Purchasing Team Activities in the Supply Chain

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Abstract

This paper presents findings from an exploratory study that examines the relationship between supply team objectives and supply teams with or without customer participation. Using a sample of 284 large North American firms, two general dimensions of purchasing team objectives were identified and empirically validated: strategic supply initiatives and performance and measurement. After controlling for sales and industry context, analysis found that both strategic supply initiatives and measurement and improvement purposes influenced the use of internal and customer teams. Our conclusion is that customer participation is not limited to strategic supply initiatives. Furthermore, firms look for broad customer engagement for team-based activities, rather than focusing on a narrow range of high-profile initiatives.

Key Words: purchasing and supply management, teams, resource based view, supply chain management.

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There has been considerable managerial interest in the opportunities to use purchasing teams as a means of enhancing external and internal integration (Ellram and Pearson 1993; Trent and Monczka 1994; Johnson et al. 2002; Johnson et al. 2007). Teams, directed toward the completion of a wide range of initiatives, have the advantage of combining the skills and resources of individuals, spanning across functions and business units. The effective management of teams is increasingly seen as a fundamental organizational capability as firms strive to achieve effective solutions to business issues that require a cross-functional perspective (Denison et al. 1996).

Much of the existing literature on purchasing teams tends to take a prescriptive approach that focuses on techniques for improving team performance (e.g., Trent and Monczka 1994; Giunipero and Vogt 1997). Teams can be deployed for a variety of strategic objectives related to development of organizational capabilities and deployment of resources, as suggested by the resource based view (RBV) (Dierickx and Cool 1989; Barney 1991).

Previous research has found that factors such as industry context and the strategic role of supply in the firm influence the use of team-based purchasing activities (Johnson et al. 2002). Notwithstanding the influence of such firm-level factors, purchasing teams are typically struck to fulfill a specific management objective, such as new product development, lower cost structures or improved quality. The success or failure of the team is frequently measured, at least in part, by its ability to achieve the objectives established at the outset. Consequently, the objectives of the team will likely influence a variety of factors, such as team composition, resources and structure.

This research makes a contribution by extending our understanding of how team objectives influence the use of team-based purchasing activities. By providing insights regarding the motivations behind the use of purchasing teams, the research provides a deeper understanding of how business objectives align with team use. The supply chain management literature stresses the importance of alignment between buyers and suppliers (Carr and Pearson 1999). Teams represent a common method of supply chain coordination in areas such as new product development, reduction in total costs of ownership and lead time reduction. Consequently, a second contribution of this research is to provide a better appreciation for when purchasing teams involve customers.

This paper is organized as follows. Drawing from the supply chain and resource based view (RBV) literatures, the following section defines the constructs and hypothesized relationships between team purposes and purchasing team usage. Next, the survey methodology and construct measurement are provided. Lastly, the results and discussion are presented along with the implications for future research and managerial practice.

Theoretical Development

Purchasing Teams

A team is a group brought together to achieve a shared goal, is independent and bound and stable over time, and has the authority to manage its own work and internal processes (Alderfer 1977;

Hackman 1990). Teams attempt to capture the benefits of cross-functional skills and orientation, and represent an accepted method for managing projects and activities in a wide variety of areas, such as new product development, information systems deployment and cost reduction initiatives. The formation and management of teams continues to present complex challenges, indicating that effective implementation is a strategic resource, possibly linked to organizational learning (Hult et al., 2003), social complexity and team-based skills (Coff 1999; Lewis 2003).

The resource based view (RBV) proposes that firms seek to acquire and control bundles of resources that when combined become sources of competitive advantage. Strategic resources are defined as assets, capabilities and organizational processes controlled by a firm which have value, are rare, difficult to imitate and have few substitutes (Barney 1991). A firm's resources, such as supply expertise, can either be acquired in the case of tradable resources or can be path-dependent, accumulating over time (Dierickx and Cool 1989; Black and Boal 1994).

While RBV is a widely applied perspective for studying firm strategy, it also has clear implications for internal firm structure. As noted above, firms also must have internal organizational structures, such as inter-functional teams, and business processes that enable it to acquire and leverage resources to facilitate the production and delivery of goods and services. Furthermore, firms can create competitive advantage when they are successful in creating linkages with critical suppliers that successfully exclude competitors from forming the same relationships (Rungtusanatham et al. 2003).

Purchasing Team Objectives

In a supply context, teams can combine skills and resources of several stakeholders, which can span across multiple functions or subunits, to facilitate the timely completion of a supply management goal that will benefit the organization, such as supplier selection, standardization of purchases, reduced total cost of ownership, improved supplier quality or reduction of lead times (Ellram and Pearson 1993; Denison et al. 1996; Trent 1998). Purchasing teams can consist of individuals from a variety of functional areas or from the purchasing function only (Trent and Monczka 1994). Finally, teams may include representatives from outside the organization, such as suppliers or customers (Carter and Narasimhan 1996). Such teams bring together stakeholders from the supply chain to address issues of mutual concern, such as quality problems or new product development (Dyer, 1996). Consequently, the success of supply chain initiatives can be influenced by the ability of firms to structure and manage long-term co-operative relationships with customers and suppliers, and sometimes with competitors (Bechtel and Jayaram 1997).

Firm-level adoption of purchasing teams can enhance both external and internal integration through the involvement of internal stakeholders, suppliers and/or customers. Prior research has supported a two-dimensional construct: internal teams and customer teams. Internal teams consisted of purchasing councils, supplier councils, commodity teams and cross-functional teams (Johnson et al. 2002). The common element among the four items in this construct was that they were concentrated and organized within the firm and/or the supplier aimed at reducing transaction costs. In contrast, customer teams had a strong downstream orientation, with active involvement of external customers in the supply chain.

Similarly, the motivation for the creation of internal and customer teams can differ. At a fundamental level, the objectives of internal purchasing teams are likely motivated by objectives related to supply improvement issues, such as supplier selection, development of product or service specifications or standardization of purchases, which do not require customer input. Such teams may be created to achieve departmental cost reduction targets, improve quality or meet supplier rationalization targets. In contrast, broader strategic corporate level initiatives, such as new product development, revenue enhancement initiatives and gaining access to new technology, are more likely to require customer participation. Such teams may be driven by customer needs, such as supplier involvement in new product development in the automotive industry (Choi 2004). Thus, we propose:

Hypothesis 1: The greater the emphasis on supply improvement team purposes, the greater the use of internal teams.

Hypothesis 2: The greater the emphasis on strategic corporate level team purposes, the greater the use of customer teams.

Research Design

A survey instrument was developed to understand both the relationship between purchasing team purposes and team usage. In the following sections, we describe our sample, data collection procedures, and constructs.

Survey Sample

A survey instrument was developed to examine the relationships between purchasing team purposes and purchasing team usage. The target population for this study was comprised of large manufacturing and services firms in the U.S. and Canada. The Title 1 membership list of the Institute of Supply Management (ISM) and the CAPS Research membership directory were used to identify U.S. respondents for firms on the *Fortune 1000* manufacturing and services lists. The membership database of the Purchasing Management Association of Canada (PMAC) was used to identify Canadian respondents for firms on the *Financial Post 100* list. In order to reduce the potential for single-respondent bias, we focused on high-level managers who tend to be more reliable sources of information than lower-level managers (Philips 1981). The title of the respondent sought was primarily vice president or director of purchasing or supply chain management.

The survey was nine pages in length and typically required 20 to 30 minutes to complete. The survey was pre-tested on a group of five chief purchasing officers (CPOs) and two academics. This group was asked to review the questionnaire for structure, readability, ambiguity and completeness, and the survey instrument was refined based on their feedback. Appendix A provides a summary of the relevant questions used in the survey instrument.

In an effort to increase the response rate, a modified version of the methodology of Dillman (2000) was followed. In October 2003, questionnaires were mailed along with a cover letter and stamped return envelope to 658 organizations. From the initial sample frame of 658, 18 were dropped because they had been inadvertently duplicated in the database, ceased operation or moved to a new location. Consequently, the effective sample frame was 640 organizations, consisting of 562 and 78 U.S. and Canadian firms, respectively. Four waves of contact were then conducted: initial mailing of survey, reminder emails or fax to all non-respondents; second mailing of the survey; and finally, a reminder telephone call.

To encourage the widest possible participation by both users and non-users of e-business technologies, respondents were given three options for the completing and returning the survey: mail in the stamped return envelope; fax; and Internet (web-based questionnaire). Nearly three-quarters of the responses were received via mail. Of the 640 targeted firms, 284 (44%) completed surveys were returned. In this study, nonresponse bias was tested by comparing the responses of early and late waves of returned surveys for firm size and respondent title (Armstrong and Overton 1977). No significant differences were encountered.

Team Purposes Construct

Sixteen purchasing team purposes were identified as generally accepted in the purchasing literature: access to new technology, achievement of lean supply initiatives, cost reduction, development of strategies congruent with corporate goals and strategies, insourcing, lead time reduction, new product development, outsourcing, performance measurement, quality improvement, revenue enhancement, specification development, standardization, supplier development, supplier selection and value improvement (Leenders et al. 2006). Respondents we asked to rate their organizations' level of use of each on a five-point Likert scale (1 = none to 5 = extensive). Table 1 summarizes the sample means and standard deviations for the 16 team purposes.

Exploratory factor analysis (principal components analysis with varimax rotation) was used to analyze the pattern of usage for the 16 forms of e-team purposes. Five items that cross loaded on both factors were removed from the analysis. Subsequently, both a scree plot and eigenvalue criterion (greater than one) supported the extraction of two factors. All 11 items loaded on one factor above the recommended level of 0.50 (Hair et al., 1995). Table 2 provides the results for the factor analysis of purchasing team purposes.

The first factor was labeled "strategic supply initiatives," and included access to new technology, cost reduction, develop supply strategies congruent with corporate strategies, insourcing, new product development and revenue enhancement. The reliability coefficient (Cronbach's α) for the dyadic coordination factor was 0.74, above the threshold recommended for exploratory research (Nunnally and Berstein 1994). The items included in the factor imply a broad range of corporate activities that may, for example, involve engineering (new product development), marketing and sales (revenue enhancement) or senior executives (corporate strategies). Cost reduction initiatives are frequently corporate-wide programs, guided by the CEO or CFO (Leenders and Johnson 2002).

The second factor was labeled "measurement and improvement," and included performance measurement, quality improvement, specification development, standardization and supplier development (α = .84). These items tend to concentrate on activities focused in specific areas aimed at driving performance improvements in the supply chain, in areas such as quality and enhancing supplier capabilities.

Team Usage Construct

Building on prior research, six types of purchasing teams have been identified and generally accepted in the purchasing literature; four are internally oriented and two directly involve customers (Trent and Monczka, 1994; Murphy and Heberling, 1996; Trent, 1998; Johnson et al., 2002; Johnson et al. 2007). Respondents were asked to rate the extent to which their organization made use of each type of team on a five-point Likert scale. Table 3 summarizes the sample mean scores for the relative usage of the six types of purchasing teams. Confirmatory factor analysis was used to assess the pattern of internal and customer team usage against the scales identified in prior research (Johnson et al., 2002). The earlier factor pattern, which employed a different sample, was replicated, and all parameter loadings on the two team factors were significant ($p < .01$) and overall model fit was good, although the chi square statistic was significant (AGFI = 0.93; CMIN/DF = 2.80; $\chi^2 = 22.3$).

Firm Sector and Size

Industry context (manufacturing and services sectors) and firm characteristics (firm sales) were included in this research as control variables. The sample included 171 manufacturing firms and 113 service firms. Manufacturing industry firms formed the reference group for the regression analysis.

Empirical Results

We used linear regression to explore the linkage between team purposes and purchasing team usage. Based on the preceding factor analysis, usage of internal teams and customer teams was assessed individually. Firm size and industry sector were included in the model as control variables. Dummy variables were used to model industry context (manufacturing and services).

Results of the regression model are provided in Table 4. The overall regression model for both team usage factors was significant, with $R^2 = 0.34$ and 0.11 ($p < .01$) for the use of internal teams and customer teams, respectively. For both models, collinearity diagnostics were within recommended limits.

First, H1 suggested a relationship between the measurement and improvement factor and internal teams, while H2 suggested a relationship between the strategic supply initiatives factor and customer teams. Findings, however, indicate that strategic supply initiatives and measurement

and improvement played a significant part in the usage of both types of purchasing teams. After controlling for firm sales and industry sector, internal teams and customer teams increased significantly for both strategic supply initiatives and measurement and improvement factors ($p < .01$).

Second, firm sales and industry context played a significant part in the usage of internal teams ($p < .01$), but not in the use of customer teams. Manufacturing firms favored the use of internal teams. Similarly, the use of internal teams increased as firm sales increased.

Discussion

The empirical results point to several important findings that contribute to a better understanding of management's use of purchasing teams. First, not surprisingly, cost reduction represented the most frequent team purpose and insourcing had the lowest mean score. However, the relatively high mean scores suggest a wide range of purposes. Overall, findings indicate a two-dimensional taxonomy for team purposes. The purposes for teams focus on strategic initiatives, such as revenue enhancement and new product development, or on measurement and improvement initiatives such as quality improvement and supplier development.

While previous research has examined the broad context of managing purchasing teams, in areas such as leadership, empowerment and authority (e.g., Trent and Monczka 1994; Trent 1996; Giunipero and Vogt 1997), this paper draws linkages between the underlying motivations for the creating purchasing teams and the type of team used. Findings did not support our original hypothesis that internal and customer purchasing team usage is influenced by different objectives. Instead, our research findings suggest that both forms of purchasing teams can be motivated by a desire to deliver broad corporate initiatives and to achieve measurement and performance objectives. These findings suggest that customer participation is not necessary to support strategic team-based initiatives. Cross-functional internal teams can be expected to deliver both strategic and operational benefits. Similarly, it is quite possible to involve customers in team-based activities motivated by measurement and improvement objectives. In addition, it may be impractical and/or undesirable to have customer participation in some strategic chain initiatives. Alternatively, in some circumstances customers may request supplier involvement in supply chain improvement projects.

Since most service organizations spend a smaller percentage of total revenue with suppliers one would expect less extensive and less sophisticated supply improvement initiatives than in manufacturing companies. On the other hand, the nature of the customer service firm provider interface, often with a high degree of intangibles, probably does require more supply teams which include customers. Consequently, it was not surprising to see that firm context did not influence the use of customer teams.

That internal team usage increases as organizational size increases should not be a surprise. Given the relatively small size of supply organization in relation to the firm as a whole, many smaller organizations lack the resources to use supply teams extensively. Also in small

companies a supply expert can probably access others in different functions easier and less formally than in larger companies.

Findings also provide important managerial implications. First, managers should attempt to cast a wide net when engaging customers on teams. Rather than focusing on customer engagement in broad strategic initiatives, such as access to new technology or revenue enhancement, we found regular contact across a broad range of initiatives. While working with customers on high profile projects such as development of new products and services, regular contact on continuous improvement teams exploring opportunities for quality improvements or lower total costs of ownership can be an effective approach to managing long-term supply chain competitiveness and developing deep relationships with supply chain partners.

Second, one explanation for the results of this research is that it is difficult to separate team purposes clearly into non-strategic and strategic. An improvement in quality can be viewed as strictly operational, but could also represent potential for competitive advantage. The same argument can be applied to any of the sixteen team purposes identified. The survey instrument applied in the research measured frequency of use. If one equates frequency of use with satisfaction with the process, one could imply teams with the highest means should be the most effective.

Third, while large firms and respondents from the manufacturing sector were more likely to use internal teams, firm sales and industry context did no influence the use of customer teams. Furthermore, it would appear, based on the high standard deviations for the customer team usage scores, that some firms make extensive use of customer teams, regardless of industry sector or firm size. It may be that such firms have identified opportunities to create linkages with customers that provide a source of competitive advantage by excluding competitors from developing similar relationships, as suggested by RBV. Additional investigation into customer team usage in the supply chain represents an opportunity for future research.

Lastly, supply initiated teams that include customers require sales/marketing agreement and assistance in inviting customer representation. On the other hand, supply initiated teams that include suppliers can be created directly, because supply “owns” the boundary/relationship between suppliers and the firm, but not the boundary/relationship between customers and the firm. Given the natural orientation of supply towards the supply market and the potential obstacles in supply’s access to the customer market, it is logical to see more supply teams including suppliers than customers. If customer permission needs to be sought to change a specification, supplier, schedule packaging etc., as would be the case in the consumer electronics and automotive industries for example, then customer inclusion on a supply team may be a way of speeding up the permission process. The high standard deviation around the means of team purposes suggests that some managers believe that being unconventional and using some types of teams more or less extensively than the mean is a sound practice, presumably reinforced by experience. The RBV argues that it is wise to exploit competitive advantage in processes or activities not widely used by others. Perhaps the effective use of certain types of supply teams represents a good example.

Conclusion and Future Research

The objective of this research was to test empirically the relationship between purchasing team use in the supply chain and team purposes. Exploratory factor analysis identified a two-dimensional construct for purchasing teams. After controlling for sales and industry context, analysis found that both strategic supply initiatives and measurement and improvement purposes influenced the use of internal and customer teams. Our conclusion is that customer participation is not limited to strategic supply initiatives. Furthermore, firms look for broad customer engagement for team-based activities, rather than focusing on a narrow range of high-profile initiatives.

Findings from the research suggest several opportunities for future research. First, the research can be extended to investigate the relationships between team purposes, team usage and firm performance. This could be achieved through the use of a large sample survey. Alternatively, case-based research could be used to investigate how purchasing team performance aligns with the benefits achieved. Are the original purchasing team expectations met or exceeded?

Given the relatively low use of supply teams including customers, it would be interesting to find out how many of such teams were actually initiated by customers demanding greater value, which ultimately required supplier cooperation and supply involvement. In addition, what reasons required supply initiated teams to involve customers at the request of supply? One might speculate that the relative power of each party in this trade relationship would influence team initiation.

Another research possibility is the examination of teams exclusively composed of firm employees versus teams including customers or suppliers. Does the presence of "outsiders" influence the behavior of the "insiders"? A third opportunity for research could be the study of "unconventional" team usage and to examine the reasons for and the results of such efforts.

Under the concept of open innovation, the search for technological options and specialty sources is more likely to require teams with the capability of accessing the market's potential to solve specific technological challenges. Supply's role on teams initiated by others would be a worthwhile topic of inquiry.

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Table 1
Purposes for Purchasing Teams

Team Purpose	Mean[†]	Std. Dev.
Cost reduction	4.21	0.93
Develop supply strategies congruent with corporate strategies	3.69	1.08
Supplier selection	3.62	1.12
Value improvement	3.59	1.13
Quality improvement	3.31	1.09
Performance measurement	3.16	1.17
Standardization	3.09	1.00
Supplier development	3.07	1.09
Achieve lean supply initiatives	3.02	1.18
Access to new technology	2.92	1.07
Outsourcing	2.88	1.14
New product development	2.86	1.28
Specification development	2.85	1.09
Lead time reduction	2.83	1.11
Revenue enhancement	2.81	1.25
Insourcing	2.00	1.00

[†] 1 = none, 2 = slight, 3 = moderate, 4 = substantial, 5 = extensive

Table 2
Purposes for Purchasing Teams: Factor Analysis

Team Purpose	Factor 1	Factor 2
Access to new technology	**0.726**	0.112
Cost reduction	**0.635**	0.220
Develop supply strategies congruent with corporate strategies	**0.601**	0.286
Insourcing	**0.576**	0.131
New product development	**0.624**	0.290
Revenue enhancement	**0.572**	0.240
Performance measurement	0.333	**0.728**
Quality improvement	0.388	**0.690**
Specification development	0.253	**0.655**
Standardization	0.074	**0.809**
Supplier development	0.252	**0.771**

† 1 = none, 2 = slight, 3 = moderate, 4 = substantial, 5 = extensive

Table 3
Purchasing Team Usage: Rating Based on Team Composition

Form of Team	Mean†	Std. Dev.
cross-functional teams	3.93	0.99
commodity teams (purchasing personnel only)	3.57	1.24
purchasing councils (purchasing personnel only)	2.83	1.30
supplier councils (primarily key suppliers)	2.11	1.10
teams with external customers	1.96	1.05
teams with suppliers and external customers	1.65	0.90

† 1 = none, 2 = slight, 3 = moderate, 4 = substantial, 5 = extensive

Table 4
Results of Regression Analysis

Independent variables	Internal teams		Customer teams	
	Control variables	Controls and factors	Control variables	Controls and factors
Sales	0.217** (0.039)	0.164** (0.035)	0.016 (0.047)	-0.029 (0.045)
Industry context	-0.370** (0.093)	-0.263** (0.082)	-0.093 (0.112)	-0.012 (0.107)
Strategic supply initiatives		0.316** (0.069)		0.194* (0.090)
Measurement and improvement		0.225** (0.059)		0.230** (0.078)
Constant	2.496** (0.143)	0.968** (0.206)	1.785** (0.173)	0.600* (0.270)
R^2	0.127	0.339	0.003	0.110
ΔR^2		0.212		0.107
F	20.422**	35.828**	0.367	8.611**

N = 284. Standard errors noted in brackets.
† $p \leq 0.10$
* $p \leq 0.05$
** $p \leq 0.01$