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Creating cross-functional strategic consensus in manufacturing facilities

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Abstract

Purpose – The purpose of this paper is to propose and tests a model that plant managers can use to develop cross-functional strategic consensus between purchasing, production, and logistics. The mechanisms studied are grounded in Organizational Information Processing Theory.

Design/methodology/approach – The model is tested using a cross-sectional survey of 120 manufacturing facilities. Path Analysis is used to determine the strength of the relationships and the model fit.

Findings – The mechanisms studied have a positive effect on the level of cross-functional strategic consensus. Some mechanisms have an effect on consensus on goals, while others have an effect on consensus on priorities. The results suggest that a plant manager must implement these mechanisms in combination to achieve the best result.

Research limitations/implications – The survey respondents are all from US manufacturing facilities. Although reasonably representative of the US population of manufacturing firms, results of a similar study in other countries would further refine the knowledge concerning the effects of the mechanisms on developing strategic consensus at the operating level.

Practical implications – The results of this paper provide plant managers with guidance regarding the mechanisms that can enhance cross-functional strategic consensus. In a hypercompetitive and dynamic environment, these mechanisms can help the Plant Manager create a streamlined and efficient operation.

Originality/value – This paper presents practitioners with mechanisms that can promote consensus between key supply chain departments. The results highlight the need to implement combinations of mechanisms in order to address both dimensions of strategic consensus. For academics, it provides an empirical test of antecedents to strategic consensus at the operational level.

Keywords Survey research, Manufacturing management, Internal supply chain management processes, Organizational information processing theory, Strategic consensus

Paper type Research paper

Introduction

Manufacturing firms in every industry are increasingly faced with intense global competition. Over four decades ago, Skinner (1969, p. 136) noted that the manufacturing function can be either "a competitive weapon or a millstone" because certain properties of the manufacturing function could be exploited for competitive advantage. This advantage could be attained by linking the functional strategies (specifically marketing and manufacturing) with the corporate strategy. Subsequent scholars have refined the manufacturing strategy construct. Hill (1987) viewed manufacturing strategy as a coordinated approach to achieve consistency between functional capabilities and policies for success in the marketplace. Blackstone (2010)

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defined it as a "collective pattern of decisions" regarding the deployment of manufacturing resources. Dangayach and Deshmukh (2001) provide an extensive literature review of research regarding manufacturing strategy.

This study follows the perspective of Swink and Way (1995), who defined manufacturing strategy as decisions and plans affecting resources and policies directly related to sourcing, production, and delivery of tangible products. Manufacturing firms consist of multiple functional departments, each responsible for specific dimensions of customer service. Purchasing strives to reduce the costs of obtaining raw materials and components while delivering the necessary quality. Logistics strives to reduce the costs of transporting product to customers while ensuring timely deliveries. In the middle, production strives to reduce processing costs while maintaining both high product quality and delivery reliability (Villa, 2002). In the traditional corporate structure of functional silos, there is little coordination between purchasing, production, and logistics, and yet these departments together comprise three core supply chain processes of a firm (Fawcett and Magnan, 2002; Pagell, 2004). Ironically, managers report that it is easier for purchasing to integrate with suppliers and logistics to integrate with customers than it is for either group to integrate within the firm (Pagell and Wu, 2006; Pagell, 2004; Sabath and Whipple, 2004).

The hypercompetitive global economy demands that plant managers run efficient and effective operations. One of their primary tasks is to ensure that the corporate strategy is implemented in a coordinated fashion by each of the departments within their purview. A lack of shared understanding about the strategic priorities can create barriers to the implementation of the corporate strategy. On the other hand, cross-functional strategic consensus facilitates collaboration and integration between departments in implementing the corporate strategy (Rapert *et al.*, 2002). In turn, higher levels of cross-functional integration are associated with achieving superior performance outcomes (Turkulainen and Ketokivi, 2012; Van der Vart *et al.*, 2012).

Although the effects of integration on performance have been studied, there is a dearth of research into the antecedents of what Turkulainen and Ketokivi (2012) call "achieved integration": the state where the various member functions of the organization work as a unified whole in the pursuit of organizational rather than functional goals. Achieved integration thus implies the presence of cross-functional strategic consensus (Swink and Way, 1995). Much of the extant research in cross-functional integration has tested relationships between various integrative practices and organizational performance, neglecting to pause and examine whether integration has indeed been achieved through these mechanisms. The use of an integrative mechanism such as cross-functional teams does not automatically indicate that integration has been achieved, which is why Turkulainen and Ketokivi (2012) call for empirical study into the factors that drive successful "achieved integration."

This study seeks to address that research gap by explicitly examining the role of several integrative mechanisms in fostering cross-functional strategic consensus between three key internal supply chain management functions: purchasing, production, and logistics. In line with recent research developments (González-Benito *et al.*, 2012), strategic consensus is subdivided into two dimensions, goals and strategies, and the combinations of mechanisms that foster each dimension are explored. Pagell (2004) previously developed a model of the factors that affect the level of achieved integration between purchasing, production, and logistics. Although that research protocol was informed by a thorough review of relevant literatures, the study is descriptive and does not reflect any particular theoretical lens. Handfield and Melnyk

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(1998) describe a theory-building process map in an operations management context, beginning with discovery of a phenomenon and proceeding through description, mapping, relationship building, hypotheses testing, and finally theory extension or refinement. Pagell's (2004) model provides description and mapping of proposed factors. The current research model uses the lens of organizational information processing theory (OIPT) to build upon Pagell's model, proposing and testing relationships between the constructs. This study has two objectives. The first is to advance the development of theoretical models by systematically exploring antecedents to strategic consensus. The second is to provide evidence-driven guidance to practitioners, particularly to manufacturing facility plant managers, in how to create the conditions that facilitate "achieved integration."

Research model development

Cross-functional strategic consensus

There is a substantial body of research regarding the subject of strategic consensus (González-Benito *et al.*, 2012; Kellermanns *et al.*, 2005; Ketokivi and Castañer, 2004; Markóczy, 2001) and its impact on organizational performance (González-Benito *et al.*, 2012; Homburg *et al.*, 1999; Knight *et al.*, 1999; West and Schwenk, 1996). The theoretical premise underlying these studies is that strategic consensus should be associated with improved performance by improving coordination within the organization. However, the empirical results have been mixed.

Kellermanns *et al.* (2005) provide an overview of the evolution of the definition of strategic consensus in the past three decades and suggest that a combination of factors contribute to the lack of consensus on strategic consensus, including inconsistencies in the definitions used in research studies, heterogeneity of measurement dimensions and instruments, conceptual issues in the choice of antecedents, and the inconsistent use of moderators. They call for further research that offers both theoretical and methodological refinement to address these inconsistencies.

Within the strategic management field, strategic consensus is traditionally defined as agreement among the top management team regarding the firm's strategic priorities. This definition is well suited to a hierarchical organizational model where decision-making power is concentrated among a small group of executives. Changes in prevailing organizational structures, however, challenge the value of this definition in explaining organizational performance. Today's organizations are much flatter, and strategy making is no longer the strict domain of the top management team. Middle- and operating-managers are seen to play a larger role in formulating the strategy of the firm (Burgelman, 1991). Prior research on strategic consensus had focussed on agreement among the top managers with regard to the goals and means of the organization. However, as the locus of decision-making shifted lower into the hierarchy, the focus has shifted to agreement on strategic priorities among lower-level managers (Mahto and Davis, 2012; Kellermanns *et al.*, 2005; Ketokivi and Castañer, 2004). González-Benito *et al.* (2012) propose that these two conceptualizations (goals vs strategies) capture different aspects of consensus and should be evaluated separately. Furthermore, they propose that the relationship between strategic consensus and performance is not straightforward: the relationship between consensus on competitive methods (strategies) and performance is both moderated by environmental dynamism and mediated by consensus on goals.

Driving this study of strategic consensus is the aforementioned assumption that agreement on organizational goals and/or priorities should improve the firm's

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performance. In practice, managers tend to exhibit positional bias, a tendency to prioritize the needs of their particular subunit over the needs of the overall entity (Dearborn and Simon, 1958; Lawrence and Lorsch, 1967; Nauta and Sanders, 2001). Dearborn and Simon (1958) reported that positional bias can persist even when managers are explicitly encouraged to examine issues from a company-wide perspective. Positional bias can result in the organization failing to reach its goals, particularly when departmental interdependence is high (Lawrence and Lorsch, 1967). However, this bias can be mitigated by implementing integrative mechanisms (Pinto *et al.*, 1993; Porter, 1985; Lawrence and Lorsch, 1967). In a study of manufacturing firms, Ketokivi and Castañer (2004) suggest that mitigating positional bias in middle-managers can lead to improved financial outcomes by improving the overall strategic consensus and thus the probability that managers will make decisions in favor of the "greater good" of the firm. Kohli and Jensen (2010) report that goal congruence leads to collaboration and in turn to higher levels of operational effectiveness.

This research study adopts the definition formulated by Kellermanns *et al.* (2005): strategic consensus is the shared understanding of strategic priorities among managers at the top, middle, and/or operating levels of the organization. In particular, it focusses on shared understanding of strategic priorities between the purchasing, production/operations, and outbound logistics managers in individual manufacturing facilities. Following the suggestion of González-Benito *et al.* (2012) two different outcome variables were measured, *Cross-Functional Strategic Consensus on Goals* and *Cross-Functional Strategic Consensus on Strategies*. The measures used for these two constructs were adapted from the interview protocols developed by Pagell (2004) and are listed in the Appendix.

Theoretical lens: OIPT

Information processing in organizations includes the gathering of data, the transformation of data into information, and the communication and storage of information in the organization (Egelhoff, 1991). The information processing perspective defines organizations as open systems that must respond to the environment in which they operate and considers managing uncertainty as the key task of the firm (Thompson, 1967, pp. 10, 13). Galbraith (1974) extended Thompson's conceptual argument and developed the operational framework known as OIPT. According to Galbraith (1974), organizations manage uncertainty by deploying the information-processing mechanism(s) which best address the amount and type of uncertainty faced by the firm. Conceptually, OIPT posits that the performance of a firm is a function of the fit between the information processing requirements created by the environment and the information processing capabilities created by the organizational design.

Galbraith (1974) identifies three progressive methods of coordination, by order of their ability to handle uncertainty: rules and procedures, hierarchical referral, and targets or goals. Rules and procedures are sufficient when tasks are routine and divergence is low. When exceptions to the rules occur, they are resolved by referring the exception to the next hierarchical level, such as by forwarding the exception to a supervisor. As uncertainty increases, the hierarchy becomes overwhelmed with exceptions, and firms are faced with two options: reduce the level of information processing requirements by creating slack resources and/or self-contained tasks; or, increase the information processing capacity by investing in vertical information systems and/or creating lateral relations. The four strategies listed are not mutually exclusive and the organization must choose which strategy or combination of strategies to pursue.

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Uncertainty and change are certainly salient in the current business environment. The competitive environment is undergoing major change, becoming more international, dynamic, and customer driven (Modi and Mabert, 2007; Fliedner and Vokurka, 1997). Today's customers demand more variety, better quality, faster delivery, and improved reliability. In the past, manufacturing firms might have managed uncertainty by implementing strategies to reduce the need for information processing, for example, by creating inventory buffers (i.e. slack resources) or by segmenting their organizations into separate product-oriented divisions and facilities (i.e. creating self-contained tasks). However, customer demand for more variety and faster speed makes these strategies cost-prohibitive. Instead, firms have begun to place more emphasis on increasing the capacity to process information, by investing in vertical information systems and creating lateral relations within the firm.

Investment in vertical information systems. Supply chain management is concerned with two major flows: the flow of materials and the flow of information. As the levels of uncertainty have increased, managers have identified information substitution, or replacing physical assets with information, as a major trend (Mentzer, 2004). Increasing an organization's ability to access, process, and use information facilitates and enhances decision making, improves responsiveness to customer needs, and reduces costs of inventory (Dröge and Germain, 2000). Better information exchange allows for more accurate inventory responses to changes in demand and thus more appropriate inventory levels throughout the supply chain (Levary, 2000).

Vertical information systems are designed to move information throughout the hierarchy of the organization by creating a formal data structure for the entire organization. This formalized "data language" allows decision makers to access relevant information as it is needed, and ensures that all decision makers are using the same data, thus tending to improve the quality of the decisions. More importantly, the ability to share information across functional barriers promotes organizational learning by facilitating the acquisition, dissemination, and shared interpretation of information across business functions (Sinkula, 1994). Grover and Saeed (2007) describe electronic integration as sharing databases, applications, and files across trading entities. Electronic integration is associated with supply chain integration (Saeed *et al.*, 2011; Wong *et al.*, 2012).

Vickery *et al.* (2003) conclude that modern supply chain management would not be possible without enterprise information systems. These systems have evolved from production planning and control applications into enterprise-wide information solutions that involve very significant commitments of resources for implementation.

The decision of whether or not to implement these systems is often beyond the scope of the functional managers' authority. However, the functional managers and their staff are the active users of these systems and thus directly benefit (or not) from their implementation. Prior research has established that these systems have a significant effect on the level of collaboration (Themistocleus *et al.,* 2000; Vickery *et al.*, 2003), and that this effect is moderated by the level of uncertainty in demand (RosadoFeger, 2011). The items used to measure this construct were adapted from Themistocleus *et al.* (2000) and Vickery *et al.* (2003). This study is concerned with the impact that the implementation of coordinated enterprise information systems has on the level of cross-functional strategic consensus, leading to the hypotheses:

H1a. The use of enterprise information systems has a positive effect on cross-functional strategic consensus on goals.

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H1b. The use of enterprise information systems has a positive effect on cross-functional strategic consensus on strategies.

Creation of lateral relations. This strategy seeks to create links across lines of authority in order to push decision making down to the level where the information exists, but without creating new self-contained groups (Galbraith, 1974). Lateral relations handle exceptions to the rules and procedures and thus avoid overloading the hierarchy.

While the technical elements of the operating system can be easily replicated, the human capital can be a source of competitive advantage (Collins and Clark, 2003). As firms become leaner, world-class performance will be a function of how well a company can manage its human resources (Murphy and Heberling, 1996). One of the challenges facing the firm is to implement mechanisms that promote and support the acquisition and continuing usage of the capabilities that allow individuals to fully contribute to the supply chain management process. In a study of top management teams, Collins and Clark (2003) determined that network-building human resource practices and incentive pay based on company performance were associated with improved organizational performance, mediated by the size and strength of the top managers' networks. They suggested that further research should be conducted to identify sets of human resource management practices that can be used to develop employee-based resources such as the top management teams' networks. At the tactical level of the manufacturing facility, the human resources management literature suggests that cross-functional teams, integrative employee assessment and channels of communication are mechanisms that can be used to create networks of lateral relations (Pagell, 2004; Bishop *et al.*, 2000; Lawrence and Lorsch, 1967; Vroom, 1964).

Cross-functional teams. Using employee teams is a popular method of increasing worker productivity and flexibility (Bishop *et al.*, 2000) as well as coordinating activities between separate groups (Gittel, 2002). Firms that have a strong customer orientation use cross-functional teams to solve problems in a way that more closely addresses a customer's experience of the firm. One particular area that has received much attention is the use of cross-functional teams in sourcing and purchasing. Cross-functional teams have been used to speed up product development, to improve the effectiveness of the purchasing function, and to address quality issues (Chopra and Meindl, 2003).

Fawcett and Cooper (2001) relate that managers at leading companies recognize that the key to competitive success is to meet the needs of the customer better than the competition. Cross-functional teams consist of members from assorted functional organizations who come together to address challenges that cut across functional boundaries and provide a more comprehensive approach to problem solving and decision making. Cross-functional teams are an integrative mechanism that bridges the differentiation divide (Lawrence and Lorsch, 1967). Employees involved in cross-functional teams tend to create a network of contacts that can be drawn upon as needed, thus forming lateral relations as proposed by OIPT. Atwater and Bass (1994, pp. 56-57) state that "groups are superior when [...] the groups contain members with diverse but relevant skills." The measures used for this construct were adapted from Pagell (2004). Cross-functional teams seek to leverage the knowledge of their various members in order to improve outcomes, leading to the hypotheses:

H2a. The use of cross-functional teams has a positive effect on cross-functional strategic consensus on goals.

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H2b. The use of cross-functional teams has a positive effect on cross-functional strategic consensus on strategies.

Integrative employee assessment. Individual performance appraisal is integral to the human resource management systems of most corporations. Performance appraisals are used to determine reward levels, to validate tests, to aid career development, to improve communications, and to facilitate understanding of job duties (Bowen and Lawler, 1992). The way employees are measured and rewarded has long been linked to behavior (Pagell, 2004; Vroom, 1964).

In the functionally oriented organization, individuals are measured and rewarded based on meeting individual and departmental objectives, which unintentionally foster positional bias (Cooke, 2003). A manager within this organization has no incentive to collaborate with his peers in other departments, and may even be penalized for committing to an action that is detrimental to the functional performance measures, though it may support the greater good of the firm. Optimizing the performance of a single department often does not support the performance of the firm as a whole.

An organization seeking to help its supply chain functions work cooperatively needs to design a performance management system that supports collaborative actions. Moreover, as the level of uncertainty increases, objective controls tied to specific rules become less able to handle the increasing number of exceptions. Organizations that have moved into the domain of management by targets and goals should expect to combine objective controls with normative controls that allow the employees sufficient flexibility to address the level of uncertainty (Leifer and Mills, 1996).

Cooke (2003) suggests that organizations should move away from "results" measures in favor of "process" measures, and ultimately to "strategic" measures. Results measures focus on the activities and performance of an individual department. Process measures focus on the needs of the customers rather than internal goals and encourage collaboration between departments to satisfy customer needs (Imai, 1986). Strategic measures assess whether the overall goals of the firm are being met.

Functional goals, like functional departments, are important to the continued operation of the firm (Womack and Jones, 1994). However, having performance measures that require cross-functional actions mitigates the problems of local optimization. Using process or strategic goals as part of an employee's performance assessment is one way to align the goals of the individual with the goals of the organization. For the purpose of this research study, integrative employee assessment is defined as the use of compensation systems that reward contributions toward the overall goals of the manufacturing facility. The items used to measure this construct were adapted from Pagell (2004). The following hypotheses can be stated:

H3a. Integrative employee assessment has a positive effect on cross-functional strategic consensus on goals.

H3b. Integrative employee assessment has a positive effect on cross-functional strategic consensus on strategies.

Communication. Supply chain management comprises two flows: goods and information flow downstream from the suppliers to the customer, and information (and perhaps product returns) flow upstream from the customers all the way to the raw materials suppliers (Handfield and Nichols, 1999). Within a firm, the flow of

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information keeps the product moving from incoming raw materials to outgoing products. Channels of communication are important to creating and sustaining team processes, such as cross-functional coordination (Pagell, 2004; Pagell and LePine, 2002).

Habermas (1998) proposed the theory of communicative action (TCA). Communicative action is defined as the interaction of two or more subjects capable of speech and action who establish interpersonal relationships. The subjects seek to reach an understanding about the situation and their plans of action in order to coordinate their actions by way of agreement (Habermas, 1984, p. 86). Successful communication results in mutual understanding regarding actions and relationship building, while poor communication results in impediments to action and relationships (Te'eni, 2001). Hence, TCA posits that communication is an antecedent to mutual understanding and relationship building. Calantone *et al.* (2002, p. 278) presented communication as an antecedent of relationship quality and integration between marketing and manufacturing, calling it a "vital prerequisite to harmonious interpersonal relationships." Communication is defined in this study as the transfer of information through interactions between members of different departments. The items used to measure this construct were developed specifically for this research. The impact of communication is hypothesized as follows:

H4a. Communication has a positive effect on cross-functional strategic consensus on goals.

H4b. Communication has a positive effect on cross-functional strategic consensus on strategies.

The role of the plant manager: providing support

As with all multi-functional change initiatives, internal supply chain coordination requires the support and leadership of management (Bhuiyan and Baghel, 2005; Ogden, 2006; Pagell, 2004; Fawcett and Cooper, 2001; Flynn *et al.*, 1995). Prior research supports the fact that the degree of management support will lead to significant variations in the degree of acceptance or resistance to projects, and by extension, to the degree of success (Brammer and Walker, 2011; Bhuiyan and Baghel, 2005; Ogden, 2006; Flynn *et al.*, 1995; Beck, 1983).

At the operating level, the direct representative of the firm's executive team is the plant manager. The plant manager's role reflects the three functions of the executive, as first formulated by Chester Barnard (1968): maintenance of organization communication, securing of essential services from individuals, and formulation of purpose and objectives. The executive's communication responsibilities are the primary function (Barnard, 1968, p. 218), and stem from his or her position as the hub of the cooperative network. The second function is derived directly from Barnard's view of the nature of authority and includes the setting and maintenance of performance management systems. The third function is to formulate the purpose and objectives for the organization to accomplish. These functions were based on the view of the organization as an organic, cooperative system, in existence only because its members agreed to participate.

Although the work of Barnard is not recent, it continues to resonate. In a seminal article, Mintzberg (1975) listed ten managerial roles, divided into three categories: interpersonal roles, informational roles, and decisional roles. The three categories overlap with Barnard's functions. Fifteen years later,

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Mintzberg (1990) reflected upon the impact of his article, noting with disappointment that the role of the manager had not been further studied. More recently, Mintzberg (2009) once again emphasized the manager's communication, performance management, and vision formulation as key to creating corporate "communities" that thrive in competitive conditions.

Managers influence subordinates in a variety of ways identified as integrating mechanisms, including role modeling, goal definition, reward allocation, resource distribution, communication of organizational norms and values, structuring of work group interactions, conditioning subordinates' perceptions of the work environment, and influence over processes and procedures used (Brammer and Walker, 2011; Ramus and Steger, 2000; Bass, 1981, 1985). These actions do not directly increase the level of strategic consensus between departments. However, they create an organizational environment conducive to the development of cross-functional strategic consensus. Hence:

H5a. Plant manager support has an indirect positive effect on cross-functional strategic consensus on goals.

H5b. Plant manager support has an indirect positive effect on cross-functional strategic consensus on strategies.

Demand uncertainty

Galbraith (1974) proposed that the key task of the firm is to manage uncertainty. The amount and types of uncertainty vary between organizations and include the stability of the external environment, the predictability of core processes, how tasks are subdivided, and the level of interdependence among those subdivisions (Galbraith, 1974; Thompson, 1967). Information is processed to accomplish internal tasks, coordinate activities, and interpret the environment.

Lawrence and Lorsch (1967) studied the patterns of differentiation and integration associated with an organization's attempts at coping effectively with their external environment. Gerwin (1993) proposed a conceptual framework where environmental uncertainty drives manufacturing strategy, in an attempt to reduce and redefine the effect of the environmental uncertainty. Sawhney (2006) extended Gerwin's model to a supply chain context, and applied it to subunits within the supply chain. Germain *et al.* (2008) concluded that in environments with high uncertainty, cross-functional integration leads to reduced supply chain process variability, which in turn leads to improved performance.

There are two main conceptualizations of uncertainty within OIPT studies. One camp, following the definitions used by Thompson (1967) and Galbraith (1974), defines uncertainty as a lack of information, or a difference between the information at hand and the information required to make a decision. The other conceptualization focusses on the rate of change of conditions in the external environment (Egelhoff, 1991; Flynn and Flynn, 1999; Lawrence and Lorsch, 1967). The rate of change in an external environment can be difficult to quantify, particularly for the level of respondents on which this study focusses. However, the personnel involved in purchasing, operations, and outbound logistics deal with production volumes daily. Hence, this study follows the example of Galbraith (1974), defining uncertainty as the lack of knowledge concerning the demand for a plant's product(s). Following González-Benito *et al.* (2012), demand uncertainty is considered as a moderator for the hypothesized relationships.

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The items used to measure demand uncertainty were adapted from van Hoek (1998). The complete research model is presented in Figures 1(a) and (b).

Methodology

This study was conducted via an online cross-sectional survey of manufacturing facilities in the USA. As in prior OIPT research (Gattiker, 2006; Flynn and Flynn, 1999), the unit of analysis for this study was the individual manufacturing facility, chosen because it represents the smallest grouping within a manufacturing firm that still contains the three focal departments.

Survey development

Forza (2002) listed three types of survey research: exploratory, confirmatory, and descriptive. The current study falls somewhat between the exploratory and confirmatory categories. The research model developed for this study repositions the model formulated by Pagell's (2004) exploratory research through a specific and well-established theoretical lens. Although the individual mechanisms are well-established, the relationships between them and the outcome variables are not yet clear. Moreover, the proposed research model tested these relationships simultaneously and in combination. A search of the literature did not reveal a validated instrument that fit the goals of this study. Therefore, the instrument used for this research study was developed and validated following the two-stage procedures outlined by Menor and Roth (2007) and Shah and Ward (2007).

In the first or "front end" stage, a list of eight to ten potential scale items was generated for each construct, either from the literature or via consultation with experts.

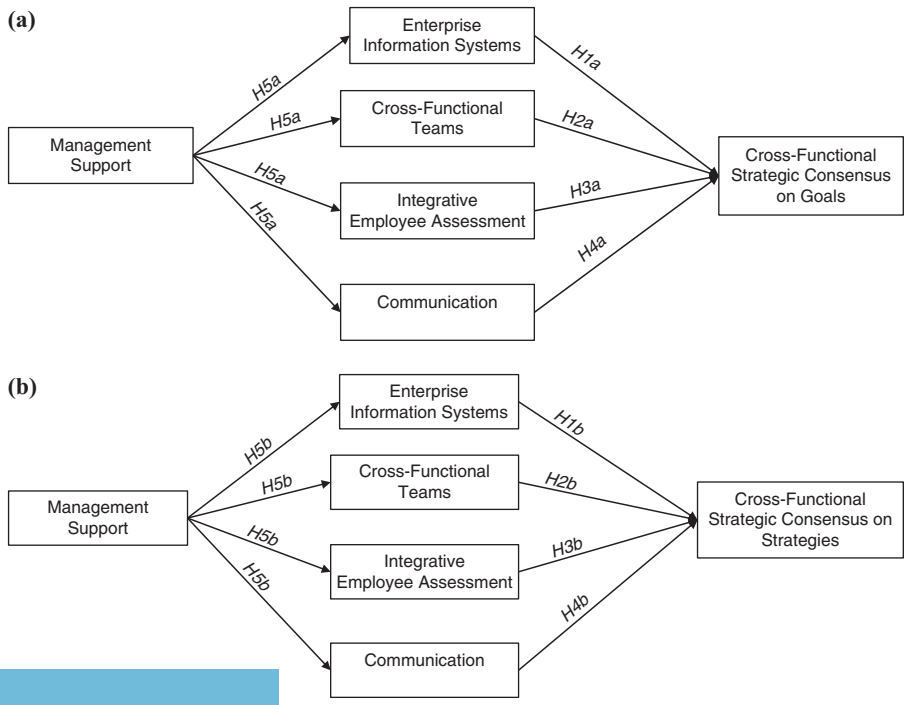

Figure 1.
(a) Research model for consensus on goals; (b) research model for consensus on strategies

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Item wording was selected carefully to reduce the incidence of double-barreled, ambiguous, or redundant items. These items were then subjected to an iterative sorting process. The goal of item sorting is to establish tentative item reliability and validity (Menor and Roth, 2007). Following the advice of Hinkin (1998) an item-sorting instrument was developed. In a modified Q-sort approach (Menor and Roth, 2007), the researcher provided respondents with definitions of each of the constructs in the model, a randomized list of prospective items (without the Likert responses), and instructions to match each item with the construct it fit most closely. Four rounds of sorting were completed. Results from each sorting round were subjected to tests of interrater reliability, an assessment of the degree to which the measures are free from error. Sources of error can be systematic (due to an assignable cause) or unsystematic (random). Items were tested to determine whether systematic, and thus potentially preventable, errors were present. When multiple judges are used to classify items, the agreement between the judges can be used to measure reliability. Interrater reliability was assessed by using Cohen's κ (Cohen, 1960) and Rust and Cooil's (1994) proportion reduction of loss.

To assess substantive validity, responses for each item were analyzed to assess how many respondents assigned the item to the target construct, providing a value for the proportion of substantive agreement (p_{sa}) as described by Anderson and Gerbing (1991). Items with low p_{sa} were eliminated. Items with p_{sa} higher than the 80 percent guideline provided by Hinkin (1998) were retained for further analysis. Although the p_{sa} provides an efficient primary "filter" for proposed items, it does not indicate whether a particular item has been repeatedly assigned to a construct different from its target. Repeated assignment to a different construct would indicate the item could be reflecting multiple constructs, the item wording is unclear, or there are problems with the construct definitions. To address these potential issues, a coefficient of substantive validity was calculated. The value of c_{sv} varies from –1.0 to 1.0, with 1.0 indicating perfect assignment by all judges, reflective of greater substantive validity. Items that did not receive a c_{sv} of 1 were eliminated. Detailed results of these analyses are omitted here for the sake of brevity, but are available from the author.

In the second or "back end" stage, the survey instrument was administered in a pilot study. Results of this pilot study were then tested to evaluate for convergent and discriminant validity. The purpose of the pilot study was to determine the underlying structure of the data. A total of 72 usable responses were obtained in the pilot study. Analysis proceeded as follows. First, descriptive statistics were calculated for each of the items. Second, a corrected item to total correlation score was calculated to assess item reliability. Finally, the data was analyzed using exploratory factor analysis as suggested by Shah and Ward (2007). The factor structure of the measurement model was tested using several techniques: reliability analysis with SPSS 16.0 (SPSS Inc., 2007), exploratory factor analysis with CEFA (comprehensive exploratory factor analysis, v. 3.02, Browne *et al.*, 2008)), and exploratory factor analysis using SPSS 16.0. In the interest of brevity, detailed results are not given here but are available from the author. The items that were selected after the analysis, along with their source, scale reliability and average variance extracted, are included in the Appendix.

Although the survey instrument underwent a rigorous evaluation process, this research is still subject to method bias, or variance that is attributable to the measurement method rather than any real difference in the latent construct. Podsakoff *et al.* (2003) provide a comprehensive review of the sources and remedies for method bias. According to their classification, the current research suffers from the threat of

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method bias arising from having a common rater, a common measurement context, a common item context, or from the characteristics of the items themselves. There are two strategies to mitigate method bias: modifying the study's procedures or using statistical controls.

Having the same respondent provide ratings for both the predictor and the response variable can result in spurious covariance between the variables. To counterbalance this effect, Podsakoff *et al.* (2003) suggest using different respondents to measure predictors and effects, separating the predictor assessment from the response assessment, and protecting respondent anonymity to reduce social response bias. The latter two of these procedural suggestions were incorporated into this research study.

The use of a cross-sectional survey with a single respondent raises the concern that any relationships between variables may be the result of common method variance (CMV). CMV occurs when the correlations between constructs are inflated because the same respondent (i.e. "method") has been used to measure both the predictor and criterion variables. The end result of CMV is that the significance of the causal paths may be an artifact of the measurement process rather than a true relationship between the variables. CMV has been a concern in behavioral research for some time (Podsakoff *et al.*, 2003), although the magnitude of its impact is not fully understood.

Lindell and Whitney (2001) provide a method to test for CMV in cross-sectional research studies. Their method is based on determining a reasonable approximation of the magnitude of the CMV and then partialling out this effect from the correlations between the variables of interest. If the correlations between the predictors and the criterion variables remain significant after this estimate of CMV has been removed, then there is greater confidence in the research findings.

In the Lindell and Whitney (2001) procedure, the CMV is estimated via a two-step process. In the first step, the researcher attempts to incorporate the suggestions summarized by Podsakoff *et al.* (2003) to minimize the severity of CMV. These include reverse scoring some items, randomizing the presence of scale items throughout the instrument, and using different response scales for the predictor and criterion variables. These recommendations were followed during survey development for this research study. Additionally, a researcher should incorporate a marker variable within the instrument. Marker variables are designed to estimate the CMV by being similar to the criterion but not associated theoretically to the predictors or conversely, by being similar in format to the predictors but not theoretically associated to the criterion (Lindell and Whitney, 2001). A marker variable which measured employee autonomy and was not related to our research model (text: employees who do purchasing and/or shipping for our plant can proceed without having to check first with their boss) was used to assess CMV. The results suggested that CMV is not a problem in the current study.

Although great care was taken during the survey development process, the resulting instrument has limitations. It was specifically designed to measure the use of a particular set of individual integrative mechanisms. It was not designed to identify or assess the operating philosophy of the facility. Thus, it is blind as to the implementation or absence of process management philosophies and programs such as Lean Manufacturing, Just-in-Time, ISO 9000 or Constraint Management. These operating philosophies encourage cross-functional collaboration to achieve performance objectives. However, implementation of these philosophies occurs in part through the selection and use of integrative mechanisms such as those in our research model. The overarching philosophy provides a reason for departments to work together but does not prescribe a method. Our research model might thus be

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viewed as being composed of building blocks that can be used regardless of operating philosophy.

The target respondents for this study were the most senior employees performing the purchasing, production, or (outgoing) logistics functions within the manufacturing plant. Sample target titles include operations manager, purchasing manager, supply chain manager, and logistics manager. The theoretical domain of the proposed research model should include larger manufacturing firms where coordinating by rules and procedures is not viable. The survey administration followed the Tailored Design Method proposed by Dillman (2000).

The population of interest for this study was manufacturing firms in the USA. Potential survey respondents were identified using a variety of sources, including but not limited to: public information such as web sites and telephone directories and directories of manufacturing associations and/or chambers of commerce. A number of states have active manufacturers associations (e.g. South Carolina Manufacturers Alliance, Delaware Manufacturers Association, Texas Alliance of Manufacturers' Associations). Several of these had online member directories with contact information. These directories represent a cross-section of manufacturers in a variety of industries; hence they provided a comprehensive pool of potential survey respondents. Initial contact was made with one individual at a firm, and this individual was asked to complete the survey, forward it to an appropriate respondent, or provide contact information for an appropriate respondent. Manufacturers' associations in twenty different states were contacted, with a total of ten states providing a membership list.

From these directories, firms were selected if they had 20 or more employees and had an e-mail address listed within their contact information. Hence this sample is biased toward those firms willing to publish an electronic contact.

Target respondents were contacted via email and asked to participate. The invitation contained a link to the online survey, as well as an invitation to request a fax, letter, or e-mail with the survey instrument. Reminder messages were sent two and four weeks after the initial survey was sent. A total of 1,355 valid e-mail addresses were identified. Of these, 130 individuals responded, for a response rate of 9.59 percent. The respondents represented a cross-section of industries and firm sizes. Respondent profiles are summarized in Tables I, II and III. Non-response bias was tested by comparing early and late respondents on a random selection of items. There were no significant differences. Non-response bias was also tested within the state directories in terms of industry and size. Smaller firms were less likely to respond.

Table I classifies the respondents by the size of their facility. Compared to the population of US manufacturing firms, the sample is biased toward larger firms/facilities ($\chi^2 = 118.03$, $p < 0.001$), which is to be expected. Some respondents who declined to participate mentioned that their facilities were too small to support

Employees	Number/% in population	Number/% in survey sample
20-49	51,660/48	14/11.7
50-99	25,883/24	31/25.8
100-249	20,346/19	34/28.3
250-499	6,853/6	22/18.3
500-999	2,720/3	11/9.2
>1,000	1,266/1	8/6.7

Table I.
Population and sample demographics by establishment size

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having different departments and all work was done by a small group of employees or by one person. The modes of coordination considered for this study are more typical of larger facilities that have outgrown the feasibility of exclusively using informal coordination.

The purpose of this research is to examine factors that may affect the integration between three departments: purchasing, logistics, and operations. The possibility exists that there is some systemic bias due to a respondent's area of responsibility. As seen in Table II, it is evident that a majority of respondents come from operations/production. This is not a surprise, given that membership lists for the manufacturers' organizations contacted tend to provide a contact person within the management structure of the manufacturing facility. Assessment of measurement invariance was conducted as described by Rungtusanatham *et al.* (2008), and no significant differences were found. In the interest of brevity, details are not included here but are available from the author.

Table II.
Sample demographics by area of responsibility

Area of responsibility	Number	%
Operations	85	65.4
Operations and purchasing	7	5.4
Operations and logistics	10	7.7
Purchasing	10	7.7
Logistics	14	10.8
Purchasing and logistics	4	3.1

Table III.
Population and sample demographics by industry

NAICS 31-33	Manufacturing	Population (%)	Survey sample (%)
311	Food mfg	8,736/8	3/2.3
312	Beverage and tobacco product mfg	987/0.9	1/0.8
313	Textile mills	1,671/1.5	4/3.1
314	Textile product mills	1,535/1.4	0/0
315	Apparel mfg	3,269/3	2/1
316	Leather and allied product mfg	394/0.4	1/0.8
321	Wood product mfg	5,655/5.2	1/0.8
322	Paper mfg	3540/3.3	7/5.4
323	Printing and related support activities	7134/6.6	2/1.5
324	Petroleum and coal products mfg	652/0.6	1/0.8
325	Chemical mfg	5500/5.1	11/8.5
326	Plastics and rubber products mfg	7893/7.3	6/4.6
327	Nonmetallic mineral product mfg	5430/4.8	2/1.5
331	Primary metal mfg	2807/2.6	3/2.3
332	Fabricated metal product mfg	17197/15.8	20/15.4
333	Machinery mfg	9850/9.1	9/6.9
334	Computer and electronic product mfg	6563/6.04	10/7.7
335	Electrical equipment, appliance, and component mfg	2879/2.7	12/9.23
336	Transportation Equipment	5589/5	10/7.7
337	Furniture and related product mfg	4878/4.5	3/2.3
339	Miscellaneous mfg	6569/6	22/16.9
	Total	108,728/100	130/100

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Finally, Table III summarizes the distribution of respondents across industries. The research sample in this study is fairly representative of the population of US manufacturing firms with two comments. First, the sample has a higher percentage of firms that identify themselves as electrical equipment, appliance, and component manufacturers. Within the time frame of the study, there were two major industry classification schemas, Standard Industry Codes (SIC), and North American Industry Classification System (NAICS). The US Census Bureau reports their statistics using NAICS codes, but the survey was conducted using SIC codes. Several categories in the SIC codes were combined in the NAICS. The second issue relates to the high number of firms that identify as "miscellaneous." Given the confusion between SIC and NAICS codes, it is possible that these respondents did not attempt to look further to identify the proper code. It is also possible that the firm produced a number of different products that might have resulted in multiple classifications. To assure that this discrepancy did not cause a problem, Industry was used as a control variable in the analysis.

The data file contained responses from a total of 130 firms. Of these, six were eliminated due to insufficient data, and four were eliminated due to the presence of multivariate outliers. Hence the final analysis was conducted with an overall sample size of 120. Path analysis was used to analyze the data with AMOS 18 (SPSS Inc., 2009). Path analysis is a form of structural equation modeling (SEM), a collection of statistical techniques used to examine the relationships between predictor (exogenous) variables and criterion (endogenous) variables. In addition to estimating path coefficients for relationships between observed variables, SEM allows for the estimation of causal paths between latent or unobserved variables, identified throughout this report as factors. In contrast to stepwise multiple regression, SEM uses an iterative process of matrix manipulation to simultaneously estimate all of the relationships implied by the research model. Hence SEM provides information on both the statistical significance of individual parameters and the overall fit of the observed data to the proposed model.

Factor scores. The survey instrument was developed to represent measures of latent constructs which cannot be directly observed. The research model hypothesizes relationships between these constructs. The scales used to measure these constructs are valuable but they are not perfect representations of the constructs. Moreover, the moderate size of the sample precluded analysis of a full SEM. However, the validated scales can be used to calculate factor scores using the factor loadings. The method of extraction was principal axis factoring (PAF) using SPSS. Path analysis assumes that the observed variables are measured without error. The PAF algorithm parcels out each observed variable's uniqueness (random and measurement-specific error) from the factor loadings, so the factor scores represent the proportion of the variance in the items that is directly related to the factor. These scores were used as observed variables in a path analysis model. The Bartlett method for generating factor scores uses least squares procedures to minimize the sum of squares of the unique factors over the range of variables. This method leads to high correlations between factor scores and the latent factors and ensures unbiased estimates (Marsh, 2001). Descriptive statistics are summarized in Table IV.

In evaluating the correlation Table IV, note that the factor scores are mean-centered (i.e. the mean of the scores is 0). The Bartlett method results in mean-centered factor scores, which reduce multicollinearity and are useful for interpreting moderation effects. Additionally note that the predictors all have significant moderate positive correlations with the outcome variables, as predicted. The predictors have moderate inter-correlations, which is not unexpected given the research model in question. However, the magnitude of these correlations should not be problematic.

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Table IV. Descriptive statistics and correlations

	Plant manager support	Enterprise information systems	Cross-func. teams	Int. emp. assess.	Comm.	Strategic consensus on strategies	Strategic consensus on goals
Management support	$\mu = 0$; $\sigma = 1.10$						
Enterprise information systems	0.47**	$\mu = 0$; $\sigma = 1.23$					
Cross func. teams	0.32**	0.26**	$\mu = 0$; $\sigma = 1.07$				
Int. emp. assess.	0.58**	0.29**	0.36**	$\mu = 0$; $\sigma = 1.16$			
Communication	0.39**	0.13	0.22*	0.36**	$\mu = 0$; $\sigma = 1.23$		
Strategic consensus on strategies	0.36**	0.39**	0.26**	0.37**	0.30**	$\mu = 0$; $\sigma = 1.20$	
Strategic consensus on goals	0.33**	0.31**	0.34**	0.39**	0.24**	0.28**	$\mu = 0$; $\sigma = 1.24$

Notes: ***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

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Analysis of the path model. The survey items along with reliability information can be found in the Appendix. The goal of this research was to examine a model of factors that contribute to strategic consensus, using OIPT as a theoretical lens. OIPT posits that organizations deploy different coordination mechanisms in response to the level of uncertainty in their operating environment. In this study uncertainty was operationalized as a combination of the predictability of production volumes and product mix, and modeled as a moderator of the relationships between the factors. Before proceeding to hypothesis testing, model fit was assessed. The results are presented in Figure 2 for consensus on goals and Figure 3 for consensus on strategies. Both models have acceptable fit, therefore analysis proceeds to testing the hypotheses.

Marsh *et al.* (2004b), examined four strategies for modeling interactions within SEMs and suggest that an unconstrained approach modeling product terms is the best technique in terms of ease of use, reliability of results, and relative robustness with regard to deviations from multivariate normality. However, their simulation study also found that sample sizes of 200 or more were better suited for such analysis. Due to the limitations in sample size, the moderation effect was tested by a multi-group comparison.

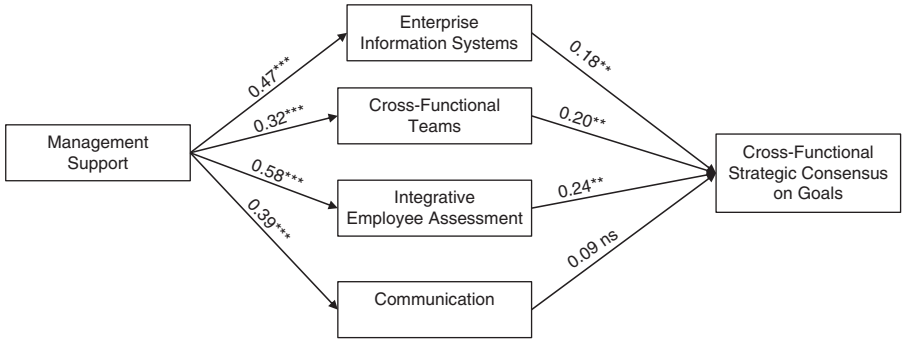

Figure 2.
Path analysis results for consensus on goals, standardized path coefficients

Notes: $\chi^2 = 13.326$, df = 7, Bollen-Stine $p = 0.078$, CFI = 0.954, TLI = 0.902, RMSEA = 0.09. ***$p < 0.01$; **$p < 0.05$; *$p < 0.10$

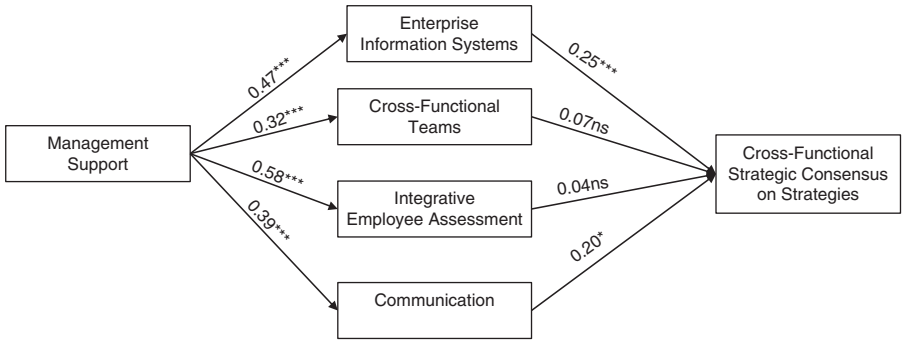

Figure 3.
Path analysis results for consensus on strategies, standardized path coefficients

Notes: $\chi^2 = 13.764$, df = 7, Bollen-Stine $p = 0.113$, CFI = 0.947, TLI = 0.886, RMSEA = 0.09. ***$p < 0.01$; **$p < 0.05$; *$p < 0.10$

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The sample was split at the median (0.316) for the uncertainty factor scores, and the model was tested separately for the low and high groups. This method is an extension of the multiple regression approach, based on separate groups with observed variables (Hancock and Mueller, 2006). Each group consisted of 60 cases. Moderation was tested by estimating two models: one in which the parameters of interest are constrained to be equal, and one in which they are allowed to be freely estimated. The difference in χ^2 between these two models is used to determine the presence of a moderating effect. The results of these model comparisons were not significant, suggesting that demand uncertainty does not have a moderating effect on the research hypotheses. The results are summarized in Table V.

Having ruled out the influence of a moderating effect, analysis proceeds to hypothesis testing. Table VI provides a summary of this analysis. *H1a* and *H1b* proposed a positive direct effect between enterprise information systems and cross-functional strategic consensus on goals and cross-functional strategic consensus on strategies. These hypotheses are both supported. Although the survey instrument did not specify the extent to which the information system was in use, the presence of an enterprise information system helps to create consensus about both goals and the means to achieve them. This finding could help assuage concerns about the value of making large investments in integrative information technology systems. As these systems become more modularized and the cost becomes more manageable, the results of this study suggest that this is indeed a good investment.

H5a and *H5b* proposed a positive indirect effect of plant manager support on cross-functional strategic consensus on goals and cross-functional strategic consensus on strategies. Without specifying which mediation paths are significant, the omnibus tests for all indirect effects were both significant ($p < 0.001$). This result was expected. Employees tend to focus on their superiors' stated priorities. The hypothesized relationship between plant manager support and both dimensions of strategic

Table V.
Moderation tests

Model	Strategies df	Strategies CMIN	Strategies p	Goals df	Goals CMIN	Goals p
Integrative information technology – Strategic consensus	1	1.525	0.217	1	1.856	0.217
Cross functional teams – strategic consensus	1	0.152	0.697	1	0.374	0.697
Integrative employee assessment – strategic consensus	1	0.744	0.388	1	0.203	0.388
Communication – strategic consensus	1	0.168	0.681	1	1.802	0.681
Management support	4	4.609	0.330	4	4.609	0.330

Table VI.
Hypothesis testing for cross-functional strategic consensus

Effect tested	Strategic consensus on Strategies Path coeff.	Strategies p	Goals Path coeff.	Goals p
H1: enterprise information systems → strategic consensus	0.25	0.01***	0.18	0.04**
H2: cross-functional teams → strategic consensus	0.07	0.50 ns	0.20	0.03**
H3: integrative employee assessment → strategic consensus	0.04	0.70 ns	0.24	0.02**
H4: communication → strategic consensus	0.20	0.08*	0.09	0.41 ns
H5: management support → strategic consensus (indirect)	0.24	0.00***	0.32	0.00***

Notes: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

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consensus was indirect. Thus it is only logical that when the facility's prime leader demonstrates support for something, and follows through with the implementation of facilitating mechanisms, positive results occur. Mahto and Davis (2012) had reported that information flow, particularly from higher hierarchical levels, has a positive effect on strategic consensus among middle and lower managers. Rapert *et al.* (2002) also notes the impact of vertical communication on enhancing strategic consensus. The integrating mechanisms included in this model reflected the functions of the executive as defined by Barnard (1968) and refined by Mintzberg (1975, 1990, 2009). The role of the plant manager cannot be discounted, and I echo Mintzberg's (1990, 2009) calls for further research into the myriad roles that managers play at all levels of the organization, and what defines a "manager" in the current dynamic, hypercompetitive environment.

The more interesting results were found in the impact of the mechanisms intended to create "lateral relations." The differences are remarkable. cross-functional teams (*H2a/b*) and Integrative employee assessment (*H3a/b*) contribute significantly to consensus on goals but not consensus on strategies whereas communication (*H4a/b*) contributes significantly to consensus on strategies but not consensus on goals. Each mechanism is described individually.

First, cross-functional teams had a positive effect on strategic consensus on goals. One of the characteristics of cross-functional teams is that the members of the team work with individuals from other functions but do not give up the core nature of their functional jobs. However, exposure to the other team members seems to assist in aligning departmental goals to corporate goals. Fawcett and Cooper (2001) relate that managers at leading companies recognize that the key to competitive success is to meet the needs of the customer better than the competition. Doing so requires developing "core competencies" or "critical capabilities" within the firm, which will lead to improved customer satisfaction. Competencies and capabilities are "collective and cross-functional – a small part of many people's job" (Stalk *et al.*, 1992, p. 63).

Integrative employee assessment also had a positive effect on strategic consensus on goals. This result is interesting because it suggests that firms should engage in a more holistic view of what constitutes "rewardable" employee performance. Bowen and Lawler (1992) describe the struggle of human resource management professionals to stay abreast of organizational developments, in their case Total Quality Management, that require new approaches to the selection, training, and performance evaluation of employees. However, they report that human resource managers have sometimes been relegated into strictly administrative and transactional roles rather than strategic partners in creating a more effective organization. The new process-management based management philosophies such as Six Sigma, Lean Manufacturing, and Just in Time require a high level of "systems thinking" when it comes to managing human resources. This in turn requires new ways to define both corporate and individual performance. Evans (2004) reports that companies with more mature performance measurement systems tend to report better outcomes. These mature systems include measures of organizational effectiveness, of the type that are proposed as integrative employee assessment. Garengo *et al.* (2005) study performance measurement systems in SME's and report that performance measurement systems should be designed to align and support the corporate strategy.

On first glance, the effect of communication seems counterintuitive. High levels of inter-departmental communication would be expected to result in increases in strategic consensus in both goals and strategies, rather than only strategies. However, on closer inspection, this may be an artifact of the nature of the items used to measure

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communication. Although intended to capture interaction in general, the items have a bias toward communication regarding work problems. As "problems" tend to require "action" to be resolved, it is logical that this mechanism would show the impact as being more significant on strategies, reflecting that the immediate "goal" is problem resolution and not necessarily overall performance. This is a weakness of the current instrument and an avenue for further study.

Discussion

These results exemplify the challenges of research regarding strategic consensus, as highlighted by Kellermanns *et al.* (2005) and González-Benito *et al.* (2012). The construct labeled as "strategic consensus" currently encompasses a variety of definitions, theoretical premises, and contexts. There is much work to be done in future research to clearly conceptualize and define this key construct. Coming to agreement on the definition of "strategic consensus" would allow researchers to converge upon appropriate measurement instruments and advance a variety of fields, including but not limited to management, strategy, organizational behavior, and operations management.

González-Benito *et al.* (2012) highlight the impact of strategic consensus, in both its forms, on the financial performance of the firm. This study extends their work by looking at antecedents to each dimension of strategic consensus. Following their multi-dimensional conceptualization, the data reflect that different information-processing mechanisms affect each dimension of consensus. The analysis suggests that normative controls, such as the team value structure promulgated by cross-functional teams, and objective controls such as tying employee rewards to overall performance, do have an impact on the sub-dimension of goal consensus. On the other hand, open lines of communication contribute to consensus on strategies, the means of achieving the organizational goals.

Kellermanns *et al.* (2010) note that the selection of antecedents should reflect the level at which strategic consensus is being measured. The mechanisms evaluated in this study are implemented and measured at the operational level, where performance evaluation is closely connected to the attainment of specific criteria. It would be expected then, that mechanisms that foster cross-functional strategic consensus should contribute to interaction and collaboration.

Prior research has shown that consensus on methods and consensus on goals have different implications for financial performance, including differences in magnitude, significance, and directionality. Both types of mechanisms to increase the information-processing capacity, vertical information systems and creation of lateral relations, contribute positively to the overall level of strategic consensus in the manufacturing facilities in our sample. This research suggests that the implementation of information-processing-mechanisms to foster consensus should consider both the multidimensional nature of the consensus construct and the resulting impact on financial performance.

OIPT posits that the organization's main task is to deploy information processing mechanisms according to the level of uncertainty in the firm's environment. In this study demand uncertainty was modeled as a moderator of the relationships between the predictor variables and the outcome variable. However, this effect was not statistically significant. Uncertainty in product mix and product volumes does not seem to impact the effect of plant manager support, integrative information technology, communication, integrative employee assessment, and cross-functional teams on strategic consensus on goals and strategic consensus on strategies. Future research should explore the impact of other sources of environmental dynamism.

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This study contributes to the field in several ways. First, it integrates the findings of Leifer and Mills (1996), who used the organizational information processing theoretical lens to study control mechanisms in emerging organizations. Today's flatter, team-based organizations call for a careful balancing of control mechanisms that provide flexibility and autonomy but retain direction and control. Creating consensus on the firm's strategy helps provide direction to employee actions. Second, it incorporates recent developments in the conceptualization of strategic consensus in the exploration of antecedents and moderators. While prior studies have focussed on the relationship between consensus and performance, our study provides a basis for understanding the process by which consensus is created in the first place. The results can provide some guidance to practitioners as to what mechanisms can help foster consensus within their facilities. In addition, our study moves the discussion of strategic consensus from the level of the executive suite to the operating facilities which are tasked with executing the corporate strategy, rather than creating it. Scholars might reasonably argue that the directionality of the relationships proposed in this study could be reversed, for example, that firms with high level of consensus might be more likely to invest in enterprise information systems. However, the implementation decision is usually at the executive level, beyond the level of analysis of this study. Plant managers may or may not have a say on whether the "parent" firm implements a particular enterprise information system. However, they do have the responsibility of encouraging and enforcing use of the EIS within their facilities, and they directly reap the benefits or suffer the consequences of this use.

In addition, this research has implications for business practice. While formulating strategy has its own set of challenges, implementation of the strategy ultimately determines performance. Mintzberg (2009) argues that many firms are suffering from the loss of "community" or sense of common purpose. When there is no consensus about the goals of the firm or the means of achieving them, individual managers are in danger of making decisions based on self-interest rather than corporate benefit. He suggests that an engaged core of middle managers, rather than the top leadership of the firm, are often best positioned to create this sense of community. The role for top management is to provide "[…] just enough leadership – leadership that intervenes when appropriate while encouraging people in the organization to get on with things" (Mintzberg, 2009, p. 141). In the research model, the role of the plant manager is to create the environment which fosters strategic consensus. This environment is created by establishing both the means of interaction (cross-functional teams and communication) as well as providing incentives for participation (integrative employee assessment). Coupling these with appropriate supporting information technology facilitates growth of strategic consensus between the managers, which would be expected to assist in nurturing Mintzberg's "community" behavior. Community in this sense is the antithesis of positional bias, and thus encourages members of the organization to work for the benefit of the overall organization.

The results also illustrate the importance of seeing strategic consensus as the result of a coordinated system of interventions, rather than any single integrating mechanism. Different elements of the system contribute to strategic consensus on goals vs strategic consensus on strategies. Both dimensions are necessary to achieve superior performance.

One area that has been neglected in past studies is the impact of performance evaluation and compensation. Positional bias is difficult to overcome when the performance measures reward achievement of function-centric rather than organizational goals. Integrative employee assessment provides individuals with tangible incentives to

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make decisions that support the overall goals of the firm. One interesting detail is that both integrative employee assessment and cross-functional teams have significant positive effects and only moderate inter-correlation. It might have been expected that employees compensated for contributions to the overall goals would have been more strongly associated with participation in cross-functional teams. This result suggests that even employees who may not be personally involved in cross-functional teams still gain consensus from integrative performance assessment.

As with all research, this study has limitations. The first is that the survey was restricted to respondents in the USA. Although the basic system dynamics of strategic consensus might be expected to transcend national boundaries, the context of this study is noted. This context might be particularly important when considering the impact of integrative employee assessment. Erez (2010) suggests that cultural values such as individualism vs collectivism can and should influence job design and performance evaluation to optimize results. The American culture tends to be individualistic, rewarding individual effort and achievement and celebrating competition. While in the American context of this study that might represent the implementation of individual performance assessment metrics, in other contexts the appropriate intervention might be at the workgroup level. Second, this study was conducted in manufacturing facilities, and caution should be taken in applying its findings to service organizations. Third, the power of the statistical analyses is limited by the moderate sample size. Avenues for further study include service organizations, multinational supply chains, further refinement of the measurement instrument, and the use of other moderating variables.

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(The Appendix follows overleaf.)

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Appendix

Table AI.
Survey instrument

Factor/item	Mean	σ	AVE	CR	Source
Communication			0.423	0.688	
We have open lines of communication between departments	4.04	0.666			Developed for this study
We have trouble getting a response from other departments when we contact them regarding work issues	3.63	0.826			Developed for this study
Employees in other departments do not hesitate to contact us to resolve work issues	4.17	0.523			Developed for this study
Cross-functional teams			0.611	0.822	
Our plant has established work teams of employees from different departments to address supplier issues	3.28	1.07			Pagell (2004)
Members of my department participate in teams with members from other departments	3.93	0.905			Pagell (2004)
Our plant has established work teams of employees from different departments to address supplier issues	3.34	0.953			Pagell (2004)
Integrative employee assessment			n/a	n/a	
Employees are rewarded for their contribution to the overall performance of the plant	3.85	0.677			Pagell (2004)
Enterprise information systems			0.491	0.73	
Our plant uses a computerized system to plan production	3.91	1.081			Vickery *et al.* (2003)
Our plant uses a commercially available ERP package	3.56	1.143			Vickery *et al.* (2003)
People in purchasing, production/operations, and shipping can access data in each other's computer systems	3.7	0.938			Themistocleus *et al.* (2000)
The computer systems in our plant can communicate with each other	3.73	0.893			Themistocleus *et al.* (2000)
Plant manager support			0.506	0.802	
The plant manager encourages departments to work together	4.2	0.708			Sum *et al.*
The plant manager is willing to clear obstacles to collaboration that are outside our plant	3.94	0.708			Sum *et al.*
The plant manager's staff knows he/she wants them to work together	4.14	0.62			Sum *et al.*
The plant manager understands what is needed to support efforts to work with the other departments	3.96	0.661			Sum *et al.*

(continued)

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Factor/item	Mean	σ	AVE	CR	Source
Cross-functional consensus on strategies			0.425	0.688	
I know my company's competitive strategy	4.141	0.715			Pagell (2004)
I know how my company sets itself apart from its competitors	4.1095	0.756			Pagell (2004)
Cross-functional consensus on goals			0.421	0.685	
Our long-term performance goals are aligned with our company's competitive strategy	3.9297	0.562			Pagell (2004)
I know how my work contributes to my company's strategy	4.2953	0.565			Pagell (2004)
Uncertainty			0.614	0.862	
The composition of demand (the product mix) is difficult to predict	3.5500	1.158			van Hoek (1998)
Demand for our products varies unpredictably	3.5833	1.017			van Hoek (1998)
Our production schedule changes unexpectedly	3.7333	1.067			van Hoek (1998)
The volume of demand is difficult to predict	3.4476	1.031			van Hoek (1998)

Note: All responses on a five-point Likert scale, 1 = strongly disagree, 5 = strongly agree

Table AI.

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