An assessment of supply chain managers’ trust in online auctions

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Abstract

Purpose – The purpose of this study is to empirically test the levels of trust supply chain managers exhibit regarding online auctions. The study seeks to test the hypotheses that supply chain managers with higher levels of trust in online auctions would exhibit more familiarity with online auctions, more positive relationships with suppliers, stronger focus on cost management, a stronger focus on revenue enhancement, and greater levels of participation.

Design/methodology/approach – A review of the extant literature provided the basis for the development of an online pilot study that was e-mailed to 100 supply chain managers. The results of the pilot study were used to develop an online survey instrument that was e-mailed to 2,313 current members of the Council of Supply Chain Management Professionals (CSCMP) and the Institute of Supply Management. A total of 213 usable questionnaires were returned, resulting in a 9.2 percent response rate.

Findings – The data were analyzed via t-test, MANOVA and ANOVA. The study indicated that online auction users exhibit high levels of trust in online auctions. The study also found that those with higher levels of familiarity with online auctions, with stronger positive relationships with online auction suppliers, and with stronger focus on cost management also exhibited higher levels of trust in online auctions. Contrary to expectations study findings indicate that higher levels of perceived firm profitability and of online auction participation do not lead to increased levels of trust in online auctions.

Practical implications – The study provides a number of important implications. First, it is important for supply chain managers to recognize the important role that trust continues to play in business relationships. Supply chain managers are advised to be cognizant of the fact that some suppliers may be reluctant to participate in online auctions because they fear participation might damage customer relationships that they have spent years cultivating. Finally, supply chain managers are advised to consider the use of online auctions in order to achieve cost management objectives.

Originality/value – The research makes an important contribution to the literature because it seeks to assess supply chain managers’ level of trust in online auctions and how this impacts on the extent to which they participate in this exchange mechanism. An equally important contribution provided by the research is that it focuses on the level of trust in online auctions in general, whereas the preponderance of past research has focused on reverse or price descending auctions only.

Keywords Electronic commerce, Trust, Budgetary control, Supplier relations

Paper type Research paper

Introduction

Auctions in various forms have been used for more than 2,000 years to facilitate the transfer of goods and to establish market values. During this time there have been
many technological breakthroughs such as the internet that have helped reduce or eliminate barriers related to time and space that have historically limited the effectiveness of auctions. As a result, online auctions are now an important exchange mechanism (Li and Smith, 2004).

At the firm level businesses use auctions to reduce transaction costs, shorten cycle times and control purchase price (Hartley et al., 2004; Kaufmann and Carter, 2004). In other cases some businesses are active participants in capital, commodity, procurement, and stock markets. The use of auctions is so ubiquitous that the market value of publicly held corporations is determined in part by the stock market. At the individual firm level, supply chain managers may use auctions to acquire or dispose of inventory and equipment (see teamauctionsales.com (cattle), mconnect.com (plastic feedstuffs), Chicago Board of Trade (CBOT) (commodities) (Bapna et al., 2001)) or to acquire raw materials or maintenance, repair, and operations goods. In other cases, auctions such as the commodity markets, provide supply chain managers with anchor points that enable them to know how much to pay for a given commodity (e.g. how much above or below the spot market price) (Luckock, 2003). Consequently, supply chain managers that oversee buying and selling activities have the potential to benefit from auction participation.

As the use of online auctions has become increasing commonplace, academic research has begun to study this important exchange mechanism from a number of different perspectives. However, only recently have relational variables such as trust been investigated. While the impact of trust in face to face business relationships is well established in the business literature (e.g. Ganesan, 1994; Morgan and Hunt, 1994) its role in the e-marketplace and more specifically business to business (B2B) online auctions has not been explored to the same extent. Thus, it is important to extend past research to include online auctions in order to better understand how trust impacts this important exchange mechanism.

This gap in the literature has been partially addressed in studies which speak to a variety of topics such as trust in the internet and e-marketplace (Chou et al., 2005; Hsu and Wang, 2008; Kim and Ahn, 2007), sources of online trust (Kim and Ahn, 2006), the impacts of web site design on trust and loyalty (Flavian and Guinaliu, 2006; Meziane and Kasiran, 2008), the mediating role of relationship variables on supplier performance (Carter and Kaufmann, 2007), and e-negotiation (Turel and Yuan, 2008). Other research by Ba et al. (2003) addresses the impact of economic incentives in order to build trust in online auctions. Studies by Carter et al. (2004) and Jap (2003) found that some buyers are concerned about the potential for sellers or market-makers (e.g. online auctions) to act in an opportunistic or untrustworthy manner. While this literature base is extensive, the authors were unable to identify any studies that specifically address a few areas of interest. The most apparent of these areas is whether or not supply chain managers actually trust online auctions. Also missing from the literature are studies, which test the impacts of a supply chain managers level of familiarity with online auctions, and if their level of participation in online auctions impacts the extent to which they trust online auctions. On a tangentially related research basis a limited number of studies such as Hartley et al. (2004) looked at the use of online auctions in regard revenue enhancement and cost containment. Therefore, the purpose of this study is to address this specific gap in the literature by empirically testing the extent to which supply chain manager’s trust online auctions and if their level of trust in online auctions is impacted by their familiarity with online auctions, the nature of their supplier relationships, perceptions of firm profitability from a sales and revenue enhancement
perspective, their use of online auctions for cost containment, and by their level of participation in online auctions.

This research makes an important contribution to the extant literature because it seeks to assess supply chain managers’ level of trust in online auctions and how this relational variable impacts online auctions usage. An equally important contribution provided by this research is that it focuses on supply chain managers’ level of trust in all online auctions whereas the preponderance of past research has focused on reverse price descending auctions (see Carter and Stevens, 2007; Emiliani, 2000; Emiliani and Stec, 2001, 2002, 2004; Pearcy et al., 2007; Talluri and Ragatz, 2004). To accomplish the stated objectives of this study the authors will begin by providing readers with an overview of the extant literature which focuses on the role of trust in business to business (B2B) relationships and ultimately as it applies to online auctions. This discussion provides the foundations necessary to study the extent to which supply chain managers trust online auctions. This overview of the extant literature will then be used to develop the research hypotheses. The authors then provide the research methodology, data analysis, research findings and will conclude by providing insights into managerial implications, suggestions for future research, and study conclusions.

Theoretical background and hypothesis
The role of trust in business relationships has been the subject of intense investigation in many of the social science disciplines including economics, ethics, management, marketing, sociology, and psychology (Sahay, 2003). Thanks to this extensive literature base the role that trust plays in the development and maintenance of face to face business relationships is well established (see Doney and Cannon, 1997; Dwyer et al., 1987; Ganesan, 1994; Hawes et al. 1989; Mayer et al. 1995; Morgan and Hunt, 1994). However, it is only recently that this important relational variable has been identified as an important construct in successful electronic based relationships (Kim and Ahn, 2006).

While the academic literature contains literally hundreds of articles on trust there is little agreement as to what constitutes trust and as a result no universally accepted definition of trust currently exists (Lee et al., 2007). The lack of a universally accepted definition is further complicated because Swan et al. (1999) meta-analysis identified over 250 proposed dimensions or antecedents of trust which are in many cases situation specific.

However, unlike past research which has sought to identify the antecedents of trust in online B2B relationships, this study utilizes the broader conceptualization of overall trust that is commonly used in the business literature in order to study how supply chain managers’ level of trust in online auctions in general impacts their perceptions and ultimate use of online auctions. Because online auctions may be conducted or participated in by single individuals, specific groups, and/or firms, additional care must be given to address these differences when adopting a suitable definition of overall trust. Based on these considerations overall trust is defined as:

Trust is the reliance by one person, group, or firm upon a voluntarily accepted duty on the part of another person, group, or firm to recognize and protect the rights and interests of all others engaged in a joint endeavor or economic exchange (Hosmer, 1995, p. 393).

To establish trust in online auctions, past research indicates that supply chain managers need to establish some level of trust in the auction maker in order to reduce
perceptions of risk that arise when participants have little or no direct contact (Griffiths, 2003; Kim and Ahn, 2007). Research by Carter and Kaufmann (2007) and Smith (2008) suggests that supply chain managers may rely on the auction maker’s web site to give them indications regarding the auction maker’s trustworthiness in order to ameliorate the perceptions of risk associated with the lack of direct contact. Other studies suggest that auction participants’ ability to access information in a timely and complete manner is equally important in the development of trust (Meziane and Kasiran, 2008; So and Sculli, 2002). Finally, Ederington and Dewally (2003) note that warranties provided by the seller do not impact bid levels whereas third party certifications do. The literature also lends itself to note that some supply chain managers have so little trust in online auctions that they refuse to participate outright, without any consideration. Consequently, it is important to study supply chain managers’ level of trust in online auctions in general whether they use or do not use online auctions. Thus, the first hypothesis ($H_1$) is motivated and is as follows and includes both online auction users as well as non-users:

$H_1$. Supply chain managers that use online auctions will exhibit higher levels of trust.

**Familiarity**

Many studies have found that trust is an important factor in the development of ecommerce in general and more specifically in the use of online auctions (Hsu and Wang, 2008). Research by Meziane and Kasiran (2008) suggests that the development of trust is a dynamic process, which develops and deepens or retreats over time through repeated experience. The process of repeated experience enables supply chain managers to become more knowledgeable or familiar in the nuances of online auction use and has a positive impact on purchase intention (Chen and Barnes, 2007). Other research suggests that as supply chain managers become more familiar with the use of online auctions they develop greater levels of trust in online auctions over time (Kim and Ahn, 2006). Hence, it is posited that those with higher levels of trust will have higher levels of familiarity with online auctions and $H_2$ is as follows:

$H_2$. Supply chain managers that exhibit higher levels of trust will exhibit higher levels of familiarity with online auctions.

**Supplier relationships**

One of the most prominent concerns surrounding the use of online auctions is their potential negative impacts on supplier relationships (Jap, 2000a). Successful supplier relationships are typified by positive interpersonal exchanges and have been found play an important role in the development of trust (Hartley et al., 2004). More recent research suggests that the development of trust in B2B relationships and more importantly in electronic based relationships is based on the use of effective negotiation techniques between exchange partners over time (Turel and Yuan, 2008). Chen and Dhillon (2003) found that repeated interactions with an exchange partner results in greater levels of familiarity with an exchange partner and their trustworthiness which potentially increases the chances of future successful interactions. Alternatively, Meziane and Kasiran (2008) noted that there is sufficient evidence to suggest that ineffective supplier relationships result where there is a lack of
trust. Based on the belief that those with higher levels of trust will exhibit more positive supplier relationships, $H3$ is motivated as follows:

$H3$. Supply chain managers that exhibit higher levels of trust in online auctions will exhibit more positive relationships with their suppliers

Cost management
One of the most important strategic focuses of all businesses is that of cost management due its immediate impact on the firm’s bottom line. Cost management is also the most widely reported reason that companies participate in online auctions. From a cost management perspective online auctions are most frequently cited for their potential for reduced acquisition costs with savings ranging from 5-40 percent (Kaufmann and Carter, 2004; Kumar and Maher, 2008). Sashi and O’Leary (2002) also found that companies participate in online auctions in order increase the pool of potential suppliers, increase competition, and to increase the possibility that potential suppliers with unique capabilities, economies of scale, or excess inventories will be identified.

However, companies by their very nature tend to be risk averse and are unwilling to take unnecessary chances without the potential for adequate rewards. Companies that participate in online auctions with known auction partners can therefore be expected to develop higher levels of trust as they become more familiar with online auctions and auction partners. Consequently, it is posited that supply chain managers that exhibit higher levels of trust will have a stronger focus on cost management than their counterparts that posses lower levels of trust in online auctions which lead to $H4$:

$H4$. Supply chain managers that exhibit higher levels of trust in online auctions will exhibit a stronger focus on cost management.

Revenue enhancement
Research by (Jap, 2000a) suggests that online auction suppliers also benefit from this exchange mechanism on a number of fronts. Some of the more prominent benefits that supply chain managers may incur due to online auction participation include the ability to better manage excess capacity, the ability to attract potential new customers, and the ability to dispose of excess inventory (Kumar and Maher, 2008). Online auctions can also help supply chain managers obtain a better understanding of their competitors cost structures and their customers’ financial goals. Online auction participation may also reduce contract negotiation times which may help them reduce forecast error due to having access to more accurate sales data. Consequently, supply chain managers that participate in online auctions may be able to reduce their inventory carrying costs by increasing inventory turnover while simultaneously reducing total inventories (Hartley et al., 2004). These benefits notwithstanding, supply chain managers that participate in online auctions could be expected to develop higher levels of trust in this market mechanism as they become more familiar with it. Therefore, $H5$ is developed as follows:

$H5$. Supply chain managers that exhibit higher levels of trust in online auctions will exhibit a stronger focus on revenue enhancement.
Participation
Past online reverse auction research suggests that as supply chain managers gain experience with online auctions they develop greater levels of trust and their willingness to conduct business in the future increases (Kim and Ahn, 2006; 2007). Additional research by Hsu and Wang (2008) finds that trust is a complexity reducing mechanism that can lead to a willingness to depend on an auction partner to fulfill its commitments. Meziane and Kasiran (2008) found that higher levels of trust are established through direct experience over time. Finally, Ba and Pavlou (2002) reported that higher levels of trust result in an increase in the number of transactions. Whereas, Wu et al. (2004) found that higher levels of trust are necessary for supply chain managers to remain committed to a business relationship. Consequently, it is posited that supply chain managers with higher levels of trust in online auctions will participate in more online auctions than supply chain managers that possess lower levels of trust. Hence the final hypotheses is as follows:

H6. Supply chain managers that exhibit higher levels of trust will exhibit greater levels of participation in online auctions.

Methodology
Survey development
The survey development phase of this study began with a modified version of the survey developed by Hartley et al. (2004), which explored adoption of auctions in supply management. Additional demographic questions were added to control for differences in the type of auction, industry, years of experience, and the firm’s intended purpose for using online auctions. Overall trust in auctions was measured using the single item indicator “Do you trust online auctions”. The use of a single item indicator was deemed appropriate because this study seeks to assess the impact of respondents’ level of trust in online auctions in general and not the multidimensional aspects of trust which is already well established in the extant literature. Support for the use of single item indicators is provided by Bergkvist and Rossiter (2007) who concluded that single item indicators should be used to measure marketing constructs which consist of a single concrete attribute. However, it is noted that the use of single item indicators can be faulted in some instances due to their inability to accurately measure multi-dimensional constructs. For data collection purposes the authors chose to post the survey instrument online and contact potential respondents via email. The authors used an online survey instrument because mailing addresses for many potential respondents were not readily available and because it enabled the authors to gather data more quickly and helped reduce the time and costs associated with paper based data collection.

Data collection
E-mail addresses for supply chain management professionals were obtained via two locales: the Institute for Supply Management (ISM) and Council for Supply Chain Management Professionals (CSCMP). Both organizations provide the email addresses of board members and organization constituents online and do not require logging into the system. A total of 4280 emails addresses were obtained. The order of those email addresses was randomized and a pilot sample of 100 emails was sent. The initial mailing resulted in a response rate of 26 percent within one week. A second reminder email was then sent to non-respondents, which resulted in an additional 5 responses. The results of the pilot study indicated that it was necessary to add one additional
question “Which of the following best describes why your firm stopped participating in Online Auctions?” to the web-based survey instrument. After this change was made the first wave of 4,180 emails was sent with 133 responses. After four weeks a second wave of emails was sent. The second wave generated 88 responses. A total of 1,867 emails were returned as undeliverable or timed out. Overall, recipients returned 213 questionnaires, for a response rate of 9.2 percent (213/(4180-1867)); excluding responses obtained during the pilot study.

A review of articles published in Industrial Management & Data Systems during the last five years identified two methods of testing for non-respondent bias that are most commonly used. The more correct and preferred method of testing for non-response bias requires the researcher to contact a representative sample of non-respondents in order to ascertain why they did not respond to the survey and to obtain their response to the survey items in order to collect the necessary data (Alreck and Settle, 1995). The second and less desirable method of testing for non-response bias which was used in this study compares responses obtained from early versus late respondents based on the belief that late respondents’ responses more closely mirror those held by non-respondents than they do early respondents. This method of testing for non-response bias was chosen because CSCMP and ISM only provide the members’ email addresses, which precluded the use of the preferred method. The results of this analysis indicated that there were no significant mean differences between the groups on measures such as familiarity with online auctions, their firm’s use of online auctions, overall trust of auctions, years employed with current company, or public versus private categorization.

**Survey results**

Construct validity was achieved in different steps. First, in order to ensure content validity, eight supply chain professionals – three from academia and five from related business and consulting fields – were asked to evaluate the survey questions. They reviewed the questionnaire not only for readability and ambiguity (Dillman, 2000), but also for match of items and constructs. Their feedback was used to modify the questionnaire before mailing.

Independent variable constructs were derived from the survey data using factor analysis. The factors were extracted using a principal components analysis followed by a varimax rotation. An item was considered to load on a given factor if the factor loading after the rotation was 0.40 or greater for the factor and less than 0.40 for the other factors. Three factors were identified through the use of eigenvalues equal to or greater than 1.0. The factors were labeled cost management (six items), supplier collaboration (five items), and sales revenue and profit enhancement (two items). The independent variable items and their corresponding factor loadings are shown in Table I.

Reliability was examined to test for internal consistency of the research variables. A Cronbach alpha test was performed on each construct and the results can be found in Table I. Estimates of all the Cronbach alphas were greater than 0.70, which is consistent with Nunnally (1979). The following section will be devoted to a discussion of respondent demographics.

**Respondent demographics**

Study respondents were a seasoned group with an average of more than ten years’ work experience. The majority of respondents worked for firms that had yearly
revenues of over $1 billion in revenues and procurement expenditures of over $100 million dollars a year. Respondents came from varied positions within their companies. It was indicated that the largest position category they were employed within their respective companies were as directors (33 percent) while the positions of manager and vice president were next with managers making up 22 percent and vice president making up 16 percent of the total respondents. Other responses made up the remaining 19 percent and included such positions as staff specialist, senior vice president, departmental specialist, and president. The breakdown of public to private firms was 127 versus 86 or about 60 percent to 40 percent. Of the 213 respondents, 79 replied that their firms currently employ online auctions with approximately 80 percent using reverse auctions versus forward auctions. Around ten percent of those currently using online auctions reported they participated in 200 or more auctions per year, 60 percent of current online auction users have completed 20 or fewer auctions. Respondents indicated that their firms’ auction use was predominately associated with MRO items, capital equipment, standardized raw materials and production parts, and shipping/transportation.

Table II presents the industry representation for the survey respondents juxtaposed with the industry breakdown from a weighted average of the ISM and CSCMP membership. This membership combination was chosen for comparison because it contains the two largest and most respected supply management associations in the United States and matched the survey email demographic. The authors acknowledge that the respondents in this survey are only a sample of the larger population of supply chain managers. However, the authors are confident that the survey sample does fairly represent supply chain managers according to CSCMP’s definition of those activities involved in supply chain management (e.g. sourcing, procurement, conversion, and logistics) (Council of Supply Chain Management Professionals, 2010).
From Table II it can be seen that 40.8 percent of the respondents categorized themselves as working in the manufacturing sector. Within the survey instrument, the manufacturing sector is broken down into six subsets for added detail and includes the specific industries of electronics, aerospace, automotive, plastics, paper and printing, and textiles. Electronics made up the largest subset in the manufacturing industry. Logistics/Warehousing/Transportation made up 17.4 percent of the total. Federal, State, or Local Government made up 13.6 percent while Construction made up 7.5 percent of the total. Professional Services represented 5.6 percent of the total while Healthcare represented 4.7 percent of the total. The other five industries made up 10.2 percent of the total.

In comparison, the combined CSCMP/ISM membership was recently profiled as follows:

- manufacturing (38.31 percent);
- logistics/warehousing/transportation (7.11 percent);
- government (12.08 percent);
- construction (2.49 percent);
- professional services (8.59 percent);
- healthcare (4.06 percent); and
- five additional industries/categories (27.37 percent).

Considering that the percentages for the manufacturing categories for both the survey and CSCMP/ISM profile are very similar and reasonably represent industry demographics,
Table III displays the descriptive statistics for the supplier collaboration, cost management, and sales revenue and profit enhancement constructs. It can be seen that respondents rated all three constructs as important to very important as purchasing objectives with the Supplier Collaboration construct rated highest based on their average mean score. The correlation matrix indicates a high degree of correlation among the constructs. However, as it is displayed, the variance inflation factor (VIF) for each item is well under the VIF limit of 10. This indicates that their multicollinearity did not have an undue influence on the overall model and lays the foundation for the study findings, which are provided in the following section.

Findings
This section contains a discussion of the hypothesis tests that were developed in this study. Hypothesis tests were based on the use of t tests $H_1$, MANOVA and ANOVA $H_2$, and ANOVA $H_3$, $H_4$, $H_5$ and $H_6$.

Research hypotheses-testing results
Trust in auctions. Overall, online auction users responded with higher trust rankings than non-users. The difference between users and non-users was tested using a $t$ test. The $t$ test found that when it came to trust users not only gave higher trust responses but those responses where statistically different than non-users. The results are provided in Table IV. A $t$ test was also conducted to find if the trust responses differed from the neutral response of 4.0. The results of the $t$ test revealed that auction users not only gave trust responses that were greater than the neutral response of 4.0 that those responses were statistically different than the neutral response ($p < 0.001$). This finding was not surprising because it is highly unlikely that supply chain managers would use exchange mechanisms that they do not trust. Hence, $H_1$ is supported:

$H_1$. Online auction users will exhibit higher levels of trust (supported).

The following section will be devoted to discourse on the hypothesis tests $H_2$ through $H_6$. To facilitate clarity and provide a more meaningful test of the research hypotheses the study results will be provided based on a comparison of high versus low trust. This analysis was made possible by asking respondents to rate their level of trust in online

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>User type</th>
<th>t-stat</th>
<th>User type</th>
<th>t-test</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean trust</td>
<td>5.58</td>
<td>3.91</td>
<td>7.50</td>
<td>1.97</td>
<td>&lt;0.00001</td>
<td></td>
</tr>
<tr>
<td>Standard error (S.E.)</td>
<td>0.165</td>
<td>0.150</td>
<td>n</td>
<td>79</td>
<td>134</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:** * Correlation is significant at the 0.01 level

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Cost management</td>
<td>5.12</td>
<td>0.98</td>
<td>1.000</td>
<td>1.62</td>
<td></td>
</tr>
<tr>
<td>2. Supplier collaboration</td>
<td>5.03</td>
<td>1.93</td>
<td>0.616*</td>
<td>1.000</td>
<td>1.19</td>
</tr>
<tr>
<td>3. Sales revenue and profit enhancement</td>
<td>5.35</td>
<td>1.31</td>
<td>0.311*</td>
<td>0.386*</td>
<td>1.000</td>
</tr>
</tbody>
</table>
auctions based on a seven-point Likert type scale ranging from 1 (not at all) to 7 (very much). High and low groups were formed based on the mean trust response. The mean response was used as the breakpoint with those responses below the mean categorized as low trust and those responses above the mean categorized as high trust. The data analysis utilized multivariate analysis using SPSS 17.0. Questions regarding familiarity with auctions utilized the same seven-point Likert type scale.

A MANOVA was conducted to determine the effect of the two groups (those with higher trust and those with lower trust) on familiarity, supplier relationship rating, cost management, perceived firm profitability, and level of participation. Significant differences were found among the two groups with regards to familiarity, supplier relationship rating, and cost management focus, based on the Wilks’ $\Lambda = 0.789$, $F(4, 74) = 4.979$, and a $p < 0.001$. The multivariate $\eta^2$ based on Wilks’ $\Lambda$ shows that respondent attitude towards trust accounts for around 21.2 percent of the variance in the variables. Therefore, we can reject the MANOVA hypothesis that the means of the two groups are equal. Univariate ANOVAs were conducted on the variables since the MANOVA was significant. Table V contains the ANOVA results for each variable. Each of these individual ANOVAs is discussed next according to the associated hypothesis.

**Trust by familiarity (current users only).** The individual ANOVA test with familiarity being the factor, illustrates that those in the high trust group possessed higher levels of familiarity with online auctions than those in the low trust group (e.g. mean familiarity of high trust group = 6.39 versus mean familiarity of low trust group = 5.61). The ANOVA results illustrate this point with an $F$ statistic of 6.868 and a $p$-value of 0.011, both of which can be found in Table V. Hence $H2$ is therefore supported:

$H2$. Supply chain managers that exhibit higher levels of trust will exhibit higher levels of familiarity with online auctions (supported).

**Trust by supplier relationship – Current users only.** In this portion of the analysis it was hypothesized (i.e. $H3$) that those with higher levels of trust will exhibit higher positive supplier relationships. The individual ANOVA test with supplier relationship being the factor, illustrates that those in the high trust group possessed higher supplier relationship ratings than those in the low trust group (e.g., mean supplier relationship rating of high trust group = 5.48 versus mean supplier relationship rating of low trust group = 4.78). The ANOVA results illustrate this point with an $F$ statistic of 6.044 and a $p$-value of 0.016, both of which can be found in Table V. Therefore, $H3$ is supported:

$H3$. Supply chain managers that exhibit higher levels of trust in online auctions will exhibit more positive relationships with their suppliers (supported).

<table>
<thead>
<tr>
<th>Current users only</th>
<th>Trust level</th>
<th>$F$ stat</th>
<th>ANOVA</th>
<th>Significance of $F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable (Mean)</td>
<td>High trust</td>
<td>Low trust</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Familiarity</td>
<td>6.39</td>
<td>5.61</td>
<td>6.868</td>
<td>0.011</td>
</tr>
<tr>
<td>Supplier relationship rating</td>
<td>5.48</td>
<td>4.78</td>
<td>6.044</td>
<td>0.016</td>
</tr>
<tr>
<td>Cost management focus</td>
<td>5.52</td>
<td>4.87</td>
<td>12.367</td>
<td>0.001</td>
</tr>
<tr>
<td>Perceived firm profitability</td>
<td>4.63</td>
<td>4.85</td>
<td>0.251</td>
<td>0.618</td>
</tr>
<tr>
<td>Level of participation</td>
<td>3.61</td>
<td>3.67</td>
<td>0.020</td>
<td>0.888</td>
</tr>
<tr>
<td>$n$</td>
<td>56</td>
<td>23</td>
<td></td>
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</tbody>
</table>

Table V. Individual ANOVA results
Trust by cost management – current users only. In turn the area of cost management was analyzed. It was hypothesized those with higher levels of trust will exhibit a stronger focus on cost management. The individual ANOVA test with cost management being the factor, illustrates that those in the high trust group possessed a stronger focus on cost management than those in the low trust group (e.g. mean cost management focus of high trust group = 5.52 versus a mean cost management focus of low trust group = 4.87). The ANOVA results illustrate this point with an $F$ statistic of 12.367 and a $p$-value of 0.001, both of which can be found in Table V. Therefore, hypothesis 4 is supported:

\[ H4. \] Supply chain managers that exhibit higher levels of trust in online auctions will exhibit a stronger focus on cost management (supported).

Trust by perceived firm profitability (current users). To answer $H5$ the authors began by looking at perceived firm profitability. In turn, it was hypothesized that those with higher levels of trust will exhibit higher levels of perceived firm profitability. The individual ANOVA test with perceived firm profitability being the factor, illustrates that those in the high trust group did not exhibit higher perceived firm profitability than those in the low trust group (e.g. mean perceived firm profitability of high trust group = 4.63 versus mean perceived firm profitability of low trust group = 4.85). The ANOVA results illustrate this point with an $F$ statistic of 0.251 and a $p$-value of 0.618, both of which can be found in Table V. Hence, $H5$ is not supported:

\[ H5. \] Supply chain managers that exhibit higher levels of trust in online auctions will exhibit a stronger focus on revenue enhancement (not supported).

Trust by level of participation (current users only). The sixth hypothesis was developed based on the premises that those that exhibit higher levels of trust will exhibit greater levels of participation in online auctions. Participation level was gauged via a seven-point scale with a 1 indicating light participation, 4 indicating moderate participation, and a 7 indicating heavy participation. From this analysis it appears that there is no difference in participation in online auctions between the high trust and low trust groups. ANOVA results demonstrate that there are no statistical differences between the high and low trust groups regarding level of auction participation. Table V illustrates this in the insignificant $F$ (0.020) and the $p$-value at 0.888. Based on this analysis it becomes evident that $H6$ is not supported:

\[ H6. \] Supply chain managers that exhibit higher levels of trust will exhibit greater levels of participation in online auctions (not supported).

Discussion
The results of this study were both expected and unexpected as only four of the six hypotheses were supported. The results of this study indicate that supply chain managers who have participated in online auctions are more trusting of this market making mechanism than those who have not. This finding was expected and supported by Kim and Ahn (2007) who found that trust in online market makers and sellers is positively related to purchase intention. Further support is provided by Hsu and Wang (2008) who found that online auction users generally trust this exchange mechanism.

The second hypothesis was developed based on past research which suggested that supply chain managers that have higher levels of trust in online auctions will also be
more familiar with them. Study findings support this expected finding and are supported by in the literature by Wu et al. (2004) who found a relationship between higher levels of trust and relationship commitment. Other research by Chen and Barnes (2007) found that higher levels of trust and familiarity lead to increased purchase intentions provide additional support.

The third hypothesis purported that supply chain managers that exhibit higher levels of trust in online auctions would exhibit more positive relationships with their suppliers. Study findings provide support for this hypothesis as does past research. Support for this finding is provided by Jap (2000b) who found that higher levels of supplier collaboration were positively related to cost containment and Hartley et al. (2004) reported that some companies use online auctions to determine contract price before beginning negotiations with the winning bidder for a multiyear contract. Finally, research by Hsu and Wang (2008) found that online auction users that exhibit higher levels of trust are also more loyal to their auction partner.

The fourth hypothesis was also developed based on research by Hartley et al. (2004). This hypothesis posited that supply chain managers that exhibited higher levels of trust in online auctions would exhibit a stronger cost management focus. Similar to Hartley et al. (2004) which studied online auction adopters and non adopters this study found support for this hypothesis. Other research by Jap (2000b) lends additional support for this finding as that study found that buyers may collaborate with suppliers in order to reduce purchase price. Other research by Dong et al. (2001) found that collaborations and process integration are key factors in JIT purchasing operations that can reduce the buyers’ costs.

The fifth hypothesis was developed in an attempt to extend research by Hartley et al. (2004). This hypothesis posited that supply chain managers that exhibited higher levels of trust in online auctions would exhibit a strong focus on revenue enhancement. This hypothesis was developed as a counterpoint to \( H4 \) in the belief that supply chain managers that were tasked with revenue enhancement would use online auctions in order to sell more products. Unfortunately, this hypothesis was not supported.

The sixth and final hypothesis purported that supply chain managers that exhibited higher levels of trust in online auctions would exhibit greater levels of participation in online auctions. This hypothesis was developed based on past research, which indicated that this hypothesis should be supported. Support for this hypothesis was provided by Wu et al. (2004), which found that higher levels of trust lead to higher levels of commitment in online auction use. Sahay (2003) who posited that increased levels of trust should lead to increased usage and a willingness to participate in online auctions and Kim and Ahn (2007) who found that increased levels of trust lead to increased purchase intent. Contrary to expectation and past research this hypothesis was not supported. This unexpected finding would then seem to imply that supply chain managers participation in online auctions beyond some, yet to be determined threshold, has little or no effect on their level of trust in online auctions. This finding was interesting because it would also seem to indicate that while supply chain managers may trust online auctions there may be other constructs such as the type of products purchased that may moderate this relationship. Summary study findings are provided as follows:

\[ H1. \] Online auction users will exhibit higher levels of trust (supported).

\[ H2. \] Supply chain managers that exhibit higher levels of trust will exhibit higher levels of familiarity with online auctions (supported).
H3. Supply chain managers that exhibit higher levels of trust in online auctions will exhibit more positive relationships with their suppliers (supported).

H4. Supply chain managers that exhibit higher levels of trust in online auctions will exhibit a stronger focus on cost management (supported).

H5. Supply chain managers that exhibit higher levels of trust in online auctions will exhibit a stronger focus on revenue enhancement (not supported).

H6. Supply chain managers that exhibit higher levels of trust will exhibit greater levels of participation in online auctions (not supported).

Conclusions
This study makes a number of important contributions to the supply chain management literature in that it provides empirical support for the notion that the level of trust that a supply chain manager has in online auctions is impacted by their familiarity with online auctions. Study findings also indicated that supply chain managers with higher levels of trust in online auctions will also exhibit more positive relationships with their suppliers and have a greater cost management focus. Other study findings of interest suggest that supply chain managers that exhibit higher levels of trust in online auctions may not be driven to increase participation in online auctions and do not use online auctions to enhance revenues. The authors also identify important considerations for supply managers that currently use or are considering using online auctions.

Study limitations
This study, as all others, possesses some limitations that may limit its generalizability. First, the population consists of members of the Institute for Supply Management and Council of Supply Chain Management Professionals and is representative of the business sector. However, study findings may not generalize to the government sector which one would expect to have different procurement goals. A second limitation of this research is that it respondents were almost exclusively from the United States and study findings may not generalize into the global marketplace. The third potential limitation of this research is that the sample contact information did not include the telephone numbers for either ISM or CSCMP members. Consequently, the authors were not able to use the preferred method of testing for non-respondent bias. The authors do understand that comparing early and late responses is a fairly old approach, but the rationale behind it is solid (i.e. late respondents are similar to nonrespondents) and is still widely used. For example, the article by Frazier et al. (2009) in the latest Journal of Marketing still used this approach. However, future researchers need to know the limitations of this method. Finally, the use of a single item indicator must be used judiciously by researchers and future research should employ the use of a multi-dimensional construct to test other aspects of auctions. Overall, it is advisable that future research address all of these potential limitations.

Managerial implications
This study provides a number of important managerial implications. These implications include but are not limited to the following. First, supply chain managers need to recognize the important role that trust plays in both face to face and online business relationships. As a result, supply chain managers that recognize the role that trust plays in business relationships may decide to only purchase non-critical
supplies or raw materials that closely resemble commodities through online auctions in order to maintain strong relationships with key suppliers.

Supply chain managers are also advised to consider the fact that some suppliers may view online auctions with a mixture of fear and suspicion because they may believe that participating in online auctions will damage business relationships that they have spent years cultivating. Consequently, supply chain managers are advised to develop alternative sources of supply in the event that online auction suppliers decide that it is no longer in their best interest to participate in online auctions. This possibility is very real given the overall state of the global economy and is most likely to occur when supply becomes constrained or during periods of hyperinflation. During periods such as these online auction suppliers may decide to forego the use of online auctions in order to devote most if not all of their efforts to supplying those customers with whom they have maintained good relationships.

The third managerial implication for supply chain managers provided by this study involves the prospect of cost management. Study findings indicate that supply chain managers that are more familiar with online auctions tend to exhibit higher levels of trust in online auctions and it is posited that this greater familiarity may be manifest in the perception that online auctions can help companies attain their cost management objectives. Consequently, the authors suggest that supply chain managers that are tasked with cost management objectives consider using online auctions to achieve their goals. The study results also lend themselves to future research, which is discussed in the following section.

Research implications

While this study finds common ground with past research it is apparent that supply chain management, as a field, is evolving rapidly and as a result past research (this study included) must be reevaluated periodically to make sure that it is still relevant. Consequently, future research should address the possible impact that the use of online auctions has had on supply chain relationships. A second potential stream of potential research identified by this research will seek to why supply chain managers use online auctions to reduce costs but not enhance revenue. Given this surprising finding it is posited that some companies may participate in online auctions because they are required to do so by more powerful channel partners who mandate participation as a condition for doing business. Finally, additional research needs to be conducted to see if supply chain managers are using other risk reducing tools to protect their firms from upside financial risk.

References


Managers’ trust in online auctions


**Further reading**


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