

## ***Exploring supply management status, internal collaboration and operating performance***

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An important internal link in the supply chain is between supply managers and their internal customers. These individuals must collaborate to determine purchase specifications, develop sourcing strategies, ensure supplier performance, and maintain effective supplier relationships. Using power and social networking as the theoretical lenses, we develop and test a conceptual model examining the supply management function's status, supply manager's networking behavior, collaboration with the internal customer, and operating performance (lower cost, better quality, faster delivery, and consistent delivery). We also examine the mediating effect of collaboration and networking behavior on the positive effect of status and operating performance. Data gathered in an online survey of supply management professionals are examined using path analysis. Results show that without including the mediators, supply management status is directly related to all four operating performance measures. It is also positively related to collaboration with the internal customer and networking behavior. Contrary to expectations, the supply manager's networking behavior is not related to collaboration with the internal customer. Collaboration is positively related to all four operating performance measures. However, the supply manager's networking behavior is only related to one operating performance measure, better quality. Mediation analysis shows that supply management status has a direct effect on faster delivery performance beyond what is explained by collaboration and the supply manager's networking behavior. The findings suggest that organizations should look for ways to elevate the status of the supply management function to improve internal collaboration and operating performance.

# **Exploring Supply Management Status, Internal Collaboration, and Operating Performance**

## **1 Introduction**

Many companies are collaborating with supply chain partners to reduce costs, improve delivery, enhance quality, develop innovative new products or services, reduce risk, and improve sustainability. For example, a 2012 survey of consumer packaged goods companies by the Grocery Manufacturers Association and Boston Consulting Group showed that over 95 % of those surveyed were collaborating with other supply chain members (GMA Supply Chain Benchmarking 2012 2013). Yet, despite their popularity, many supply chain collaborations fail to achieve their goals (Ellinger et al. 2006; Benavides et al. 2012; Fawcett et al. 2012). Internal politics and lack of internal collaboration inhibits supply chain collaboration (Stevens 1989; Stank et al. 2001; Frohlich and Westbrook 2001; Das et al. 2006; Sanders 2007; Chen et al. 2009; Fawcett et al. 2012). Yet, internal collaboration remains elusive for many companies (Ellinger et al. 2006; Halldórsson et al. 2008; Fawcett et al. 2012).

Our research examines an important link in supply chain collaboration, the level of internal collaboration between a supply manager and his/her internal customers. Collaboration between supply managers and internal customers is needed in a number of supply management activities. Collaboration is necessary to develop sourcing strategies, determine purchase requirements and specifications, select suppliers, determine contract terms, and manage on-going supplier relationships to create the best overall value for the organization. However, Tassabehji and Moorhouse (2008 p. 63) suggest that there is an “internal politico-cultural glass ceiling” that suppresses the influence of supply managers within their organizations. Further, they suggest

that lack of appropriate individual level skills as well as the relatively low organizational status of supply management contributes to this glass-ceiling.

In this research, theories of social power (French and Raven 1959; Raven 1965) and social networks (Granovetter 1973; Burt 1997) provide the support for developing a model that explores the supply management glass ceiling. Specifically, we propose that the supply management function's status within an organization affects collaboration both directly and indirectly through an individual supply manager's networking behavior. Supply management status is how top management and others perceive supply management relative to other functions such as finance, marketing, and operations (Pearson et al. 1996; Carr and Smeltzer 1997; Goebel et al. 2003; Cousins et al. 2006; Ogden et al. 2007; Ramsay and Croom 2008). At the individual level, networking is an important political behavior that can be used to influence processes and outcomes (Ferris et al. 2005; Blass et al. 2007; Ferris et al. 2007). Networking is defined as "individuals' attempts to develop and maintain relationships with others who have the potential to assist them in their work or career," (Forret and Dougherty 2004, p. 420). To provide a complete model, the relationships between collaboration and networking behavior with operating performance from working with the internal customer are examined. In this research, operating performance consists of four performance measures: lower cost, better quality, faster delivery, and consistent delivery. The measures focus on working with the internal customer rather than an organization's overall operating performance.

Our study contributes to theory and practice by 1) focusing specifically on the supply manager and internal customer relationship, 2) exploring collaboration in goal setting and identifying performance improvements, 3) examining an individual level construct, supply manager's networking behavior, and 4) measuring if, and how, supply management status affects

internal collaboration. A number of studies show performance benefits from internal integration as a component of overall supply chain integration (e.g. Narasimhan and Kim 2002; Frohlich and Westbrook 2001; Flynn et al. 2010; Schoenherr and Swink 2012; Zhao et al. 2011; Williams et al. 2013). However, these studies broadly define internal integration across a number of functions and are targeted toward information sharing for supply chain operations planning and execution. Thus, our study contributes by focusing on the supply management-internal customer interface and by taking a broader view of internal collaboration.

Further, in the supply management literature, most studies of internal collaboration have remained exclusively at an organization level (e.g. Stevens 1989; Stank et al. 2001; Frohlich and Westbrook 2001; Das et al. 2006; Sanders 2007; Chen et al. 2009; Flynn et al. 2010; Schoenherr and Swink 2012; Zhao et al. 2011; Williams et al. 2013). However, the heart of collaboration occurs at the *individual level*, people working with each other, communicating, solving problems, and making decisions (Schrage 1990; Gray 1991; Stank et al. 2001). Thus, this research contributes by examining if, and how, an individual's networking behavior affects internal collaboration and operating performance.

The few studies of supply management-internal customer relationships have focused on the organizational level and have examined overall service quality (Finn et al. 1996; Stanley and Wisner 1998; Wisner and Stanley 1999), coordination efforts (Carr et al. 2008; Das et al. 2006), potential conflict (Anklesaria and Burt 1987; Lonsdale and Watson 2005), and organizational structure, culture, and reward systems (Pagell 2004). As the supply management function has evolved from tactical to strategic, the status of the supply management function has also been elevated (Carr and Smeltzer 1997; Lintukangas et al. 2010). Our study contributes by exploring if supply management's status affects internal collaboration.

The results also contribute to practice by identifying two mechanisms that managers may be able to use to increase collaboration. Supply management status can be increased by improving skills in supply base management, strategic thinking, and project management (Eltantawy et al. 2009). If networking behavior is positively related to internal collaboration and/or performance, focused training can help individuals improve their networking skills (Aasheim et al. 2009; Suhonen and Passivaari 2010) and ultimately operating performance.

Over the next few sections the literature is briefly reviewed, research hypotheses are developed, and the conceptual model is presented. Then, the survey research method used to gather the data is described. The results of data analysis using path analysis are presented and discussed followed by limitations, future research opportunities, and conclusions.

## **2 Conceptual model and hypotheses development**

Collaboration is a process in which individuals work together to generate ideas, solve problems, and make decisions (Schrage 1990; Gray 1991; Stank et al. 2001). Collaboration requires a mutual understanding of goals, involves sharing of information and resources, and creates joint responsibility for decisions and outcomes (Schrage 1990; Gray 1991; Kahn and Mentzer 1998; Ellinger et al. 2000; Stank et al. 2001). Because supply managers provide a service to their internal customers there is a mutual dependence between these individuals. Beyond just managing purchasing transactions, collaboration with internal customers is one way that supply managers can increase value for their organizations. As boundary spanners between their organizations and the supply market, supply managers gather and share critical information internally and with suppliers. Through collaboration, supply managers learn about their organizations' current and future resource requirements (Carter et al. 2007), influence business

decisions and budgets (Tassabehji and Moorhouse 2008), and help their organizations meet short and long-term goals (Stuart 1991; Schiele 2005).

In some organizations politics can be a barrier to internal collaboration. Organizational politics involve an exercise of power, control, and influence, often geared toward use and allocation of an organization's resources for self-serving purposes (Mayes and Allen 1977). Politics can affect supply management because supply managers commit organizational resources on behalf of internal customers (Pettigrew 1975). Internal customers sometimes fear that supply managers will not focus on their interests and will lose control over budgets (Schiele 2005; Ellram et al. 2007; Bals et al. 2009). This suggests that self-interests, control, and influence inhibit collaboration. The social power (French and Raven 1959; Raven 1965) obtained through attaining a higher status within the organization and an individual supply manager's networking behavior may counteract organizational politics and facilitate collaboration. Research shows that networking behavior is an important political skill (Ferris et al. 2005, 2007).

The conceptual model is shown in Figure 1. Hypotheses are developed in the next section.

[Insert Figure 1]

### *2.1 Supply management status*

Status is the “relative standing in a group in terms of respect, honor, and prestige” and the status of an individual or group is generally accepted by others within the organization (Willer et al. 2012, p. 356). Status is a signal of value within the organization. The way that top managers and others perceive supply management relative to finance, marketing, operations, or other

functions is referred to as supply management status (Pearson et al. 1996; Carr and Smeltzer 1997; Goebel et al. 2003; Cousins et al. 2006; Ogden et al. 2007; Ramsay and Croom 2008).

A function with higher status has a higher level of legitimate authority allowing it to make decisions on behalf of the organization (Ogden et al. 2007). Working in a higher status department increases a supply manager's legitimate authority for making sourcing and supply decisions (Ogden et al. 2007) and is likely to have a direct, positive effect on operating performance (lower cost, better quality, faster delivery, and consistent delivery). This is because the supply manager can effectively enact the organization's supply management decisions both internally, and with suppliers. Suppliers are more likely to look to the supply manager as the single voice of the organization. When supply management status is lower, suppliers may receive conflicting information about requirements from internal customers and supply managers which may negatively affect performance.

Thus, we propose:

*Hypothesis 1: The higher the status of the supply management function, the better the operating performance (lower cost, better quality, faster delivery, and consistent delivery) directly related to working with the internal customer.*

Collaboration and the supply manager's networking behavior may influence the relationship between status and operating performance. There are several reasons why supply management's status should be related to higher collaboration with the internal customer. Studies show that higher status groups engage in less intergroup conflict than lower status groups (Ashforth and Mael 1989) and are more likely to collaborate. Lower status groups often engage in behaviors to improve their status at the expense of other groups in the organization (Watson and Dutton 1969).

Another reason that status may lead to collaboration is that status is a source of referent power (Dali et al. 2013) and legitimate authority (Ogden et al. 2007) within an organization enabling supply management to exert influence on organizational decisions and outcomes. Referent power occurs when others in the organization want to be associated with those with higher status (French and Raven 1959). Thus, internal customers are more likely to be willing to work closely with supply managers in higher status departments. In inter-organizational relationships between buyers and suppliers, referent power is positively related to relational characteristics such as collaboration, commitment, and trust (Benton and Maloni 2005). In addition, internal customers should be more willing to collaborate with supply managers who they view as having the legitimate authority to influence organizational decisions.

Thus, we propose:

*Hypothesis 2: The higher the status of the supply management function, the higher the level of supply manager's collaboration with the internal customer.*

Networking behavior allows individuals to develop connections with influential people and use those connections to accomplish goals (Ferris et al. 2005). By being a member of a higher status functional group, supply managers should have more access to influential organizational members both within their organization and externally. For example, higher status departments often report to more senior level executives such as Senior Vice Presidents (Johnson et al. 2006). Because of the higher level of referent power that accompanies status, influential individuals within the organization, as well as suppliers, are more likely to be willing to network with supply managers in higher status departments. Pearson et al. (1996) found positive relationships between access to information and participation in cross-functional decision making and supply management status. When organizational members perceive that

supply management has a higher status, they are more likely to value the information and opinions of supply managers (Cousins et al. 2006).

The psychology and organizational behavior literature suggest that behavior results from an interaction of a person's underlying characteristics and situations (e.g. Pervin 1989). Higher status groups are more attractive to others, and as a result, the members of higher status groups have higher esteem (Podolny 1993). Individuals within a department adopt the group's characteristics and behave accordingly (Tyler and Blader 2003). When their department is higher status supply managers are more likely to see themselves as highly valued and highly regarded, and are willing to take on more social risks, such as networking. The social network literature suggests that an individual's status (centrality) in the network is related to his/her personality traits (Obstfeld 2005).

Therefore, we propose:

*Hypothesis 3: The higher the status of the supply management function, the higher the level of supply manager's networking behavior.*

## 2.2 *Supply manager's networking behavior*

In supply chain research, social networks have been used as a lens to examine buyer-supplier relationships (e. g. Bernardes 2010; Borgatti and Li 2009; Choi and Kim 2008) at the organizational level. However, social networks are at the individual level as well. Networking behavior allows individuals to develop strong, diverse relationships that can be advantageous both for the individual and the organization (Ferris et al. 2005; Ferris et al. 2007). Because of their connections with suppliers and the external market, supply managers have access to information that may not be available to their internal customers. Social network theory suggests that internal customers are more likely to collaborate with a supply manager who has a large, diverse

network because he/she has access to unique information that the internal customer needs (Granovetter 1973; Burt 1997).

Networking enables supply managers to perform informal, unstructured activities across departments that are necessary for internal collaboration (Kahn and Mentzer 1998). As a result, a supply manager who extensively networks can build strong internal and external networks that he/she can turn to for information and other resources, enhancing his/her value to internal customers, suppliers, and the organization overall. Additionally, networking creates opportunities for communication that do not as readily exist in a less interactive environment. More active networking then can enable collaborative opportunities that may otherwise be shut off from the supply manager. Collaboration is facilitated by informal networks (Cross et al. 2002) and these networking behaviors enhance teamwork across the organization (Zou and Ingram 2013).

Thus, we propose:

*Hypothesis 4: The higher the level of the supply manager's networking behavior, the higher the level of supply manager's collaboration with the internal customer.*

The supply manager's networking behavior is also likely to directly affect operating performance (lower cost, better quality, faster delivery, and consistent delivery) for purchases for the internal customer. Supply managers network externally as well as internally within their organizations. Supply managers who do a high level of networking are likely to have access to the essential information to make good sourcing decisions. For example, by networking with key decision-makers within their organizations supply managers can ensure that selection criteria and negotiated contracts align with the organization's strategic objectives. Supply managers who exhibit strong networking behaviors also are likely to have access to information from

suppliers and the marketplace that will help them to make better sourcing decisions and be more effective when managing suppliers. The ability to gain access to influential people both within the organization and externally may better position supply managers to address problems and conflicts. Better performance in sourcing and supplier management should help purchases better meet the internal customer's requirements.

Thus, we propose:

*Hypothesis 5: A higher level of the supply manager's networking behavior is positively related to higher levels of operating performance (lower cost, better quality, faster delivery, and consistent quality) directly related to working with the internal customer.*

### 2.3 Collaboration and operating performance

Several studies show a positive relationship between cross-functional collaboration and organizational performance (Lawrence and Lorsch 1967/1986; Kahn and Mentzer 1998; Eng 2005; Stank et al. 2001; Sanders 2007). Collaboration between supply managers and their internal customers can directly affect operating performance which encompasses cost, quality, and delivery performance (Cousins et al. 2006) relative to competitors. By collaborating with internal customers, supply managers can better identify and negotiate with suppliers that possess the needed skills and capabilities, identify opportunities for standardization of purchases, find substitute materials, modify purchase specifications, consolidate purchases with fewer suppliers, bring innovative ideas from suppliers into their organizations, identify and mitigate supply risk, and switch suppliers if needed. Thus, collaboration can enhance the operating performance in terms of lower cost, better quality, faster delivery, and consistent delivery related to working with the internal customer.

To be effective, supply managers must fully understand the internal customer's needs and constraints and gain the internal customer's support for initiatives. Gaining internal support for

supply driven initiatives can be difficult. For example, sometimes internal customers do not want to change suppliers even if there is no impact on performance and the overall firm would benefit (Lonsdale and Watson 2005). Through collaboration, supply managers can work with internal customers to ensure that sourcing and supply management decisions are in the best interest of both the internal customer and the overall organization.

Thus we propose:

*Hypothesis 6: The higher the level of supply manager's collaboration with the internal customer, the higher the level of operating performance (lower cost, better quality, faster delivery, and consistent delivery) directly related to working with the internal customer.*

Collaboration with the internal customer and the supply manager's networking behavior may mediate the positive effect of supply management status on operating performance. If they mediate the effect, the results will provide a compelling reason for organizations to adopt interventions to enhance internal collaboration and the networking behavior of supply managers.

Thus we propose:

*Hypothesis 7: Higher levels of supply manager's collaboration with the internal customer and higher levels of supply manager's networking behavior mediate the effect of supply management status on operating performance (lower cost, better quality, faster delivery, and consistent delivery).*

#### 2.4 Control variables

It is likely that individual supply manager characteristics may also affect collaboration with the internal customer and networking behavior. This study controls for two of these characteristics, the years of experience in supply management and the years of tenure with the current organization by including these variables in the model. More experienced supply managers may have more experience in collaboration and networking than those who are newer to the profession. The longer a supply manager has been with his/her organization the more people

he/she is likely to personally know. Knowing more people may affect collaboration and networking.

### **3 Research method**

#### *3.1 Sample characteristics*

The data were gathered through an online survey of 5,000 randomly selected members of APICS, The Association for Operations Management, whose job titles relate to supply management. The online survey was developed and deployed using Qualtrics software. APICS randomly selected the sample using the criteria based on job titles provided by the research team. An email soliciting participation was developed by the research team but all communication with the respondents was directly from the APICS organization by email. Three emails with the survey link were sent by APICS, an initial email followed by two reminder emails, each email was sent one week apart. In total, 146 people clicked on the survey link and 126 surveys were usable for a 2.5% response rate. APICS would not allow direct follow-up with non-respondents.

The response rate was likely affected by some of the unique challenges posed by online surveys. Spam filters may have limited the number of people who actually received the email invitation, and even if received, people may have been concerned that clicking on the link could harm their computers. Further, our APICS contact commented that individuals often do not update their membership data when their job responsibilities change. Thus, some individuals in the sample may have changed job responsibilities and did not respond.

A low response rate by itself does not indicate sampling error or non-response error (Groves 2006) in an online survey in which researchers have limited control over contact information, email filtering, and access to respondents' email addresses (Dillman et al. 2009). Those who respond later to a survey may be similar to non-respondents (Armstrong and Overton

1977). Therefore, early respondents who completed the survey after the first email reminder (37 respondents) were compared to those who completed the survey after the third reminder (38 respondents). Results of MANOVA show no statistically significant differences between the early and late respondents on the constructs in the model. Chi-squared test results showed no difference between the early and late respondents on company annual sales, supply management experience, or organizational tenure. However, the small sample size of the early and late groups limits the power to detect differences. There was a significant difference in gender with more women responding early than men. Perhaps women were more interested in the topic and thus responded earlier. Overall, the majority of respondents are male (61%) which is consistent with APICS membership.

A wide range of company sizes are in the sample with 32% of respondents reporting sales over \$1 billion and 29% reporting sales under \$100 million. Most respondents are in manufacturing industries. The majority (56%) report that the primary purchase area for internal customers is direct materials and 24% report that services is the primary area. The respondents are experienced with 84% reporting working in supply management for five or more years. To increase the probability of a response and reduce missing data, the years of experience was measured using a scale of 1 to 5 (1 = less than 1 year and 5 = more than 10 years of experience) rather than in actual years. A similar 1 to 5 scale was also used for organization tenure. The results show that 57% of respondents reported working for their current employer for five or more years. The most frequently reported job titles are buyer/planner, purchasing manager, and supply chain manager. When responding to the survey, the supply managers were asked to focus on the internal customer that they had worked with most recently regardless of the nature of the

relationship with this internal customer. Of the respondents, 36% have worked with the particular internal customer for five years or more.

In a few cases, not all data provided were complete. The potential for bias due to listwise deletion of incomplete cases has been well demonstrated (van Buuren 2012). Therefore, we used multiple imputation in PRELIS to impute values. This method uses the EM algorithm to generate starting values for a set of variables (Joreskog and Sorbom 200; Gupta and Chen 2011). PRELIS then applies multiple imputation methodology to estimate values of missing data.

### 3.2 *Measurement model*

The validation process for the survey instrument assessed three characteristics: content validity, construct validity, and reliability. Content validity was ensured through an extensive review of literature and published empirical studies. Existing scales were adapted for networking behavior (Ferris et al. 2005), supply management status (Cousins et al. 2006), collaboration with the internal customer (Kahn and Mentzer 1998; Pagell 2004; Zacharia et al. 2009), and operating performance (Cousins et al. 2006) as shown in the Appendix. The measure for operating performance was modified to consider the outcomes that directly result from working with the internal customer rather than overall operating performance. Operating performance was measured using four single item scales: lower cost, better quality, faster delivery, and consistent delivery.

Confirmatory factor analysis shows that the scales for supply management status, supply manager's networking behavior, and collaboration with the internal customer are one dimensional providing support for construct validity. Because the sample size is insufficient for a full structural equation model (Kline 1998) the confirmatory factor analysis was done separately from hypothesis testing using LISREL 8.72 (Jöreskog and Sörbom 2001). Table 1

presents the factor loadings by item. A model with each of the indicators forming the latent variables (supply management status, supply manager's networking behavior, and collaboration with the internal customer) was specified. The latent constructs were also allowed to covary which is the default setting for LISREL 8.72. The model fit the data well, yielding the following fit statistics:  $\chi^2(24) = 30.84$ ,  $p = .16$ , RMSEA = .05, SRMR = .05, CFI = .98, and TLI = .98. The indices for  $\chi^2$ , RMSEA, SRMR, CFI, and TLI all suggest good fit of the model to the data (Hu and Bentler 1999; Kline 2003).

Reliability of the scales was measured through the internal consistency method with Cronbach's alpha as the reliability indicator, as well as with composite reliability and average variance extracted (see Table 1). The Cronbach's alpha and composite reliability scores all exceed 0.8 indicating good internal consistency (Nunnally 1978; Bacon et al. 1995). Average variance extracted values are good, exceeding the recommended cut-off of .50 (Fornell and Larcker, 1981). Descriptive statistics and correlations are shown in Table 2.

[Insert Tables 1 and 2]

Because the data for this study were gathered using a single survey a test for common method bias was needed. A confirmatory factor analysis was performed such that all indicators from all latent variables were specified as a single factor to determine the influence of common method factors. Fit statistics are poor with  $\chi^2(27) = 266.43$ ,  $p < .001$ , RMSEA = .27, SRMR = .16, TLI = .58, and CFI = .69. We further attempted a model where the items were allowed to load on their own latent factor as well as to cross-load on a "common method" factor (Podsakoff et al. 2003) but the solution did not converge. These results provide evidence against common method bias and support for the measurement properties of the self-reported scales (Podsakoff et al. 2003).

#### **4 Results: Path analysis and hypothesis tests**

Having established favorable psychometric properties of the measurement scales, items were averaged to form a composite for each respondent which was used for path analysis using LISREL 8.72 (Jöreskog and Sörbom 2001). Due to the limited sample size, hypotheses were tested using path analysis, rather than a full structural equation model. A number of indices were used to determine the fit of the data to the model. The indices for  $\chi^2$ , RMSEA, SRMR, CFI, and TLI all suggest good fit of the model to the data, (Hu and Bentler 1999; Kline 2003). The overall fit statistics indicate that the hypothesized model fit the data well with  $\chi^2 (8) = 13.97$ ,  $p = .08$ , RMSEA = .08, SRMR = .028, CFI = .99, and TLI = .95. CFI and NNFI values indicate very good fit, as values exceeding 0.9 are considered very good (Bentler 1990). The RMSEA value of .08 is in the .05 and .08 range (Browne and Cudeck 1993), and together with the SRMR value below .05 (Hu and Bentler 1999), indicates a good fit.

The hypotheses were tested by examining each of the individual paths within the model. The four operating performance measures were allowed to covary due to their significant positive correlations. All unstandardized path coefficients and significance tests are provided in Tables 3 and 4. Neither of the control variables, tenure with the organization and experience in supply management, is related to collaboration or networking behavior as shown in Table 4. However, this may be because variance was limited by the use of 1 to 5 scales rather than actual years of experience and tenure.

Hypothesis 1 which proposes that supply management status is related to operating performance is supported as shown in Table 3. Prior to adding collaboration with the internal customer or supply manager's networking behavior to the model, supply management status is

significantly related to all performance outcomes: lower cost (.35,  $p < .01$ ), faster deliver (.45,  $p < .01$ ), better quality (.35,  $p < .01$ ), and consistency delivery (.30,  $p < .01$ ). Turning to the path analysis, Hypothesis 2 which proposes a positive relationship between supply management status and collaboration with the internal customer is also supported (0.28,  $p < .01$ ). Likewise Hypothesis 3 is supported, indicating a significant relationship between supply management status and supply manager's networking behavior (.44,  $p < .01$ ). Contrary to Hypothesis 4, the supply manager's networking behavior is not related to collaboration with the internal customer (.02, ns).

Hypothesis 5 through Hypothesis 7 examine the effect of supply management status, collaboration with the internal customer, and networking behavior on performance outcomes . The results in Table 4 reveal that both networking behavior and collaboration have significant direct effects on operating performance. Networking behavior has a significant direct effect only with better quality (0.24,  $p < .01$ ) and not on lower cost, faster delivery or consistent delivery, partially supporting Hypothesis 5. Collaboration has a significant direct effect on all aspects of operating performance at  $p < .01$ , fully supporting Hypothesis 6.

To determine if collaboration and networking behavior mediate the effect of supply management status on operating performance, we examined the direct and indirect effects of supply management status on operating performance while controlling for networking behavior and collaboration (Shrout and Bolger 2002; Mackinnon et al. 2007). As shown in Table 3, the indirect effect of supply management status on all four measures of operating performance is statistically significant ( $p < 0.01$ ) suggesting full mediation. However, supply management status maintained a significant direct effect on faster delivery (.25,  $p < .01$ ), although the unstandardized path coefficient was reduced from .45 when the mediators were excluded from the model to .25

when the mediators were added (see Table 3). Together these results indicate partial support for Hypothesis 7: (1) full mediation by collaboration with the internal customer and supply manager's networking behavior of the effect of supply management status on operating performance as lower cost, better quality, and consistent delivery, and (2) partial mediation by collaboration with the internal customer and networking behavior of the effect of supply management status on performance as faster delivery.

## **5 Discussion**

Our findings suggest that collaboration between supply managers and their internal customers can improve the operating performance (lower cost, better quality, faster delivery, and consistent delivery) directly related to working with the internal customer. This further supports the growing evidence in the literature that internal collaboration is an important component of successful supply chain collaboration (Stevens 1989; Stank et al. 2001; Frohlich and Westbrook 2001; Das et al. 2006; Sanders 2007; Chen et al. 2009; Fawcett et al. 2012; Kim 2013). Through collaboration, the supply manager and the internal customer can agree upon purchase specifications and supplier selection criteria so suppliers who have the right capabilities and performance can be selected. In addition, contracts can be written and supplier relationships managed in ways that meet the internal customer's ongoing needs. Further, if problems with supplier performance do arise, internal collaboration helps to maintain a consistent position within the buying organization. Thus, suppliers will be less likely to take advantage of conflicting positions between the internal customer and the supply manager.

For years, researchers have called for increasing supply management's status within the organization (e.g. Carr and Smeltzer 1997 1999; Cousins et al. 2006; Reck and Long 1988;

Ogden et al. 2007) and research shows that progress is being made (Johnson et al. 2006). Our research shows the benefits of increasing supply management's status within the organization. Supply managers in higher status departments collaborate more with their internal customers which, in turn, leads to better operating performance in cost, quality and, delivery speed and consistency directly related to working with the internal customer. The findings also show that supply managers who perceive that their departments have higher status within the organization exhibit higher levels of networking behavior. Higher levels of supply manager's networking behavior are positively related to better quality related to working with the internal customer. Networking behavior likely leads to a more complete understanding of what quality means to all stakeholders and hence better ability to meet quality objectives.

Supply management status has a direct effect on faster delivery performance beyond what is explained by collaboration with the internal customer and the supply manager's networking behaviors. This may be because suppliers are more responsive to supply managers whom they perceive to have more legitimate authority within their organizations. Future research should explore the supplier's perception of supply management status to determine if this is the case.

The results do not show the expected positive relationship between supply manager's networking behavior and collaboration with the internal customer. There may be several explanations for this finding. This study did not examine the structure and make-up of the supply manager's network. Social network theory suggests that if there is a significant overlap between the supply manager's and the internal customer's network, the supply manager will not have unique information so the internal customer is not likely to perceive any additional information benefit from collaboration (Granovetter 1973; Burt 1997). Future research should examine the structure and overlap of the supply manager's and the internal customer's networks.

Alternatively, as a political skill, networking may be perceived as being self-serving rather than being something that benefits the organization (Mayes and Allen 1977). Thus, an internal customer may not trust a supply manager who he/she observes engaging in frequent networking behavior. Ferris et al. (2005 2007) identify other aspects of political skill including apparent sincerity, social astuteness, and interpersonal influence. It may be that to be effective in facilitating collaboration, networking behavior must be accompanied by one or more of these other political skill components. Other supply manager characteristics such as personality and motivational factors also may interact with networking behavior.

## **6 Limitations, future research and conclusions**

There are several limitations to this research that should be addressed in future studies. This research only focused on the internal aspect of supply chain integration and did not examine external collaboration with customers or suppliers. Future research should include external collaboration to provide a more complete understanding of collaboration and operating performance.

There also are some methodological issues with the survey research. Because of the online approach and the source of the sample, the overall response rate is low; caution should be used when generalizing the results, especially beyond manufacturing industries. Future research should attempt to increase response rates and to reduce the potential for non-response bias. Bias may have also been introduced by the self-selection of the internal customer by the supply manager. Although supply managers were asked to report about the internal customer who they worked with the most recently, they may have focused on positive rather than difficult

relationships. Future research should focus on a range of collaborative relationships and ideally explore how collaboration evolves over time to address causality.

Another limitation of this research is that we employed a single method and single respondent to collect the data, creating the opportunity for common method and common source bias. Ideally data should be gathered from both the internal customer and the supply manager using multiple methods. It is possible that supply manager and internal customers have different perceptions of supply management status, collaboration, networking behavior, and operating performance outcomes. Future research could gather data about independent variables from the supply managers and data on the dependent variables from internal customers.

In this study the sample size was not large enough to examine differences in the collaboration context. The purpose of collaboration such as new product development, selecting a new supplier, or solving a problem with an existing supplier may affect the antecedents of and outcomes from internal collaboration. Supply management policies, procedures, and strategies such as supply base reduction and standardization may influence the collaboration process and should be studied in the future (Daugherty et al. 2006).

Individual, organizational, and country characteristics may affect collaboration and networking and offer opportunities for future research. In this study, individual experience and organizational tenure were measured using scales, rather than years. Future research using years may uncover different results. Organizational characteristics such as industry type, reward contingencies, social norms, and organizational culture could be investigated in future research. Finally, the impact of national culture and how it affects collaboration within the supply management function should be explored. Given the differences among national norms

(Hofstede 1984), collaboration may have different effects based on different expectations and preferences for behavior within organizations.

Several recommendations for practice are noted as a result of this research. Our research further supports the view that organizations should find ways to overcome the barriers to internal collaboration (Lonsdale and Watson 2005; Schiele 2005; Ellram et al. 2007; Bals et al. 2009). The results provide further evidence that organizations should continue to elevate the status of supply management. This can be accomplished by improving skills in supply base management, strategic thinking, and project management (Eltantawy et al. 2009). Changing the organizational structure so that supply management reports to a higher level executive can also increase the function's status (Johnson et al. 2006). However, there may also be a downside to increasing supply management status to too high of a level. Early research on professionalism in supply management suggests that when supply managers perceive that their department has higher status they are more likely to go around organizational rules to accomplish their goals (Barath and Hugstad 1977; Hackman 1992). Thus, future research should examine both the potential positive and negative consequences of higher status supply management departments. Although it will not increase internal collaboration, organizations should enhance supply managers' networking behaviors as a means to improve operating performance outcomes. Internal individual development programs, such as soft skills training can help supply managers develop critical skills and improve their networking behaviors (Hunt and Baruch 2003; Baron and Morin 2010).

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Table 1. Measurement model factor loadings from confirmatory factor analysis and reliability metrics.

Construct/Item	Standardized Loading	Observed t-value
Supply management status: .87 <sup>a</sup> , .92 <sup>b</sup> , .75 <sup>c</sup>		
Status 1	0.82	10.62**
Status 2	0.93	12.84**
Status 3	0.79	10.15**
Collaboration with the internal customer: .82 <sup>a</sup> , .89 <sup>b</sup> , .67 <sup>c</sup>		
Collab 1	0.91	11.51**
Collab 2	0.70	8.27**
Collab 3	0.80	9.83**
Supply manager's networking behavior: .84 <sup>a</sup> , .93 <sup>b</sup> , .72 <sup>c</sup>		
Net 1	0.85	10.86**
Net 2	0.61	7.09**
Net 3	0.90	11.79**
** p ≤ .01		

<sup>a</sup> Cronbach's alpha

<sup>b</sup> Composite reliability

<sup>c</sup> Average variance extracted

Table 2. Mean, standard deviations, and correlations.

	Mean (SD)	1	2	3	4	5	6	7	8
1. Supply management status	5.4 (1.15)	-							
2. Supply manager's networking behavior	5.6 (0.97)	.45	-						
3. Collaboration with the internal customer	5.8 (0.87)	.35	.20	-					
4. Lower cost	5.2 (1.14)	.36	.29	.52	-				
5. Deliver faster	5.4 (1.17)	.45	.25	.59	.69	-			
6. Better quality	5.6 (1.07)	.38	.36	.58	.50	.71	-		
7. Delivery consistency	5.4 (1.07)	.32	.19	.50	.52	.62	.59	-	
8. Organizational tenure	3.4 (1.33)	.03	-.01	-.01	.08	-.09	.01	.02	-
9. Supply management experience	4.4 (1.00)	.09	.01	.11	-.05	.14	.12	.10	.05

*Note:* Supply management status, networking behavior, collaboration with the internal customer, and performance measures use scales of 1 to 7. Tenure and supply chain experience are on a scale (1 = less than one year, 3 = 3 to 5 years, 5 = more than 10 years).

Table 3. Mediation analyses for the effect of collaboration and networking on performance measures while controlling for the effect of supply management status.

Performance as:	Direct effect of status without mediators	Direct effect of status with mediators	Indirect effect of status with mediators
Lower cost	.35 <sup>**</sup>	.11	.24 <sup>**</sup>
Faster delivery	.45 <sup>**</sup>	.25 <sup>**</sup>	.20 <sup>**</sup>
Better quality	.35 <sup>**</sup>	.07	.28 <sup>**</sup>
Consistent delivery	.30 <sup>**</sup>	.13	.16 <sup>**</sup>

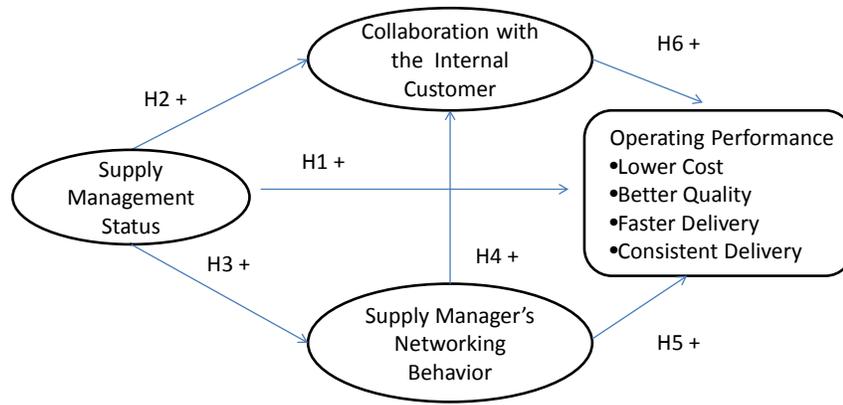
\*\* p<.01

Table 4. Path analysis results.

Dependent variables	Independent Variables				
	Collaboration with the internal customer	Supply management status	Supply manager's networking behavior	Supply management experience	Organizational tenure
Collaboration with the internal customer		.28**	-.04	.07	-.02
Supply manager's networking behavior		.44**		-.03	-.01
Lower cost	.59**	.11	.16		
Faster delivery	.66**	.25**	.03		
Better quality	.62**	.07	.24**		
Consistent delivery	.55**	.13	.02		

\*\*  $p < .01$

Figure 1. Conceptual model.



Appendix

<b>Supply Management Status (Adapted from Cousins et al. 2006)</b>
Status 1: Supply management is considered a vital part of our company strategy.
Status 2: Top managers consider supply management's input to be important.
Status 3: Supply management is an equal partner with other functions in my company.
<b>Supply Manager's Networking Behavior (Adapted from Ferris et al. 2005)</b>
Net 1: I am good at building relationships with influential people at work.
Net 2: I have a large network of colleagues I can call on when I really need to get things done.
Net 3: At work, I am well connected to important people.
<b>Collaboration with the Internal Customer</b> <b>(Adapted from Kahn and Mentzer 1998; Zacharia et al. 2009; Pagell 2004)</b>
Collab 1: We work to achieve goals collectively.
Collab 2: We have a mutual understanding of our responsibilities.
Collab 3: We jointly decide how to improve performance.
<b>Single Item Measures for Operating Performance Directly Related to Working with the Internal Customer (Adapted from Cousins et al. 2006)</b>
Lower cost: Our total costs are lower.
Faster delivery: We can deliver faster.
Better quality: We offer better product/service quality.
Consistent delivery: Our delivery is more consistent.