by satisfaction and productivity. The unmediated models in both periods show that *Customer Orientation* is positively and significantly related to *Satisfaction* (see Panel A in Figure 2). The strength of the relationship is remarkably stable across the two periods (β= .18 in Period 1 $p < .01$ versus β= .14 in Period 2 $p< .01$). This is particularly noteworthy given the significant decrease in *Customer Orientation* over time (5.36 to 5.09; p = 0.00). Apparently, a threshold for *Customer Orientation* exists. As long as companies surpass this threshold, they achieve relatively high levels of customer satisfaction as measured by their internal systems. In fact, the mean *Satisfaction* score increased significantly from Period 1 to Period 2 (4.66 to 4.86; p = .08). We should note that the construct for *Customer Orientation* obtained the highest means of all the constructs evaluated in both time periods.

Customer Orientation's influence on *Productivity* is more subtle and less consistent over time. In Period 1, no significant relationship existed (β= .00; p = ns). However, the relationship strengthened somewhat over time such that by Period 2, *Customer Orientation* exerted a positive and significant influence on *Productivity* (β= .10, $p < .05$). It is interesting to observe that the strengthened relationship emerges as the *Customer Orientation* score

weakens. Indeed, the *Productivity* score actually increases in the presence of a slightly lower *Customer Orientation* (4.10 to 4.31; $p < .05$). This finding appears to confirm the belief that too much customer focus can create chaos and diminished productivity in the supply side of an organization.

Supplier Orientation's Influence

Hypothesis 2 assessed the relationship between a firm's supplier orientation and its value creation capability as measured by satisfaction and productivity. Not surprisingly, as shown in Panel A of Figure 2, *Supplier Orientation* has a strong, positive influence on *Productivity* in both time periods ($\beta = .51$, $p < .01$; $\beta = .38$, $p < .01$). The surprise is that the strength of the relationship appears to be diminishing. However, because the change in β-coefficient is not significant, data needs to be collected at a future point to verify the existence of a meaningful trend. *Supplier Orientation's* influence on *Satisfaction* is slightly different: the relationship is significant in both time periods, but the magnitude of the β-coefficient has increased slightly ($\beta = .11$, $p < .05$; $\beta = .14$, $p < .01$). This possible trend also merits future assessment.

Collaboration Orientation's Influence

Hypothesis 3 evaluated the relationship between a firm's collaboration orientation and its value creation capability as measured by customer satisfaction and productivity. The *Collaboration Orientation* construct was operationalized as a latent construct comprising two observable indicators: *External Collaboration* and *Internal Collaboration*. Of note, the *Internal Collaboration* score remained consistent across the two time periods (mean = 4.38, rank = 5 in Period 1 compared with mean = 4.42, rank = 6 in Period 2). By contrast, the *External Collaboration* score increased dramatically and significantly over time. The increase of .61 from 4.17 to 4.84 ($p = 0.00$) was the largest change among the eight measured constructs (rank = 6 in Period 1; rank = 4 in Period 2). The responses clearly suggest that establishing the mechanisms to share information, mitigate conflicts, and collaborate across organizational boundaries is difficult; many companies find it easier to build collaborative mechanisms with supply chain partners than it is to build them between functions within their own organizations.

Focusing on the hypothesized relationships, Panel B in Figure 2 shows that *Collaboration Orientation* is positively and significantly related to both *Satisfaction* and *Productivity*. *Collaboration Orientation's* influence on *Productivity* ($\beta = .82$, $p < .01$) in Period 1 is somewhat stronger than on *Satisfaction* ($\beta = .64$, $p < .01$). Over time, both of these relationships strengthen: *Productivity* ($\beta = 1.15$) and *Satisfaction* ($\beta = 1.30$). These are the largest β-coefficients in the structural models, suggesting that a *Collaboration Orientation* is increasingly important to a company's value-creation capability and that managers must embrace the challenge of removing barriers to more effective collaboration identified above.

Collaboration's Mediating Role

Hypothesis 4 suggested that a collaboration orientation mediates the relationship between functional orientations and value creation. This mediation effect was analyzed by comparing the differences in the relationships between the functional orientations and value

creation, with and without the collaboration orientation included in the model (compare Panels A and B in Figure 2). In Panel A, the *Collaboration Orientation* paths are constrained to zero. In Panel B, the *Collaboration Orientation* construct is allowed to enter the analysis. The constrained and unconstrained models are significantly different, indicating a need to evaluate the mediating role of collaboration (CMIN = 863.382, 12 d.f., $p < .001$).

The results displayed in Figure 2 confirm the importance of a strong collaboration capability. In Period 1, significant relationships exist between both *Customer Orientation* and *Supplier Orientation* and *Collaboration Orientation* ($\beta = .41$, $p < .01$; $\beta = .72$, $p < .01$ respectively). *Collaboration Orientation* in turn fully mediates *Customer Orientation's* relationship with both *Satisfaction* and *Productivity*. The β-coefficient for the *Satisfaction* relationship falls to .06 while the β-coefficient for *Productivity* actually becomes negative, suggesting a counterproductive influence on internal and upstream productive processes. *Collaboration Orientation* plays a similar mediation role with *Supplier Orientation*. The β-coefficient for the *Productivity* relationship falls to 0.09 while the β-coefficient for *Satisfaction* becomes negative. In Period 2, these basic relationships remain consistent. The analyses suggest that investing in a multi-faceted collaboration capability is critical to harnessing and meshing together the deep skills engendered through *Customer* and *Supplier Orientations* in the quest to create superior levels of unique value. One final analytical note: comparing the Period 1 and 2 models reveals that *Collaboration Orientation* is increasingly influenced by internal collaboration initiatives rather than external mechanisms (see Table 5). Given *Internal Collaboration's* low scores across both time periods, more managerial effort needs to focus on mitigating functional conflicts in order to promote higher levels of cross-functional collaboration.

Value Creation and Business Performance

Our final hypothesis, Hypothesis 5, explored the relationship between the operational performance constructs *Satisfaction* and *Productivity* and firm performance as measured by *Profitability* and *Growth*. *Satisfaction* exerts a consistent positive influence across both *Profitability* (Period 1: $\beta = .19$, $p < .01$; Period 2: $\beta = .13$, $p < .05$) and *Growth* (Period 1: $\beta = .15$, $p < .01$; Period 2: $\beta = .14$, $p < .05$). *Productivity's* influence on firm performance manifests itself primarily through a strong, positive, and highly significant relationship with *Profitability*. This relationship is consistent across both time periods (Period 1: $\beta = .72$, $p < .01$; Period 2: $\beta = .76$, $p < .01$). However, although *Productivity* is not statistically related to *Growth* in Period 1, by Period 2 *Productivity* had begun to drive *Growth* at a moderate level (Period 1: $\beta = .05$, $p <$ ns; Period 2: $\beta = .22$, $p < .01$). This change in relationship may be the result of a shift in marketplace values. Finally, to validate our implied assumption that the functional and collaboration orientations' effect on firm performance is fully mediated by productivity and satisfaction, we tested the model with direct effect paths between the orientations and firm performance constructs. The direct paths were all insignificant.

To summarize, strong functional and collaboration orientations are important to firm performance. Of note, many of the relationship results did not change remarkably over time, suggesting that 1) the samples were comparable and 2) the model itself is a good reflection of the constructs and relationships. The cross-sectional study across time periods revealed that companies are building their collaboration capabilities and achieving greater

balance across customer and supplier orientations. This finding suggests that although strong functional orientations are important, it is possible for them to be too strong. When this occurs, decision-making myopia may lead to counterproductive outcomes. Evidence for this idea emerged from the fact that even though the mean score for *Customer Orientation* decreased significantly over time, its impact on *Productivity* actually increased.

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