

A Market Value Analysis of Buyer–Supplier Relationship Building Awards

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Abstract—The purpose of this article is to study the signaling potential of “supplier awards” in creating shareholder value for the award-giving and the award-receiving firm. We use event study methodology with supplier awards as events that signal mutually beneficial buyer–supplier relationship (BSR) efforts to estimate the firm value generated from these efforts. Supplier awards, apart from being a supplier development (SD) activity in themselves, are also a signal of a mutually beneficial relationship between a buyer and a supplier. This article performs a deep study by investigating the impact of traits, such as award exclusivity and award satiation, on the efficacy of supplier awards as a signaling mechanism. We find that shareholders of firms that give awards (buyers) and those of firms that receive awards (suppliers) react positively to such events, thereby establishing the signaling potential of supplier awards that signal the mutually beneficial BSR and SD efforts. We find that a more exclusive award has a higher positive impact on the buyer’s shareholders. We also find that there is a higher impact on the supplier’s market value when that supplier receives awards less frequently. This article pioneers a study of interorganizational awards that considers traits, such as exclusivity and award satiation, that are not frequently studied in extant research.

Index Terms—Buyer–supplier relationship (BSR), corporate award, event study, firm value, supplier award.

I. INTRODUCTION

THE notion of the supply chain is often considered to have shown companies the limitations of individualistic thinking. However, Japanese companies (post–World War II) had already embraced collaborative thinking in the limited form of supplier development programs to build long-term relationships with their supply partners [1]. The success stories of Toyota, Nissan, and Honda have shown their counterparts around the world the importance of building deep supplier relationships [2]. A report on the experiences of supply-chain leaders of

industries across the world suggests that supply chains with strategic supplier engagement enjoy a better reputation than others [3]. Among other initiatives, supplier development (SD) activities are one of the most important ways to build a deep and long-term buyer–supplier relationship (BSR)¹ [4], [5], [6].

This article aims to quantify the shareholder value creation potential of events, such as the announcement of supplier awards, which signify mutually beneficial BSR and SD efforts. Although numerous papers have studied the importance of these efforts, there is a dearth of research establishing the shareholder value-creation potential of such initiatives. Supplier award event signals the mutually beneficial BSR initiatives between a buyer and a supplier. In this sense, this study is the first to document the market reaction to fruitful efforts by firms toward developing BSR. Through “supplier awards,” a form of interorganizational awards between transacting firms involved in BSR, we capture the aforementioned market reaction toward the fruitful BSR.

This study is the first to analyze the impact on shareholder value of the award-giving firm (i.e., the buyer) along with the award-receiving firm (i.e., the supplier). It is also the first to quantify and analyze the traits associated with the awards, such as exclusivity and satiation. We use the event-study method to study the phenomenon.

A. Supplier Awards

Among the various ways of developing BSR, one of the primary ways is SD. SD can be defined as efforts by the buyer to shape the capabilities of a supplier to meet its long-term supply needs [4], [7]. SD activities, such as training and education, technology investment, site visits, supplier evaluation, and supplier recognition (awards), are considered “direct involvement” activities/efforts [8]. “Indirect involvement” includes the promise of increased future business and the use of alternative suppliers to provide competition to the current supplier [8]. Supplier awards are some of the important direct involvement SD activities undertaken by companies [9], [10]. Many companies have a supplier handbook that serves as a practical guide to the SD process, and awards are one of the activities listed in that handbook. For instance, ON Semiconductor, a Fortune 500 company, has a handbook that discusses its five-step SD process, one of the steps being a “supplier recognition award” [11]. Note

¹As noted, supplier development (SD) initiatives are part of building buyer–supplier relationships (BSR). In this regard, we refer to the literature on both the topics. Additionally, from this point on, we use “BSR/SD” together while making a common statement and “SD” independently for any specific statement with respect to SD.

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that even without a formal SD program in place, firms engage with suppliers through various activities that still fall under the umbrella of BSR and SD efforts.

Awarding the best/preferred supplier indicates four major aspects of a BSR/SD. First, the supplier award gives a clear indication of a mutually beneficial SD dyad, which also reflects the promise of a successful long-term BSR. Second, it is a way of recognizing the efforts of the supplier in the firm's growth and provides a nonmonetary incentive to the supplier. Third, from the supplier's perspective, such recognition cements its position and the perception in the market about its capabilities and role in mutually beneficial BSR/SD efforts. Finally, such awards can be considered a good proxy for the efforts made by the buying firm in building long-term relationships with its supplier by implementing SD initiatives. Supplier awards, therefore, signal the satisfaction of both the firms (buyer and supplier) involved in the SD interaction [9], [12], indicating the firm's improved operational and financial performance, leading to a positive shareholder reaction. By calculating the shareholder value generated by such awards, we estimate the value creation potential of BSR/SD efforts for both the buyer and the supplier.

To gain a nuanced understanding of supplier awards, we also study award characteristics such as "exclusivity" and "satiation." Exclusivity of an award is defined as the "number of awards conferred by the buyer per supplier," and the satiation of an award is defined as the "frequency at which a supplier is receiving the award."

B. Contribution

Our study makes several contributions to the research and literature in the field of event study, operations management, and BSR and SD literature. Through analyzing data from about 18 years, we find that supplier awards have a positive impact on the market value of both the award-giving (buyer) and the award-receiving (supplier) firms.² Furthermore, buyers' shareholders appreciate exclusive awards, and suppliers' shareholders have award satiation, i.e., initial awards have a higher impact than subsequent awards. Our work also contributes directly to the literature by being the first study to capture the effectiveness of supplier awards in signaling mutually beneficial BSR efforts to shareholders by quantifying the impact on the market value of the firms involved. By studying both the award giver and the recipient firm, the study provides a holistic understanding of the "supplier award" phenomenon in the context of BSR/SD efforts.

II. LITERATURE REVIEW: RESEARCH GAP

We establish the research gap using two streams of literature, i.e., organizational awards literature and BSR and SD literature.

A. Organizational Awards Literature

Organizational awards literature in the operations management field can be reviewed along the dimension of "type of

²We use the expressions "award-giving firm" and "buyer firm" interchangeably throughout this article. Similarly, we use the expressions "award-receiving firm" and "supplier firm" interchangeably throughout this article.

TABLE I
SUMMARY OF RELEVANT ORGANIZATIONAL AWARDS LITERATURE

| Study | Conceptual foundation | Type of award | Award-receiving firm analysis | Award-giving firm analysis |
|----------------------------|---|--|-------------------------------|----------------------------|
| Hendricks and Singhal [13] | Awards have a positive impact on future cash flows, which in turn positively impacts the market value. | Program specific awards (quality awards) | ✓ | - |
| Wilson and Collier [14] | The effectiveness of award criteria determines whether an award is a good indicator of firm performance. | Third-party award (Malcolm Baldrige Quality Award) | ✓ | - |
| Azadegan and Pai [16]* | The impact of an award on firm performance is dependent on the product lifecycle stage. | Supplier award | ✓ | - |
| Chae et al. [15] | A buyer will value a supplier (among all who have received awards in past) more if there is higher social capital between them. | Third-party award (PACE Award) | ✓ | - |
| <i>Our Study</i> | <i>Supplier award signals the mutually beneficial relationship between a buyer and a supplier, thereby positively impacting the market value of both entities. The positive market value impact is a function of various award characteristics.</i> | <i>Supplier awards</i> | ✓ | ✓ |

* Studies supplier awards for a single industry.

award" considered in a study. Earlier event studies related to the type of awards have been based on 1) quality awards being used as proxies for successful Total Quality Management programs [13] or (2) awards conferred by third-party institutions, such as the Malcolm Baldrige National Quality Award (MBNQA) [14] and Automotive News' PACE awards for supplier innovation [15]. The studies that have considered awards conferred by the buying firms are largely based on awards that represent one unique dimension for which the supplier is awarded. Most such studies are based on the dimension of "quality." For example, "quality awards," studied by Hendricks and Singhal [13], represent product conformance and performance quality. The award recognizes the quality of the product supplied by the firm and not the overall supplier "firm" performance. The same is also reflected in the title of such awards, for instance, "product quality award" or "innovation award." However, some awards are constituted by the buyers to recognize the suppliers who excelled on multiple dimensions, signifying the overall mutually beneficial BSR. "Supplier awards" represent such awards. Therefore, the assessment of a supplier for a potential "supplier award" is based simultaneously on several dimensions, such as pricing, reliability, cost, quality, delivery, innovativeness, technology, continuous improvement, responsiveness, flexibility, safety, and environmental responsibility, depending on each buying firm's specific context. These multiple criteria for "supplier awards" are also reflected in the definitions of such awards (refer to web Appendix B for sample definitions from our dataset). Table I provides a snapshot of the existing organizational awards literature along with the research gap. We find no paper studying "supplier awards" except Azadegan and Pai [16], which considers the impact of supplier awards in the computer and semiconductor industry on the supplier's financial performance. Specifically, they consider the product lifecycle perspective to understand the impact of operational awards (i.e., supplier awards) and "product awards" during various lifecycle stages. The objective of their study was to capture the impact of such awards on the suppliers' (award receivers) financial performance. We note that the study, by Azadegan and Pai [16], does not consider the signaling potential of such awards to create shareholder value for the concerned firms. Moreover, unlike this study, the study by Azadegan and Pai [16] (and other studies in the awards literature) does not consider the perspective of both the award giver (buyer)

and the receiver (supplier) together and is limited to the context of a single industry, the semiconductor industry.

Next, we discuss the other differentiating factors of our study, such as the consideration of award characteristics and the choice of signaling theory as the appropriate theoretical lens. None of the papers we have come across in the field empirically studies any award characteristics. Through our study, we quantify and test the award characteristics such as exclusivity and satiation.

Depending upon the objective, various studies based on awards have chosen an appropriate theoretical lens to analyze the phenomenon. The objective of the study by Wilson and Collier [14] was to test the effectiveness of the MBNQA's award criteria that are primarily based on "leadership drives the system that creates results." Chae et al. [15] adopted the social capital view in their objective of analyzing which supplier the buyer values the most out of all the suppliers that have previously won a PACE innovation award. Specifically, the authors look at the role of social capital between the buyer and the supplier toward the innovation value added by the supplier. In their study, Azadegan and Pai [16] utilized the diffusion of innovation (DOI) model to capture the impact on suppliers' financial performance on receiving awards for innovation. DOI lens enables the authors to capture the product lifecycle and the role of innovation at different stages of the lifecycle. Hendricks and Singhal [13] hypothesized the positive impact of an award on the market value of a firm due to the likely increase in the net expected future cash flows of the firm. The authors differentiate between conformance quality and performance quality and how each form of quality improvement can lead to a positive market value once the supplier receives the quality award. In our study, we adopt the signaling theory lens to analyze the impact of supplier awards on the market value of the firms. Moreover, given that our study analyses the award characteristics, such as exclusivity and satiation, signaling theory provides us with appropriate constructs to build argumentation on how such characteristics of an award lead to different market value impacts.

B. BSR and SD Literature

As mentioned earlier, awarding a supplier is considered an SD activity, thus signifying the mutually beneficial BSR dyad. From that perspective, our study also contributes to the broad literature around SD and BSR. We briefly discuss the gap filled by our study in this stream. We classify the extant literature related to BSR/SD under three broad categories,³ viz.,

- 1) participating entity's perspective;
- 2) theoretical lenses;
- 3) type of impact.

Our extensive literature review reveals several papers discussing the benefits of SD efforts. However, we find that the extant literature provides only a limited understanding of these benefits. First, a majority of such papers limit their benefit analysis to the operational level, and the impact on financial performance is largely understudied. Second, most of the papers

study the impact of SD efforts on the buyer and, to an extent, on the BSR. The impact on supplier's performance is largely missing, with the few studies that analyze it doing so from the buying firm's perspective. Moreover, no attempt has been made to estimate the shareholder value creation potential of BSR/SD efforts for the buyer and the supplier. Market value is an important indicator of firm performance. Therefore, any evidence pertaining to the effect of BSR/SD efforts on the market value of the firms involved is valuable information. The objective of such studies in the literature is to analyze the impact on the operational, financial, and strategic performance of the parties involved in mutual relationships. Hence, the theoretical lenses adopted in such studies include transaction cost theory, resource-based view, evolutionary perspective, social exchange theory, knowledge-based view, resource dependence theory, and social capital theory. Given that our objective is to analyze the impact on the market performance through supplier award events, signaling theory provides us with the required constructs. Table A2 in web Appendix A provides a snapshot of the existing BSR and SD literature along with the research gap.

Based on the research gaps identified, we define our research aim as:

Studying the shareholder value creation potential of events, such as the announcement of supplier awards, that signify mutually beneficial BSR and SD efforts while understanding the efficacy of supplier awards as a signaling mechanism for such mutually beneficial efforts.

III. HYPOTHESIS DEVELOPMENT

A. Signaling Theory

We use signaling theory to build our theoretical grounding and the eventual hypothesis development. The signaling theory is based on the premise that information asymmetry between parties is reduced through appropriate signals [17], [18]. The mechanism involves the sender, the receiver, the signal, and the signaling environment or context. The senders are typically the insiders (for instance, managers) of a firm who have information about the firm that is not easily available to outsiders. Such information may include supply chain health, the firm's investment plan in technology, or, in our study's context, the state of the relationship with the key suppliers. The receivers are the outsiders who lack the "privileged perspective" about the firm due to the information asymmetry. The extant literature in operations management has considered various categories of receivers, such as customers [19], [20], supply chain partners [21], and investors [22].

In the context of our study, we consider shareholders/investors as the receivers. Investors and shareholders access the firm information through publicly available documents such as financial reports. However, they may not have access to private information about the firm, such as its initiatives around developing mutually beneficial relationships with its supply chain partners. To reduce such an information asymmetry, investors and shareholders may look for signals, such as "supplier awards," that can help them in their decision-making process. Senders intend to convey specific information through these signals to the receivers. As

³Web Appendix A provides a detailed classification of the extant literature in these categories along with the references for the papers.

mentioned earlier, “supplier awards” are representative of the mutually beneficial supply chain relationship. Furthermore, such awards are considered part of the SD/BSR process. Therefore, we can say that the senders (buyers), through such signals (such as supplier awards), intend to convey the benefits the firms involved (buyer and supplier) have received through the SD/BSR engagement in the past period to the outsiders (shareholders and investors).

Next, we develop the base hypotheses for our study while discussing how the BSR/SD practices that lead to mutually beneficial relationships affect the respective firms’ (the buyer and the supplier) operational, strategic, and financial performance, which in turn, when signaled through “supplier award” influence the shareholders and investors to take their decision.

B. Abnormal Returns for Buyer and Supplier Firms

SD efforts are an ongoing process throughout a year, either formally constituted through a program or informally practiced depending on where the buying firm is located on the continuum between limited to extensive SD adoption [23]. A comprehensive list of different types of SD activities undertaken by various firms (in their respective contexts) is presented in web Appendix B. On the one hand, giving an award to a supplier firm is one of the SD activities [9], [10], [24] undertaken by a buyer firm, and on the other hand, such an award is also a strong signal of the benefits of BSR/SD efforts that both the firms are reaping [9], [12]. This situation is clear when we compare different SD activities with sample award definitions from our dataset.⁴ It is evident that factors considered while evaluating a supplier for an award are also directly linked to the SD activities performed by firms. For example, “innovation practices” as one of the criteria for awards is directly related to the SD activity of “giving product/technology development advice.” Similarly, “cost” as one of the criteria for awards is directly related to the SD activity of cost-saving projects. We again note that not all SD efforts are successful and that most fail at the implementation stage [25]. Therefore, although SD activities are carried out throughout a year, the announcement of an award is a clear signal to the outside world of the mutually beneficial BSR/SD efforts carried out between the two firms to date and the promise of future long-term benefits. Hence, the event generates an immediate stock market reaction.

The impact of BSR/SD efforts on the associated firms can be classified into three categories (please find relevant papers in Table A3 in web appendix), viz.,

- 1) impact on operational performance;
- 2) impact on strategic performance;
- 3) impact on financial performance.

Successful BSR/SD efforts positively affect a firm’s operational and strategic performance [26], which in turn positively affect the firm’s financial and nonfinancial performance, leading to positive shareholder reaction.

Regarding the impact on operational performance, supplier firms involved in a long-term relationship experience higher

sales growth and better process performance (in terms of quality, cost, inventory, and lead time) compared to supplier firms involved only in transactional relationships with their customers (buyers) [8], [26], [27]. Furthermore, the improvement in supplier’s operational performance is mediated by bilateral communication, cooperation, and commitment [28] and resource allocation [29], among others. Regarding the impact on strategic performance, a long-term relationship enables the exchange of knowledge between buyer and supplier firms, creating a joint position of competitiveness [30]. The receipt of an award signals the positive impact of BSR/SD efforts on the operational and strategic performance (and, therefore, on the financial and nonfinancial performance) of the supplier firm. This, in turn, reassures the supplier’s shareholders’ expectations of increased future cash flows. Hence, we propose the following hypothesis:

H1: Receiving an award as a quality/dependable/top supplier positively impacts the award-receiving firm’s market value.

There is an equal incentive for the buyer to put effort into maintaining and strengthening the relationship [31]. Buyers can utilize the supplier’s capabilities to their advantage in BSR and hence increase their quality and process performance [26], [32], thereby improving their operational performance. Regarding the impact on strategic performance, successful BSR/SD efforts improve buyer firms’ market responsiveness [33] and competitive advantage [34]. Moreover, a dedicated SD program for its suppliers enables a buying firm to tailor its purchasing strategy to its corporate strategy [10], resulting in a positive impact on both operational and strategic performance. The positive impact of BSR/SD efforts on the operational and strategic performance positively impacts the financial and nonfinancial performance of the buyer firm. Therefore, an event of “supplier award” signals and reassures the buyer’s shareholders’ expectations of increased future cash flows due to the buyer’s effort to develop beneficial supply chain relationships. Hence, we propose the following hypothesis:

H2: Giving an award to a quality/dependable/top supplier positively impacts the award-giving firm’s market value.

C. Value of Award

Not every award holds equal value among the potential recipients or the audience in general. Different characteristics of the award giver and the award recipient impact the perceived value of an award [35]. The higher the value of an award, the more it is sought after by the potential recipients. One way to judge the value of an award is to determine how exclusive the award is. Recognition through an award has more value if the award is difficult to get and more recipients are vying for the same [36].

1) Award Giver (Buyer): A buyer can have an SD program with many of its suppliers in some form or another. In such a scenario, receiving an award from the buyer indicates the success of the relationship and provides the supplier assurance of future business with the buyer. From the supplier’s perspective, the more suppliers there are that receive such an award from the buyer, the less confidence the supplier and its shareholders will have in the perceived value of such an award. The above

⁴See web appendix for SD activities and award definitions in dataset.

argument (at the ‘individual’ level) is well observed in the domain of economics and HRM [35], [37]. This leads us to propose the following hypothesis:

H3a: The exclusivity of the “supplier award” positively impacts the increase in the award-receiving firm’s market value.

From the buyer’s (award-giving firm’s) perspective, the more exclusive the award is, the more it is valued by its shareholders. Although giving awards to many suppliers might indicate a buyer’s fruitful relationship with multiple suppliers, it might not surprise the market enough, i.e., the more the number of awards, the lesser the surprise for the market. Moreover, buyers tend to be selective while giving awards to their suppliers. One of the rationales behind being selective while giving awards is to induce competitive pressure among suppliers to improve their performance [8]. Furthermore, giving an award is also an indirect indication of the performance standard the buying firm sets for its suppliers, and an exclusive award is an indication of “asking more” from the suppliers, in the absence of which the buyer might only deserve a sub-standard service from its suppliers[23]. Hence, we propose the following hypothesis for buyers:

H3b: The exclusivity of the “supplier award” positively impacts the increase in the award-giving firm’s market value.

2) *Award Recipient (Supplier):* How frequently a person/organization receives an award has an impact on the perceived value of the award [36]. Initial recognition has a higher value to the receiver than subsequent recognition [36]. This phenomenon of fatigue to excess has been referred to as satiation in the nutrition literature [38]. The satiation effect has been studied in management literature to signify fatigue from various events like television commercials [39] or market events [40]. Any award or recognition has a similar satiation effect where the initial award will have a higher impact, and satiation or fatigue will set in for subsequent awards leading to a lower impact from those. This can also be understood from the expectancy theory [41], [42].

Receiving an award for the first time is generally unexpected by shareholders, leading to a strong reaction in the stock market. On the other hand, a supplier’s receipt of an award that it has secured multiple times in the past is more obvious than a surprising outcome in the eyes of its shareholders. The absence of surprise on winning awards continuously is the award satiation or fatigue, referred to in the preceding paragraph. Extant research on second awards and subsequent victories has established that the novelty and desirability of any award decrease steadily as the awards become frequent [43]. As Bordalo et al. [44] pointed out, the market values a firm with respect to expectations. Hence, the market value of firms will rise less with repeat awards as a result of the satiation effect getting stronger in the shareholders. We hypothesize that as the frequency of receiving the award increases, the increase in the market value reduces nonlinearly due to diminishing marginal satiation from the subsequent awards. Hence, we propose the following hypothesis:

H4a: As the frequency of receiving the “supplier award” increases, the increase in award receiving firm’s market value diminishes nonlinearly.

From the award giver’s perspective, the award-receiving firm’s satiation can affect the award-giving firm’s market value. That is, if an award-giving firm awards a supplier whose satiation is high (owing to receiving such awards more frequently), then the increase in the award-giver’s market value is less. This is likely the case as the expectation of such an event is already high, and the element of surprise is missing. Hence, we propose the following hypothesis:

H4b: As the frequency of receiving the “supplier award” increases for a supplier, the increase in the market value of the firm giving an award to the supplier diminishes.

IV. DATA AND METHOD

Our empirical study employs a two-phased approach, i.e., event study followed by regression analysis. The two phases together enable us to test thoroughly the hypotheses proposed in Section III.

A. Data Collection

To collect data related to these events, we used two databases, i.e., Factiva and LexisNexis.⁵ Our time frame of analysis is 2002 to 2019. We chose the following three keywords for a news search: supplier awards, supplier award, and best supplier award. These three keywords were selected after analyzing corporate reports and news events about supplier awards to cover the maximum number of news articles related to the event of choice. Post the utilization of these keywords, we employed a secondary analysis to extract any remaining announcements. For the same, we included the asterisk (*) wildcard in the search phrases to enable us to capture a vast array of supplier awards and act as a robustness measure to ensure we did not miss differently worded awards, including preferred supplier awards, excellent supplier awards, and choice supplier awards. Web Appendix B provides a brief selection of the events (in the period 2002–2019) with examples of some news announcements.

The news announcements are generated from both databases to ensure that we can capture any news event from any news outlet pertaining to the event of interest. The earliest recorded occurrence of the event in any newspaper is treated as the event date as it is the first occurrence of the news in the public domain [45], [46]. Web Appendix C shows the data preparation process in detail. All confounding events are eliminated from the dataset of the news events that we collect as suggested in the established literature [47], [48]. To remove the data points with confounding events, we create a new search window for each event for the supplier and the buyer. If any confounding event is detected in the event window of 5 days [−22], that event is eliminated from our dataset for the buyer/supplier for whom a confounding event is detected. Confounding events include the following:

⁵Factiva and LexisNexis are news aggregation databases. Utilization of complementary databases ensured higher robustness for data collection in the sense that we could capture the earliest announcement of a news item from a news outlet and released on one of these databases.

- 1) declaration of annual results;
- 2) declaration of dividend;
- 3) top management arrests;
- 4) resignation or death of top management;
- 5) announcement of mergers or acquisitions.

This step leads to a total of 484 events for analysis.

Furthermore, for these 484 events, we follow the listed steps to create the dataset of award-giving firms (buyers): 1) remove unlisted award-giving firms and 2) remove award-giving firms with confounding events. This process leaves us with a total of 290 relevant events. Table C2 shows the number of announcements of supplier awards as retained in our dataset at different stages of analysis.⁶

For this set of award-giving (buyers) and award-receiving (suppliers) firms, we retrieve the daily closing stock prices for a period of 232 days ranging from 230 days before the event to 2 days after the event. These data are generated from Bloomberg and Thomson-Reuters along with firm-level financial data, such as firm revenue and profit. Both award-receiving (suppliers) and award-giving (buyers) firms in our dataset have diverse sets of characteristics, and this ensures the robustness and generalizability of our analysis. Table D1 in web appendix shows the characteristics of the firms in our dataset.

B. Research Method

The event study employed in this article is widely used in a variety of management disciplines to analyze the impact of firm-specific managerial events on their market value [49], [50]. Several researchers have used event studies to test the impact on firms of awards-related announcements, such as quality awards [13] and green activities [45]. A detailed description of the event study method and models used in this study are provided in web appendix.

Our event of focus is the announcement of awards to suppliers. We use regression with abnormal returns as the dependent variable for subsequent analysis. Through the event study, we generate the value of the abnormal return, or the excess return, over the expected market transaction for each firm that can be attributed to the phenomenon under study, i.e., the giving and receiving of supplier awards. The primary explanatory variables in our analysis are the two award characteristics, i.e., “award exclusivity” and “satiation distance.”

1) *Award Giver (Buyer) Metric: Exclusivity*: We operationalize the desirability of the award through variable exclusivity (Exclusivity). In organizational studies, exclusivity or desirability of the award is generally construed as the possibility of a specific employee getting an award compared to the wider pool of potential recipients [51]. It is often operationalized as the number of awards per eligible employee.

For firm-level awards, this translates to the “number of awards per supplier.” Hence, we have operationalized exclusivity as this. Operationalization of the above construct requires data on the

exact number of suppliers of each firm in every year of analysis, i.e., 2002–2019. However, the limitations in collecting and archiving data on the supply-chain division of firms suggest that Bloomberg SPLC only has these data for the period beginning in 2006 compared to our original analysis period beginning in 2002.

To overcome this limitation, we create the exclusivity variable by treating firm size (operationalized by firm revenue) as a proxy for the number of suppliers. The assumption is that larger firms have larger numbers of suppliers. We later validate this assumption as shown in Section V.⁷ Using firm size enables us to analyze the impact of award exclusivity on the complete data from the period 2002–2019 using firm revenue as the denominator instead of supplier count. The variable is operationalized by replacing the “supplier count” in the exclusivity measure with the log of firm revenue plus one (the number 1 is added as a constant to eliminate the possibility of division by 0 in case of logarithms). This transforms our measure of exclusivity to the “number of awards per unit revenue.” This metric indicates if a small firm is giving too many awards and hence the award is less exclusive or if a large firm (with potentially many suppliers) is giving few awards making the award highly exclusive.

However, in the case of supplier awards, additional complexity is the fact that a firm may not give supplier awards every year, and the number of awards given every year may change. This way, the awards could be exclusive not just in size but also in time, i.e., an award being available once a few years. Hence, we take this into account as well while operationalizing an alternate metric of “exclusivity” called “exclusivity rolling.”

We consider two aspects while defining Exclusivity in this fashion, viz., 1) the rate at which buyer firm i has been awarding, i.e., the average number of awards given by buyer firm i per year, and 2) average supplier count/pool out of which buyer firm awarded. To ensure the independence of the metric from the sample time frame, we create a rolling window of n years preceding the award wherein we compute the award metrics. We then define exclusivity of supplier award by buyer i in year t (with n denoting rolling window length) as

$$\begin{aligned} \text{Exclusivity_rolling}_{it} &= \frac{\text{average award rate}_t}{\text{average supplier count}_t} \\ &= \frac{\sum_{j=t-(n-1)}^t \text{awarded suppliers count}_{ij} / n}{\text{average supplier count}_t}. \end{aligned} \quad (1)$$

For our analysis, we have taken the rolling window length to be 5 years. This rolling window analysis ensures that we take into account firm behavior over a fixed time window that is large enough to study recurring award patterns (if any). To check the robustness of the metric, we also compute the metric and perform analysis for a 3-year window.

For instance, in the year 2006, a firm gives one award, then the exclusivity of that award will be based on the total number

⁶Detailed description of data including year-wise, month-wise, and industry-wise distribution of firms in the sample set have been made available in Table C1 in the web appendix.

⁷We use the Bloomberg SPLC data, which provides the historical supplier count of each firm on a specific date, to create the exclusivity variable with the actual supplier count corresponding to award announcements for the 2006–2019 period and use that recomputed metric for robustness analysis.

of awards given till 2006 (let us suppose it was zero, two, three, four, and one in the 5-year window from 2002 to 2006, totaling to ten). The denominator will have years elapsed till 2006, i.e., 5, and the average number of suppliers (let us assume 100 till the year 2006). So, the exclusivity will be $(10/5)/100$ or 0.002. For the purpose of analysis, we normalize the values and subtract it from 1, i.e., 0 represents the lowest exclusivity, and 1 represents the highest exclusivity.

2) *Award Recipient (Supplier) Metric: Satiation Distance:* As discussed in Sections II-B and III-C2, theory suggests that the value of awards (in terms of stock market reaction) would be higher for firms that receive the awards scarcely vis-a-vis firms that receive them frequently. We have used the construct of satiation distance to operationalize award satiation for firms. This is in line with prior literature that operationalizes satiation either as satiation retention i.e., amount of satiation that is retained from each exposure [52], or satiation distance i.e., amount of exposure required to achieve full satiation [38]. The operationalized construct is, therefore, high (i.e., 1) for a supplier firm receiving an award for the first time and decreases (toward 0) as the firm receives more awards and the firm's satiation of the award (fatigue with award) increases.

To capture the hypothesized nonlinear effect of award frequency in the regression analysis, *satiation_distance* is defined as the inverse of the number of awards won by the supplier firm such that an infinite number of awards will lead to full satiation (0 distance) and the first award will lead to satiation distance of 1

$$\text{Satiation_distance}_{jt} = 1/\text{Number of awards received by the supplier } j \text{ in preceding } n \text{ years} \quad (2)$$

where n is the rolling window period. Similar to the computation of exclusivity, this metric might also suffer from sample bias, where the start period of data collection will change the computed satiation distance. Hence, we deploy a similar strategy where we compute the variable in a 5-year rolling window that would inform us of the satiation distance of the firm in a 5-year rolling period. We perform a robustness check on the variable with a 3-year rolling period as well. For instance, the satiation distance for a firm in the year 2006, if it has received 4 awards during 2002–2006, would be 0.25, whereas, for a firm that has received its first award in 2006, it would be 1.

3) *Control Variables:* We also use several control variables to control for their probable effect on the hypothesized variables under study. The variables are similar to the ones used in similar event studies [15], [53]. The first of these is the Profit margin of the firm. It is defined as the profit per unit revenue of the firm. It is essential to control for profit margin as it accounts for the relative performance of the firm that may, in turn, impact the stock returns [53]. We have used the firm's sales as another control variable in our analysis. It is an indicator of firm size.⁹ Firms of different sizes would have a different impact on their stock returns due to similar events, and hence it is necessary to control for size [15]. Another variable that needs to be controlled

for is market capitalization.⁸ Market capitalization is used to control for effect due to the size of the firm [54]. It denotes the size of the firm by its market value. Another financial variable that we have controlled for is financial leverage. It denotes the debt-to-equity ratio for a firm and is a very important indicator impacting the firm's market valuation. It is necessary to control for leverage as the stock returns of a firm are sensitive to their leverage, and not controlling for leverage may overestimate the impact of the events on their returns [55].

For the supplier, we have also included the size of the award-giving firm (buyer) as a control as the buyer firm's size and hence its market power and reputation may impact the value the market attaches to a specific award. We have not included the counterparty size in the analysis of the buyer as a single buyer gives supplier awards to multiple suppliers at a time of varying sizes, and hence the impact of the supplier's size on the buyer cannot be uniquely differentiated.

We have also controlled for firm type using the dummy variable *Manufacturing*. It is set as 1 for manufacturing firms and 0 for other firms. Although the supplier awards are given mainly by manufacturing firms, the suppliers receiving may be either manufacturing or otherwise. Given the nature of the awards and their impact on manufacturing firms, it is necessary to control for firm type. Another control variable is *Year* representing the time series and is included to control for the effect of time. Since our dataset consists of awards given over a long period, this control variable accounts for variance due to time.

4) *Regression Model:* We use the weighted least squares (WLS) and the ordinary least squares (OLS) regression for the estimation. The data consist of multiple firms that received the award on the same day, which may lead to a cross-sectional correlation in the dataset. WLS regression and the groupwise heteroskedasticity procedure account for both correlation and heteroskedasticity in the data and have been employed in extant research [56], [57]. We use the method proposed by Karafiath [58] for analyzing the abnormal returns of the award-giving firms and the award-receiving firms by assuming error variance to be equal within industry groups. The inverse of variance computed from group-specific OLS residuals is used as the weight for firms within an industry group. The following model specification is used for award-receiving (supplier) firms:

$$\begin{aligned} \text{AR}_{ij} = & \beta_0 + \beta_1 \text{Exclusivity}_i + \beta_2 \text{satiation_distance}_j \\ & + \beta_3 \text{Profit margin}_j + \beta_4 \text{Sales}_j \\ & + \beta_5 \text{Market capitalization}_j \\ & + \beta_6 \text{Financial leverage}_j + \beta_7 \text{Manufacturing}_j \\ & + \beta_8 \text{Year} + \beta_9 \text{Award giving firm sales}_i \end{aligned} \quad (3)$$

where AR_{ij} represents abnormal returns to firm j due to award i .

Similarly, we use the model specification of the above equation to analyze the award-giving (buyer) firms. We include the average satiation of all suppliers awarded by firm j to analyze the

⁸We use the natural log of market capitalization as a control variable in this analysis.

TABLE II
ABNORMAL RETURNS FOR THE PERIOD 2002–2019 FOR ALL SUPPLIER FIRMS

| Event window | [-1, 1] | [-1,0] | [0,1] | [-1] | [0] | [1] |
|-----------------------------------|---------|--------|--------|----------|---------|---------|
| Base market model | | | | | | |
| Mean abnormal return (%) | -0.04 | 0.04 | 0.08 | -0.18 | 0.28 | -0.21 |
| t-test | -0.672 | 0.729 | 1.16 | -1.81** | 3.37*** | -1.96** |
| BMP test | -0.981* | 1.14 | 1.21 | -1.98** | 3.92*** | -2.21** |
| Median AR (%) | -0.04 | 0.03 | 0.06 | -0.13 | 0.1 | -0.04 |
| Wilcoxon rank test | -1.24* | 0.101 | 0.68 | -2.17** | 2.05*** | -1.97** |
| Corrado rank test | -1.42* | 0.45 | 0.83 | -2.45*** | 2.226** | -1.73** |
| Percentage positive | 48.78% | 50.35% | 51.39% | 44.8% | 53.03% | 48.42% |
| Binomial sign test | -0.92 | 0.65 | 0.85 | -2.24** | 1.76** | -0.69 |
| Fama–French 4-factor model | | | | | | |
| Mean abnormal return (%) | -0.04 | 0.06 | 0.07 | -0.07 | 0.29 | -0.26 |
| t-test | -0.73 | 0.93 | 0.92 | -1.48* | 3.47*** | -2.15** |
| BMP test | -0.81 | 1.02 | 1.1 | -1.55* | 3.66*** | -2.21** |
| Median AR (%) | -0.02 | 0.03 | 0.06 | -0.11 | 0.13 | -0.09 |
| Wilcoxon rank test | -0.88 | 0.28 | 1.11 | -1.92** | 2.42*** | -1.91** |
| Corrado rank test | -0.91 | 0.33 | 1.29* | -2.08** | 2.65*** | -2.18** |
| Percentage positive | 49.61% | 50.52% | 52.01% | 46.54% | 54.50 | 47.79% |
| Binomial sign test | -0.29 | 0.32 | 1.28* | -1.51* | 1.96** | -0.961 |

*represents $p < 0.1$, **represents $p < 0.05$ and ***represents $p < 0.01$

impact of the award receiver's satiation on award-giving firm.⁹

$$\begin{aligned}
 AR_j = & \beta_0 + \beta_1 \text{Exclusivity}_j + \beta_2 \text{Profit margin}_j \\
 & + \beta_3 \text{Sales}_j + \beta_4 \text{Market capitalization}_j \\
 & + \beta_5 \text{Financial leverage}_j + \beta_6 \text{Manufacturing}_j \\
 & + \beta_7 \text{Year} + \beta_8 \text{Average satiation}_j. \quad (4)
 \end{aligned}$$

For variables with long-tailed distribution, i.e., sales and market capitalization, we use the log of the variable to ensure normal distribution of the data. We ensure that the regression analysis performed is valid and robust. The regression models are tested for the presence of multicollinearity and heteroskedasticity. For all the models, variance inflation factor (VIF) is reported to be less than 7. The highest VIF is found for model 4, with a mean VIF of 3.8. We also conduct the Breusch–Pagan test for heteroskedasticity for the models. The null hypothesis of constant variance cannot be rejected for any of the models.

V. RESULTS AND ANALYSIS

Table II presents the results of the analysis in the form of the average abnormal returns for the award-receiving (supplier)

firm. The results are for the time window of [-1, 1]. We have reported the abnormal returns computed through the base market model as well as Fama–French–Carhart four-factor (FF4) [59] models to provide an additional level of robustness.

We report the relevant test statistics and multiple event windows in line with the most robust result-reporting standards¹⁰ [60]. The results clearly show that the impact of the award announcement is most significant on the day of the event, i.e., day [0]. The results are consistent across different models, as presented in Table II (0.28*** in the market model and 0.29*** in the FF4 model). Hence, we can conclude that there is a significant positive impact of the announcement of the award on the market returns for the award-receiving (supplier) firms, which supports the proposed hypothesis H1.

One counterintuitive result that Table II shows is the negative abnormal returns on the days preceding and succeeding the announcement of the awards. Based on the core premise of the event study based on the efficient market hypothesis, we would expect the supplier firms to have positive abnormal returns on the day of the award, as discussed above. Furthermore, the mixed market reaction for the supplier on days preceding the event day could be because of the uncertainty around the possibility of

⁹It needs to be stated here that we can only compute average satiation for all listed suppliers as detailed satiation information for nonlisted suppliers is not present.

¹⁰Web appendix contains the detailed methodological information on these tests performed on abnormal return.

TABLE III
ABNORMAL RETURNS FOR THE PERIOD 2002–2019 FOR ALL BUYERS

| Event Window | [-1, 1] | [-1,0] | [0,1] | [-1] | [0] | [1] |
|-----------------------------------|---------|---------|--------|--------|---------|--------|
| Base market model | | | | | | |
| Mean abnormal return (%) | 0.48 | 0.18 | 0.77 | 0.03 | 0.33 | 0.95 |
| t-test | 1.28* | 3.34*** | 1.29* | 0.45 | 4.45*** | 0.80 |
| BMP test | 1.32* | 3.36*** | 1.32 | 0.46 | 4.53*** | 0.85 |
| Median AR (%) | 0.04 | 0.04 | 0.08 | 0.03 | 0.1 | 0.05 |
| Wilcoxon rank test | 2.15** | | 3.33* | 0.07 | 3.13*** | 0.67 |
| Corrado rank test | 2.22** | 2.37*** | 3.46** | 0.11 | 3.45*** | 0.78 |
| Percentage positive | 50.42% | 52.55% | 51.69% | 50.91% | 55.03% | 46.18% |
| Binomial sign test | 0.26 | 1.31* | 0.78 | 0.91 | 1.62* | -1.21 |
| Fama–French 4-factor model | | | | | | |
| Mean abnormal return (%) | 0.51 | 0.19 | 0.81 | 0.04 | 0.27 | 0.68 |
| t-test | 1.56* | 3.62*** | 1.39* | 0.71 | 4.64*** | 0.45 |
| BMP test | 1.71** | 3.84*** | 1.41* | 0.82 | 4.81*** | 0.49 |
| Median AR (%) | 0.05 | 0.06 | 0.1 | 0.04 | 0.09 | 0.06 |
| Wilcoxon rank test | 2.53*** | 2.55*** | 3.58** | 0.38 | 3.31*** | 0.81 |
| Corrado rank test | 2.68*** | 2.61*** | 3.62** | 0.59 | 3.38*** | 0.89 |
| Percentage positive | 51.63% | 54.19% | 52.64% | 52.72% | 56.26 | 46.54% |
| Binomial sign test | 0.94 | 1.96** | 1.29* | 0.90 | 2.11** | -1.14 |

where * represents $p < 0.1$, ** represents $p < 0.05$ and *** represents $p < 0.01$

receiving an award. A similar market-correcting phenomenon has been documented post-specific events in the finance literature [61], [62]. We believe further studies are required to dive deeper into this phenomenon, which is beyond the scope of the current study. However, our results unequivocally establish a positive market return on the day of the award announcement.

For the award-giving firms (buyers) also, the results for the analyzed period 2002–2019 show significant abnormal returns. The returns are almost similar in magnitude to the standardized abnormal returns for the award-receiving (supplier) firms (0.28% for suppliers, Table II, and 0.3% for buyers, Table III). The analysis regarding award-giving firms (buyers) on the complete event window is shown in Table III. The findings illustrate that there is no significant leakage for award-giving firms or any delay in the assimilation of the event. The impact is significant only on the day of the event, i.e., day [0], which, again, supports hypothesis H2. The market value of the buyer firm is significantly impacted by the announcement of awards for its best/preferred suppliers. The signaling mechanism works significantly, not only for the award-receiving (supplier) firms but also for the award-giving (buyer) firms.

To test other hypotheses, we use OLS and the WLS regression, as specified in the previous section. Extant literature has suggested the use of differing event windows for analysis of abnormal returns like 2-day window [-10] and 3-day window [-11] [53]. However, in our case, we find no evidence of either news leakage or delayed assimilation, as the impact of the awards is significant on the day [0] only. Hence, we use the abnormal returns on the day [0] as the dependent variable for analysis. However, to illustrate the robustness of results and also to provide comparability with extant research in this domain, we have also provided regression results with abnormal returns for event windows [-11] and [-10] in web appendix. The abnormal returns for all of these analyses are calculated using the Fama–French four-factor model. Table C4 (in web appendix) shows the

correlation coefficients of the variables, where the upper triangle shows the coefficients for the award-giving (buyer) firms, and the lower triangle shows the coefficients for the award-receiving (supplier) firms.

Table IV contains the results of the analysis of abnormal returns for award-receiving (supplier) firms using the WLS method.¹¹ Model 1 contains the control variables, whereas Model 2 contains the explanatory variables with the simple formulation of exclusivity included. In Model 3, we use the rolling formulation of exclusivity instead of the simple formulation. In Model 4, we include a variable for explanatory variable interaction. The interaction effects are included to account for any moderation effect that the explanatory variables may have on each other.

The results presented in Table IV show that exclusivity has an insignificant impact on the abnormal returns of the award-receiving (supplier) firms (WLS coefficient = -0.005 , $p > 0.1$).

This leads us to reject hypothesis H3a. This finding implies that the exclusivity of the award has no bearing on the abnormal returns of the supplier. A possible explanation is that the shareholders of award-receiving firms do not attach a higher value to an award being awarded to a select few firms but attach value to the phenomenon of receiving the award itself. However, we do find that the variable satiation distance has a significant and positive impact on abnormal returns of the award-receiving (supplier) firms (WLS coefficient = 0.011 , $p < 0.05$). This indicates a decline in impact on the market value of suppliers due to each additional award. Hence, we find support for hypothesis H4a. Models 6 and 7 in Table V indicate that the coefficient for average satiation of the suppliers for award-giving firms is insignificant. This indicates that our hypothesis H4b is not supported. There is no impact on the award giver on account of the frequency of awards received by its suppliers on average.

The results for award-giving (buyer) firms are shown in Table V. The results illustrate that the coefficient for exclusivity is positive and significant (WLS coefficient = 0.427 , $p < 0.01$, Model 6). This finding shows that with an increase in the exclusivity of awards, award-giving (buyer) firms obtain more significant abnormal returns. Hence, hypothesis H3b is supported. The results remain consistent for longer event windows of [-10] and [-11] for both buyers and suppliers. The results for longer event windows are available in web appendix.

A. Robustness and Additional Analysis

1) *Variable Robustness*: We have created constructs of exclusivity and satiation. In exclusivity, we have made two major assumptions. First, we have replaced supplier count by firm size as supplier data was unavailable. Here, we test that assumption and run the robustness analysis for the period of 2006–2019, where supplier data was available, and we could use supplier count to compute exclusivity. Table D4 in web appendix shows the results of the WLS regression analysis for both supplier (Model 1) and buyer (Model 2) using the alternate formulation of

¹¹We have shown the WLS results in the main paper in interest of parsimony. The OLS analysis performed for comparative analysis has been provided in online appendix.

TABLE IV
RESULTS OF WLS ANALYSIS FOR AWARD-RECEIVING (SUPPLIER) FIRMS ON EVENT DAY, DAY [0]

| | Model 1: WLS | | Model 2: WLS | | Model 3: WLS | | Model 4: WLS | |
|--|--------------|------------|--------------|------------|--------------|------------|--------------|------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| Profit margin ($\times 10^{-6}$) | -2.4 | 1000 | -7.6 | 1100 | -5.3 | 1000 | -4.6 | 1000 |
| Sales | -0.003** | 0.001 | -0.002* | 0.001 | -0.003** | 0.001 | -0.003** | 0.001 |
| Market capitalization ($\times 10^{-3}$) | 0.43 | 2.01 | 0.58 | 1.2 | 0.48 | 3.12 | 0.45 | 8.13 |
| Financial leverage ($\times 10^{-4}$) | 3.6** | 1.1 | 3.8* | 1.8 | 3.5** | 1.5 | 3.4* | 1.6 |
| Year ($\times 10^{-4}$) | -0.64 | 2.6 | -0.71 | 2.2 | -0.70 | 2.3 | -0.78 | 3.2 |
| Manufacturing ($\times 10^{-3}$) | 0.36 | 3.1 | -0.12 | 2.6 | -0.21 | 2.6 | -0.19 | 3.1 |
| Award giver sales ($\times 10^{-4}$) | 6.8 | 5.9 | 6.9 | 6.1 | 6.9 | 6.1 | 7.2 | 6.9 |
| Exclusivity ($\times 10^{-3}$) | | | -4.2 | 6.8 | | | -4.9 | 7.2 |
| Exclusivity_rolling ($\times 10^{-3}$) | | | | | -6.4 | 9.65 | | |
| Satiation distance | | | 0.008** | 0.003 | 0.009** | 0.003 | 0.011** | 0.005 |
| Exclusivity * Satiation distance | | | | | | | 0.019 | 0.037 |
| Intercept | 0.003* | 0.001 | 0.015* | 0.008 | 0.004* | 0.001 | 0.019* | 0.009 |
| R-squared | 0.053** | | 0.059** | | 0.061** | | 0.057** | |

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. The errors in the table are robust standard errors.

The stars on R-squared represent the significance of the model.

All models have included month dummies to account for seasonality.



Fig. 1. Relationship between the number of suppliers and revenue of award-giving firms.

exclusivity metric using no. of suppliers for award-giving firms. Here exclusivity is computed as “no. of awards per supplier.” The results indicate no significant qualitative change. Fig. 1 also shows the relationship between the number of suppliers and the firm size of award-giving firms. We find them to closely follow each other (Pearson correlation coefficient = 0.62, $p < 0.01$), establishing the validity of our assumption in computing a virtual exclusivity metric for the complete period during 2002–2019.

Second, we have created an alternate exclusivity metric to account for exclusivity over time that we have computed over 5-year rolling windows. We have done similar computations for “satiation distance” as well. To test the robustness

of our construct against alternate specifications, we create the “exclusivity_rolling” and “satiation distance” metrics in 3-year windows as well. The results are available in Table D5 in web Appendix D. The results denote no qualitative difference from the original formulation.

Another possible cause of concern with our variable formulation could be the fact that the rolling time windows may mask the variance within the time windows. For instance, there would be a difference between firms giving three awards as one each year versus three in the first year and none afterward. To control for this effect, we computed a variable “awards_sd” representing the standard deviation in awards by the award-giving firm in its exclusivity metric. The results after controlling for this variable are presented in Table D10 in web appendix and show the variable to be insignificant.

2) *Test of Endogeneity*: Endogeneity is increasingly considered a major issue in causation analysis in regression-based research [63], [64]. We take multiple steps to ensure our analysis is free of endogeneity concerns. First, we include several control variables to ensure that only the effect of the target variable is captured in the analysis [63], [65].

Finally, to ensure that endogeneity is not arising out of the explanatory variables or control variables, we perform the Durbin–Wu–Hausman test. The test statistic for the award-receiving (supplier) firms is found to be 0.74 ($p = 0.377$), and for award-giving (buyer) firms, it is found to be 0.69 ($p = 0.561$). In both cases, the null hypotheses of no-endogeneity cannot be

TABLE V
RESULTS OF ANALYSIS FOR ABNORMAL RETURNS OF AWARD-GIVING
(BUYER) FIRMS

| | Model 5: WLS | | Model 6: WLS | | Model 7 | |
|---|--------------------------------------|------------|--------------|------------|-------------|------------|
| | Coefficient | Std. error | Coefficient | Std. error | Coefficient | Std. error |
| | DV: Abnormal returns on day 0 | | | | | |
| Profit margin ($\times 10^{-4}$) | -2.6 | 2.4 | -2.3 | 2.1 | -2.4 | 2.1 |
| Sales | -0.008 | 0.02 | -0.008 | 0.02 | -0.008 | 0.02 |
| Market capitalization ($\times 10^{-3}$) | -0.28** | 0.14 | -0.25** | 0.13 | -0.27** | 0.14 |
| Financial leverage ($\times 10^{-5}$) | -7.6 | 3.8 | -7.1 | 6.4 | -6.7 | 4.6 |
| Year ($\times 10^{-4}$) | -0.66 | 1.4 | -0.79 | 1.5 | -0.88 | 2.1 |
| Manufacturing ($\times 10^{-3}$) | 4.1** | 2.1 | 4.2** | 2.3 | 3.9** | 1.8 |
| Exclusivity ($\times 10^{-3}$) | | | 0.427*** | 0.042 | | |
| Exclusivity_rolling ($\times 10^{-3}$) | | | | | 0.311** | 0.112 |
| Average Satiation (Averaged across all listed suppliers) | | | 0.007 | 0.12 | 0.008 | 0.13 |
| Intercept | 0.017** | 0.008 | 0.051*** | 0.012 | 0.043** | 0.026 |
| R-squared | 0.086** | | 0.20*** | | 0.17*** | |

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

The stars on the R-squared represent the significance of the model. The errors in the table are robust standard errors.

All models have included month dummies to account for seasonality.

rejected. Web appendix contains the detailed computations for the test.

3) *Additional Robustness Tests*: We have performed additional robustness tests to ensure the validity of the results. These are presented in web appendix. Our results are robust to these tests as well. These are presented in Table D10 in web appendix.

VI. DISCUSSION AND IMPLICATIONS

The results from both H1 and H2 indicate that shareholders of both the buyer and supplier value their firms' efforts to develop stronger long-term relationships as signaled by "supplier awards."

One of the interesting results of our analysis pertains to hypotheses H3 and H4a. As theorized, we find that as the frequency of awards received increases for a supplier firm, the rise in the market value due to the award diminishes nonlinearly, i.e., a supplier firm that receives awards rarely witnesses a higher impact on its market value than the one that regularly receives awards. This phenomenon can be observed in Fig. 2, where the nonlinear diminishing trend in the abnormal stock market return with the increase in award frequency is clearly visible.

For award givers (buyers), a more exclusive award has more value. The act of giving the award to only a few firms reaffirms the importance of the award-giving effort as opposed to the act of giving awards to many suppliers where the shareholders cannot ascertain the impact of the awards. From the award-receiving (supplier) firm's perspective, the nonsignificance of award

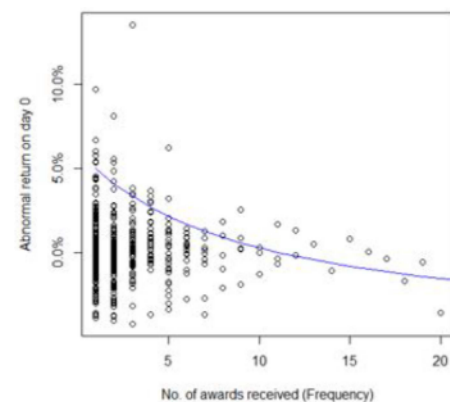


Fig. 2. Relationship between award frequency and abnormal returns on day 0 of supplier firms.

exclusivity is surprising. Although the theoretical discussion in Section III suggests that more exclusive awards should lead to higher market returns for the supplier, the results did not support the hypothesis. It is evident that the "exclusivity" of an award does not impress the shareholders. It is the act of receiving an award that is more important for shareholders of award-receiving (supplier) firms than receiving an exclusive award.

The temporal analysis around the financial crisis of 2008 provides some interesting insights that could be further analyzed in future works.¹² The results show that for award-receiving

¹²Detailed temporal analysis is provided in web appendix.

(supplier) firms, the abnormal return for the period before 2008 is statistically significant and much higher than the overall abnormal return in the 2002–2019 period. However, the abnormal return in the post-crisis period is not significantly different from 0. This finding shows the ineffectiveness of awards as the signaling mechanism post-2008 for the supplier firms.

For the award-giving (buyer) firms, we find that the impact is greater in the latter period than in the earlier period. One of the possible reasons for the deviant behavior of the award-giving (buyer) firms compared to the award-receiving (supplier) firms becomes apparent on deeper inspection of the nature and quantity of awards. Although the number of awards is lower in the pre-2008 period than in the post-2008 period, the number of awards per firm decreases from 2.5 in the former period to 1.6 in the latter. In the former period, a few concentrated firms give out many awards.

A. Implications for Academia

In the existing SD literature, a supplier award/recognition is primarily studied as a mechanism to motivate suppliers, and therefore existing studies [16] have looked at its impact on a firm's financial performance. The results of our study establish the usefulness of such awards as an effective signaling mechanism to the outside stakeholders as we find evidence for the market value creation potential of such awards for both the buyer and the supplier. Our study also contributes to the organizational awards literature. Through our study, we fill the research gap around the shareholder value creation potential of such awards. Unlike the existing studies [13], [14], [15], [16], [66], it is the first (to the best of our knowledge) to study award characteristics such as exclusivity and award satiation and their impact on the awards' impact on shareholders of firms. This article opens up the discourse around how firms can communicate/signal their efforts around relationship-building with their supply chain partners. Future works can take up other issues, such as the implications of a firm having multiple awards in place, the implications of choosing a closed versus open methodology for the awards in place, etc. Furthermore, other dimensions, such as relationship asymmetry, the relative reputation of the involved parties, and the length of the relationship, can be studied in conjunction with the phenomenon of award announcements to better understand the effect of such events.

B. Implications for Practice

This article establishes the role of supplier awards as a signaling tool apart from their generally understood role of motivating suppliers. Given that shareholders of both the parties involved react positively toward such events, the probability of both the buyer and the supplier acting farsightedly toward building long-term relationships increases. Based on our findings, we have the following recommendation for the buyer and supplier firms.

Through our study, the signaling potential of "supplier awards" in creating positive shareholder value is established. Therefore, firms that engage in BSR and SD activities but have not institutionalized the practice of awarding the best suppliers

should consider doing the same. Not only will it help the buyer firm but also the supplier firm, thereby creating overall supply chain value.

For buyers, we find that the exclusivity of the award is significantly connected to firm value. An award's signaling effectiveness is only as strong as the exclusivity of that award. Therefore, buyers should carefully establish and implement the evaluation criteria for giving out awards, thereby limiting the awards granted only to deserving suppliers. We find that shareholders of supplier firms overlook award exclusivity. They attach significance only to the act of building relationships with buyers. Our results would recommend that suppliers should not be too concerned about the number of awards a buyer gives; instead, they should be invested in building a fruitful long-term relationship with a buyer reflected through supplier awards. Furthermore, we find that shareholders respond much more positively, as indicated through higher abnormal returns, for firms getting their maiden or initial supplier awards. This means that suppliers that have not received too many supplier awards in the past should put additional effort into securing those awards, as their shareholders will recognize and respond very positively to such additional efforts.

We also found that the shareholders understand the importance of the SD process in the manufacturing sector, given the real-time investment and effort required in this sector. Therefore, firms belonging to the manufacturing sector should realize the importance of "supplier awards" as an SD activity and as an effective signaling mechanism. Through our study, we show that awarding a supplier is not a simple activity, and it has significant market implications. Therefore, a firm needs to capture the data to understand the impact of its award policy and, in the long term, utilize the data analytics around the same to suitably modify its policy for the best results.

VII. CONCLUSION

This research has its share of limitations, which must be considered in interpreting the results. The first limitation arises from the choice of methodology. Any event study assumes the presence of an efficient market, which assumes that the current market price of a firm accounts for all the information available to the shareholders. The results may not hold in the case of market inefficiency. Second, although all efforts were made to include a wide array of supply chain awards, a broader and more inclusive set of keywords could be used in the future to capture as many awards. Third, we have treated buyers and suppliers as distinct entities owing to the choice of listed firms with nonconfounding events as a unit of analysis. However, future research could consider the buyer–supplier dyad level. Fourth, better proxies for award characteristics can improve the study. The mechanism of possible interplay between these and other possible award characteristics also needs to be studied in subsequent research. In this study, we were also limited by the limited availability of supplier characteristics data. Future studies could include more supplier characteristics to enhance the models. Additionally, alternate methods like propensity score matching techniques could be utilized to test the robustness further.

Within the bounds of the study's limitations, our current research extends our understanding of the mechanism through which BSR development awards are viewed by shareholders. We analyze their value-generating capacity and identify the circumstances wherein these activities create maximum impact for both buyers and suppliers. This study is unique in its two-sided approach to addressing a complex value-creation issue in the domain of supply chain management. This empirical investigation proves beyond a doubt the impact of SD efforts on buyers and suppliers, as well as their importance as perceived by firm shareholders.

NOTE

Supplementary Material (Online Appendix) necessary for reproducibility of the work can be accessed from Authors' page at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4308919.

REFERENCES

- [1] M. A. Cusumano, "The limits of 'Lean,'" *Sloan Manage. Rev.*, vol. 35, no. 4, 1994, Art. no. 27.
- [2] J. K. Liker and T. Y. Choi, "Building deep supplier relationships," *Harvard Bus. Rev.*, vol. 82, no. 12, pp. 104–113, 2004.
- [3] K. Marah, G. John, B. Blake, and P. Manenti, *The Chief Supply Chain Officer Report 2014-Pulse of the Profession*. London, U.K.: SCM World, 2014.
- [4] D. R. Krause and L. M. Ellram, "Success factors in supplier development," *Int. J. Phys. Distrib. Logistics Manage.*, vol. 27, no. 1, pp. 39–52, 1997.
- [5] S. M. Wagner, "A firm's responses to deficient suppliers and competitive advantage," *J. Bus. Res.*, vol. 59, no. 6, pp. 686–695, 2006.
- [6] S. M. Wagner, "Supplier development and the relationship life-cycle," *Int. J. Prod. Econ.*, vol. 129, no. 2, pp. 277–283, 2011.
- [7] T. Jain, J. Hazra, and T. E. Cheng, "Strategic sourcing under supplier development investments," *IEEE Trans. Eng. Manage.*, vol. 67, no. 3, pp. 902–917, Aug. 2019.
- [8] D. R. Krause, T. V. Scannell, and R. J. Calantone, "A structural analysis of the effectiveness of buying firms' strategies to improve supplier performance," *Decis. Sci.*, vol. 31, no. 1, pp. 33–55, 2000.
- [9] D. R. Krause, R. B. Handfield, and T. V. Scannell, "An empirical investigation of supplier development: Reactive and strategic processes," *J. Oper. Manage.*, vol. 17, pp. 39–58, 1998.
- [10] P. K. Humphreys, W. L. Li, and L. Y. Chan, "The impact of supplier development on buyer–supplier performance," *Omega*, vol. 32, no. 2, pp. 131–143, 2004.
- [11] K. Katase, H. F. Yap, J. Ko, and S. Horvath, *ON Semiconductor Supplier Handbook: A Practical Guide to Supplier Development Process from ON Semiconductor*. Phoenix, AZ, USA: Onsemi, 2018.
- [12] D. R. Krause, "The antecedents of buying firms' efforts to improve suppliers," *J. Oper. Manage.*, vol. 17, pp. 205–224, 1999.
- [13] K. B. Hendricks and V. R. Singhal, "Quality awards and the market value of the firm: An empirical investigation," *Manage. Sci.*, vol. 42, no. 3, pp. 415–436, 1996.
- [14] D. D. Wilson and D. A. Collier, "An empirical investigation of the Malcolm Baldrige National Quality Award causal model," *Decis. Sci.*, vol. 31, no. 2, pp. 361–383, 2000.
- [15] S. Chae, T. Yan, and Y. Yang, "Supplier innovation value from a buyer–supplier structural equivalence view: Evidence from the PACE awards in the automotive industry," *J. Oper. Manage.*, vol. 66, no. 7/8, pp. 820–838, 2020.
- [16] A. Azadegan and D. Pai, "Industrial awards as manifests of business performance: An empirical assessment," *J. Purchasing Supply Manage.*, vol. 14, no. 3, pp. 149–159, 2008.
- [17] M. Spence, "Job market signaling," *Quart. J. Econ.*, vol. 87, no. 3, pp. 355–374, 1973.
- [18] B. L. Connelly, S. T. Certo, R. D. Ireland, and C. R. Reutzel, "Signaling theory: A review and assessment," *J. Manage.*, vol. 37, no. 1, pp. 39–67, 2011.
- [19] S. Ba, Y. Jin, X. Li, and X. Lu, "One size fits all? The differential impact of online reviews and coupons," *Prod. Oper. Manage.*, vol. 29, no. 10, pp. 2403–2424, 2020.
- [20] Y. Duan, C. Hofer, and J. A. Aloysius, "Consumers care and firms should too: On the benefits of disclosing supplier monitoring activities," *J. Oper. Manage.*, vol. 67, no. 3, pp. 360–381, 2021.
- [21] L. Cheng, C. W. Craighead, Q. Wang, and J. J. Li, "When is the supplier's message 'loud and clear'?" Mixed signals from supplier-induced disruptions response," *Decis. Sci.*, vol. 51, no. 2, pp. 216–254, 2020.
- [22] R. Narasimhan, T. Schoenherr, B. W. Jacobs, and M. K. Kim, "The financial impact of FSC certification in the United States: A contingency perspective," *Decis. Sci.*, vol. 46, no. 3, pp. 527–563, 2015.
- [23] D. R. Krause, *Interorganizational Cooperation in Supplier Development: Influencing Factors*. Tempe, AZ, USA: Arizona State Univ., 1995.
- [24] D. R. Krause, "Supplier development," in *Wiley Encyclopedia of Management*, vol. 10, C. L. Cooper, S. Roden, M. Lewis, and N. Slack, Eds. New York, NY, USA: Wiley, 2015.
- [25] R. Handfield, "Executive report of key results of recent research on supplier development strategies and outcomes," in *Supply Chain Resource Consortium*. Raleigh, NC, USA: North Carolina State Univ., 2002. [Online]. Available: <https://scm.ncsu.edu/as/scm/i/channels/articles/scm/912ExecsumSuppDev.doc>
- [26] M. U. Kalwani and N. Narayandas, "Long-term manufacturer–supplier relationships: Do they pay off for supplier firms?," *J. Marketing*, vol. 59, no. 1, pp. 1–16, 1995.
- [27] S. M. Wagner, "Indirect and direct supplier development: Performance implications of individual and combined effects," *IEEE Trans. Eng. Manage.*, vol. 57, no. 4, pp. 536–546, Nov. 2010.
- [28] W. C. Benton Jr., C. Prahinski, and Y. Fan, "The influence of supplier development programs on supplier performance," *Int. J. Prod. Econ.*, vol. 230, 2020, Art. no. 107793.
- [29] S. S. Saghir and V. Mirzabeiki, "Buyer-led environmental supplier development: Can suppliers really help it?," *Int. J. Prod. Econ.*, vol. 233, 2021, Art. no. 107969.
- [30] S. D. Jap, "Perspectives on joint competitive advantages in buyer–supplier relationships," *Int. J. Res. Marketing*, vol. 18, no. 1, pp. 19–35, 2001.
- [31] R. Terpend, B. B. Tyler, D. R. Krause, and R. B. Handfield, "Buyer–supplier relationships: Derived value over two decades," *J. Supply Chain Manage.*, vol. 44, no. 2, pp. 28–55, 2008.
- [32] B. Fynes and C. Voss, "The moderating effect of buyer–supplier relationships on quality practices and performance," *Int. J. Oper. Prod. Manage.*, vol. 22, no. 6, pp. 589–613, 2002.
- [33] W. Li, P. K. Humphreys, A. C. L. Yeung, and T. C. E. Cheng, "The impact of specific supplier development efforts on buyer competitive advantage: An empirical model," *Int. J. Prod. Econ.*, vol. 106, no. 1, pp. 230–247, 2007.
- [34] W. Li, P. K. Humphreys, A. C. L. Yeung, and T. C. E. Cheng, "The impact of supplier development on buyer competitive advantage: A path analytic model," *Int. J. Prod. Econ.*, vol. 135, no. 1, pp. 353–366, 2012.
- [35] Z. Shapira and I. Venezia, "Size and frequency of prizes as determinants of the demand for lotteries," *Org. Behav. Hum. Decis. Processes*, vol. 52, no. 2, pp. 307–318, 1992.
- [36] B. S. Frey, *Giving and Receiving Awards (Perspectives on Psychological Science)*. Los Angeles, CA, USA: SAGE Publications, 2006, pp. 377–388.
- [37] S. Szymanski and T. M. Valletti, "Incentive effects of second prizes," *Eur. J. Political Econ.*, vol. 21, no. 2, pp. 467–481, 2005.
- [38] J. Olds, "Satiation effects in self-stimulation of the brain," *J. Comp. Physiol. Psychol.*, vol. 51, no. 6, pp. 675–678, 1958.
- [39] D. W. Hendon, A. F. McGann, and B. L. Hendon, "Children's age, intelligence and sex as variables mediating reactions to TV commercials: Repetition and content complexity implications for advertisers," *J. Advertising*, vol. 7, no. 3, pp. 4–12, 1978.
- [40] R. J. Aumann and J. H. Drèze, "Values of markets with satiation or fixed prices," *Econometrica, J. Econometric Soc.*, vol. 54, no. 6, pp. 1271–1318, 1986.
- [41] K. R. Ferris, "A test of the expectancy theory of motivation in an accounting environment," *Accounting Rev.*, vol. 52, no. 3, 1977, Art. no. 605.
- [42] J. R. Pieper, J. M. Greenwald, and S. D. Schlachter, "Motivating employee referrals: The interactive effects of the referral bonus, perceived risk in referring, and affective commitment," *Hum. Resource Manage.*, vol. 57, no. 5, pp. 1159–1174, 2018.
- [43] A. T. Landry, M. Gagné, J. Forest, S. Guerrero, M. Séguin, and K. Papachristopoulos, "The relation between financial incentives, motivation, and performance," *J. Personnel Psychol.*, vol. 16, no. 1, pp. 61–76, 2017.
- [44] P. Bordalo, N. Gennaioli, R. L. Porta, and A. Shleifer, "Diagnostic expectations and stock returns," *J. Finance*, vol. 74, no. 6, pp. 2839–2874, 2019.

- [45] A. Stefan and L. Paul, "Does it pay to be green? A systematic overview," *Acad. Manage. Perspectives*, vol. 22, no. 4, pp. 45–62, 2008.
- [46] I. Bose and R. Pal, "Do green supply chain management initiatives impact stock prices of firms?," *Decis. Support Syst.*, vol. 52, no. 3, pp. 624–634, 2012.
- [47] A. McWilliams and D. Siegel, "Event studies in management research: Theoretical and empirical issues," *Acad. Manage. J.*, vol. 40, no. 3, pp. 626–657, 1997.
- [48] X. Zhan, Y. Mu, R. Nishant, and V. R. Singhal, "When do appointments of chief digital or data officers (CDOs) affect stock prices?," *IEEE Trans. Eng. Manage.*, vol. 69, no. 4, pp. 1308–1321, Aug. 2022.
- [49] J. Binder, "The event study methodology since 1969," *Rev. Quant. Finance Accounting*, vol. 11, pp. 111–137, 1998.
- [50] Y. Li, J. He, and K. C. Chan, "Information transmission along supply chains: Stock price reaction of suppliers upon a customer's release of qualitative risk information," *Int. J. Prod. Econ.*, vol. 239, 2021, Art. no. 108189.
- [51] B. S. Frey and J. Gallus, *Honours Versus Money: The economics of Awards*. Oxford, U.K.: Oxford Univ. Press., 2017.
- [52] F. Caro and V. Martínez-de-Albéniz, "Product and price competition with satiation effects," *Manage. Sci.*, vol. 58, no. 7, pp. 1357–1373, 2012.
- [53] L. Ding, H. K. S. Lam, T. C. E. Cheng, and H. Zhou, "A review of short-term event studies in operations and supply chain management," *Int. J. Prod. Econ.*, vol. 200, pp. 329–342, 2018.
- [54] K. S. Im, K. E. Dow, and V. Grover, "A reexamination of IT investment and the market value of the firm: An event study methodology," *Inf. Syst. Res.*, vol. 12, no. 1, pp. 103–117, 2001.
- [55] J. Hasbrouck, "The characteristics of takeover targets q and other measures," *J. Bank. Finance*, vol. 9, no. 3, pp. 351–362, 1985.
- [56] S. Mitra and V. Singhal, "Supply chain integration and shareholder value: Evidence from consortium based industry exchanges," *J. Oper. Manage.*, vol. 26, no. 1, pp. 96–114, 2008.
- [57] K. Han, W. Oh, K. S. Im, R. M. Chang, H. Oh, and A. Pinsonneault, "Value cocreation and wealth spillover in open innovation alliances," *MIS Quart.*, vol. 36, no. 1, pp. 291–315, 2012.
- [58] I. Karafiath, "Is there a viable alternative to ordinary least squares regression when security abnormal returns are the dependent variable?," *Rev. Quant. Finance Accounting*, vol. 32, no. 1, pp. 17–31, 2009.
- [59] M. M. Carhart, "On persistence in mutual fund performance," *J. Finance*, vol. 52, no. 1, pp. 57–82, 1997.
- [60] K. B. Hendricks, B. W. Jacobs, and V. R. Singhal, "Stock market reaction to supply chain disruptions from the 2011 Great East Japan Earthquake," *Manuf. Service Oper. Manage.*, vol. 22, no. 4, pp. 683–699, 2019.
- [61] S. Mehdian, T. Nas, and M. J. Perry, "An examination of investor reaction to unexpected political and economic events in Turkey," *Glob. Finance J.*, vol. 18, no. 3, pp. 337–350, 2008.
- [62] K. Daniel, D. Hirshleifer, and S. H. Teoh, "Investor psychology in capital markets: Evidence and policy implications," *J. Monetary Econ.*, vol. 49, no. 1, pp. 139–209, 2002.
- [63] B. H. Hamilton and J. A. Nickerson, "Correcting for endogeneity in strategic management research," *Strategic Org.*, vol. 1, no. 1, pp. 51–78, 2003.
- [64] M. Ketokivi and C. N. McIntosh, "Addressing the endogeneity dilemma in operations management research: Theoretical, empirical, and pragmatic considerations," *J. Oper. Manage.*, vol. 52, pp. 1–14, 2017.
- [65] K. Grigoriou and F. T. Rothaermel, "Organizing for knowledge generation: Internal knowledge networks and the contingent effect of external knowledge sourcing," *Strategic Manage. J.*, vol. 38, no. 2, pp. 395–414, 2017.
- [66] S. Curkovic and R. Handfield, "Use of ISO 9000 and Baldrige Award criteria in supplier quality evaluation," *Int. J. Purchasing Mater. Manage.*, vol. 32, no. 1, pp. 2–11, 1996.