Customization Management in Supplier Performance

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Abstract: Prior research on customized component transactions asserts that from a manufacturer’s perspective, customization costs can be reduced by creating collaborative relationships. However, there are few researches on the supplier’s perspective. In this paper, a survey of Japanese suppliers revealed that (a) supplier performance improves when there are more proposals both from and to customers, and that (b) supplier performance deteriorates when proposals only come from the customer. In other words, in case of the top-down relationship in (b), supplier performance deteriorates, but in the bidirectional relationship in (a), supplier performance improves.

Keywords: customization, B2B business, proposal to customers, proposal from customers

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Introduction

Customized components are parts made according to a customer’s (or manufacturer’s) specifications (Asanuma, 1997). The opposite of this is an “off-the-shelf product,” which means the parts offered by catalog. Collaborative relationships between manufacturers and suppliers are found mainly in Japan’s automotive industry, where they facilitate customized component transactions by, for example, reducing transaction costs (Dyer & Chu, 2003) or the length of the development stage (Clark & Fujimoto, 1991). In other words, Japanese manufacturers gained a competitive advantage globally because many of their suppliers have been able to make high-quality customized components at low costs in accordance with the customers’ (manufacturers’) needs.

However, these studies have usually focused on analyzing manufacturer performance, with no regard to the performance of the supplier. An exception is Stump, Athaide, and Joshi (2002), who asserted that customized component transactions increase sales potential, so that suppliers actually gain a competitive advantage when they meet manufacturers’ customization needs. However, few studies have focused on the impact of the customization of the supplier’s performance (Wang, Lee, Fang, & Ma, 2017).

In fact, customization costs will reduce suppliers’ profits. To prevent this reduction, engaging in close communication based on collaborative relationships between manufacturers and suppliers will promote information-sharing and help to solve problems (Takeishi, 2001). In addition, information-sharing between manufacturers and suppliers, such as the purpose and functions of customized component, could reduce customization costs (Nakagawa & Song, 2016). Moreover, prior research indicates collaboration with manufacturers, for example, information-sharing and problem-solving improves supplier performance and broadens
customer scope (Konno, 2003, 2007).

However, prior research on information-sharing has paid little attention to differences of who sends the information. The impact on supplier performance is considered to differ depending on whether (a) the proposal was made by the manufacturer to the supplier (proposal from customer) or (b) by the supplier to the manufacturer (proposal to customer). In fact, the prior research on business solutions company emphasizes that high profits are to be made by providing new value to customers (Nobeoka, 2011), and Kuwashima (2004) showed that in the chemical industry, development is successful when proposals are made to the customer before the customer specifies what they want, rather than simply responding to whatever the customer says. Therefore, this paper conducted a quantitative analysis of suppliers to several industries in Japan with respect to the impact on supplier performance of (a) the proposal from customer and (b) the proposal to customer.

**Method**

This paper uses data from the 6th International Manufacturing Strategy Survey (IMSS) conducted in 2013. The IMSS is a periodic survey conducted by a global network of research institutions and targets manufacturing operations, supply chains, strategies and execution, and performance of manufacturing companies around the world; it is often cited in academic papers (e.g., Frohilch & Westbrook, 2001). While this paper uses data only for Japan, it incorporates the IMSS questionnaire items, including questions about customer feedback (revised from those used in Nakagawa and Song, 2016). The questionnaire was sent to 100 randomly chosen companies, and 83 responses were received, of which 73 were effective responses used in the analysis.

The IMSS surveys companies in terms of their current sales and
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profits compared with the sales and profits three years ago, using a five-point scale ranging from “much lower” (1) to “much higher” (5). Sales and return on sales are the dependent variables in this analysis.

The independent variables are the following three:

(A) Degree of customization (DC): In these questionnaire items, customers were asked to characterize their transactions with three types of customers—(i) top tier, (ii) second tier, and (iii) mid- or lower-tier\(^1\)—on a five-point scale ranging from (1) pure standardization to (5) pure customization. Because the responses of the three types of customers were highly correlated, we defined the synthesis variable created from aggregating these responses as the “degree of customization.”

(B) Frequency of the supplier proposing product designs to customers: As in the case of DC, for this variable, respondents were asked about (i) top tier, (ii) second tier, and (iii) mid- or lower-tier, respectively, and because of the strong correlation, we used the aggregate for the three types as a synthesis variable.

(C) Frequency of customers’ proposals for product designs to the supplier: For this variable as well, respondents were asked about (i) top tier, (ii) second tier, and (iii) mid- or lower-tier, respectively, and because of the high correlation, the three responses were aggregated and used as a synthesis variable.

**Results**

We divided the three independent variables of A, B, and C into two groups—those above the mean and those below the mean—to conduct our analysis.

\(^1\) Respondents were asked to gear their answers to the average for customers between the second-tier and lowest groups.
First, we created cross tables for (B) proposals to customers and (C) proposals from customers by splitting (A) into high and low groups. The low DC group is shown in Table 1, and the high DC group is in Table 2. The low DC group makes products that are almost off-the-shelf goods, so the distribution was mainly (53%, or 20/38) in the cell in which both proposals to customers and proposals from customers were low. Meanwhile, for the high DC group, there was a significant positive correlation between proposals to customers and proposals from customers.

However, even in the low DC group with almost standardized products, suppliers with a high number of (B) proposals to customers were performing significantly well in terms of both sales (F(1, 34) = 3.651, p < 0.1) (Table 3) and return on sales (F(1, 34) = 4.053, p < 0.1) (Table 4). On the other hand, neither table shows a significant

| Table 1. Cross table of low DC group |
|--------------------------------------|
|                                       |
| Proposal to Customers                  |
|                                       |
| High                                  |
| Proposal from Customers                |
| High                                  |
| 5                                     |
| Low                                   |
| 7                                     |
| Total                                 |
| 12                                    |
| Note: r = 0.191, χ² = 1.380, n.s.     |

| Table 2. Cross table of DC group       |
|----------------------------------------|
|                                       |
| Proposal to Customers                  |
|                                       |
| High                                  |
| Proposal from Customers                |
| High                                  |
| 13                                    |
| Low                                   |
| 5                                     |
| Total                                 |
| 18                                    |
| Note: r = 0.428, χ² = 6.415, p < 0.05  |
difference between high and low in terms of proposals from customers. In other words, in case of low DC, only proposals to customers have a significant impact on supplier performance.

The same trend was evident in the high DC group. The supplier group with a high number of proposals to customers had significantly higher sales ($F(1, 31) = 10.770, p < 0.01$) (Table 5) and return on sales ($F(1, 31) = 8.803, p < 0.01$) (Table 6). In addition, interaction was also significant for return on sales ($F(1, 31) = 3.242, p < 0.1$). In other words, as shown in Figure 1, when the frequency of proposals to customers was high in the high DC group, return on sales was high when the frequency of proposals from customers was high. However, when the frequency of proposals to customers was low, return on sales declined when the frequency of proposals from customers was high.

### Table 3. Average sales of low DC group

| Proposal to Customers | Proposal from Customers | High | Low | Total |
|-----------------------|-------------------------|------|-----|-------|
| High                  | 3.60                    | 3.67 | 3.63|
| Low                   | 3.00                    | 2.75 | 2.88|
| **Total**             | **3.30**                | **3.21** | **3.25** |

### Table 4. Average return on sales of low DC group

| Proposal to Customers | Proposal from Customers | High | Low | Total |
|-----------------------|-------------------------|------|-----|-------|
| High                  | 3.20                    | 3.67 | 3.43|
| Low                   | 2.86                    | 2.60 | 2.73|
| **Total**             | **3.03**                | **3.13** | **3.08** |
Table 5. Average sales of high DC group

| Proposal to Customers | Proposal from Customers | High | Low | Total |
|-----------------------|-------------------------|------|-----|-------|
| High                  | High                    | 3.31 | 3.60| 3.45  |
|                       | Low                     | 1.60 | 2.67| 2.13  |
|                       | Total                   | 2.45 | 3.13| 2.79  |

Table 6. Average return on sales of high DC group

| Proposal to Customers | Proposal from Customers | High | Low | Total |
|-----------------------|-------------------------|------|-----|-------|
| High                  | High                    | 3.31 | 2.80| 3.05  |
|                       | Low                     | 1.40 | 2.33| 1.87  |
|                       | Total                   | 2.35 | 2.57| 2.46  |

Figure 1. Return on sales of high DC group
Conclusion

As summarized in Table 7, return on sales tended to be lower for the high DC group than that for the low DC group.\(^2\) However, as is clear from Figure 1, the problem is when the frequency of (B) proposals to customers is low and the frequency of (C) proposals from customers is high. In other words, when suppliers have customization requests from customers, without a proposal to customers, return on sales is greatly reduced. However, as can be seen in Figure 1, when the frequency of (B) proposals to customers is high, return on sales is high when the frequency of (C) proposals from customers is also high. Thus, in the high DC group, when the frequency of (C) proposals from customers is high, suppliers may see their return on sales suffer unless they become proactive in making their own proposals.

It has been noted that because size of Japanese suppliers are smaller than manufacturers, it is structurally difficult for suppliers

| Degree of Customization (DC) | High | Low |
|-----------------------------|------|-----|
| Sales                       | 2.89 | 3.05|
| Return on Sales             | 2.63 | 2.89|

\(^2\) There has been much discussion regarding the impact of customization on supplier sales and profitability. Regarding the impact of customization on sales, some are of the opinion that it has a positive impact because it increases sales opportunities, while others believe that it has a negative impact because it limits sales to other customers. On the other hand, as for the impact on return on sales, some believe that customization has a negative impact due to customization costs (Takashima, 1998).
to turn down customization requests from manufacturers (Takashima, 1998). In other words, these suppliers have a high DC and a high frequency of proposals from customers. In such cases, the most effective strategy for a supplier is to build relationships and capabilities that allow for bi-directional proposals with manufacturers. It is not ideal for suppliers to merely follow customization orders, as this only hurts their performance.

Moreover, in recent years, globalization has been accompanied by more transactions with new overseas partners for both manufacturers and suppliers. Despite that, it is more difficult to create collaborative relationships with foreign partners than with domestic partners; customization requests are still the norm in some industries (Nakagawa & Song, 2016). If Japanese companies are able to make proposals to their overseas customers, it is very likely that their domestic production sites will become a strength to them as they globalize (Fukuzawa & Inamizu, 2017).

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References

Asanuma, B. (1997). *Nihon no kigyososhiki kakushinteki tekiou no mekanizumu* [Japanese corporate organization: The mechanism of innovative adaptation]. Tokyo, Japan: Toyokeizai (in Japanese).

Clark, K. B., & Fujimoto, T. (1991). *Product development performance: Strategy, organization, and management in the world auto industry*. Boston, MA: Harvard Business School Press.
Dyer, J. H., & Chu, W. (2003). The role of trustworthiness in reducing transaction costs and improving performance: Empirical evidence from the United States, Japan, and Korea. *Organization Science, 14*(1), 57–68.

Frohlich, M. T., & Westbrook, R. (2001). Arcs of integration: An international study of supply chain strategies. *Journal of Operations Management, 19*(2), 185–200.

Fukuzawa, M., & Inamizu, N. (2017). Multi-functional factories. *Annals of Business Administrative Science, 16*, 229–241. doi: 10.7880/abas.0170421a

Konno, Y. (2003). Suppliers’ performance and parts transactions with customers. *Annals of Business Administrative Science, 2*, 1–10. doi: 10.7880/abas.2.1

Konno, Y. (2007). Enhancement of the advanced R&D cooperation between automakers and suppliers in the Japanese automobile industry. *Annals of Business Administrative Science, 6*, 15–33. doi: 10.7880/abas.6.15

Kuwashima, K. (2004). Shinseihin kaihatsu ni okeru kokyaku no kokyaku senryaku: Kagakusangyou no jisshoubunseki wo tsuujite [“Customer’s customer” strategy in new product development: Through empirical analysis of chemical industry]. *Kenkyu Gijutsu Keikaku, 18*(3-4), 165–175 (in Japanese).

Nakagawa, K., & Song, W. W. (2016). Customised component transaction with insufficient trust: Case study of the LCD-panel industry. *International Journal of Business Innovation and Research, 10*(1), 87–101.

Nobeoka, K. (2011). *Kachi zukuri keiei no ronri* [Logic of value creation]. Tokyo, Japan: Nihonkeizaishuppansha (in Japanese).

Song, W., Akiike, A., & Park, Y. W. (2018, July). *Customization management in supplier performance*. Paper presented at ABAS Conference 2018 Summer, University of Tokyo, Japan.

Stump, L., Athaide, A., & Joshi, W. (2002). Managing seller-buyer new product development relationships for customized products: A contingency model based on transaction cost analysis and empirical test. *Journal of Product Innovation Management, 19*(6), 439–454.
Takashima, K. (1998). *Seisanzai no torihikisenryaku: Kokyakutekiou to hyoujyunka* [Trading strategy of produced goods: Customer adaptation and standardization]. Tokyo, Japan: Chikura Shobo (in Japanese).

Takeishi, A. (2001). Bridging inter- and intra-firm boundaries: Management of supplier involvement in automobile product development. *Strategic Management Journal, 22*(5), 403–433.

Wang, Y., Lee, J., Fang, E., & Ma, S. (2017). Project customization and the supplier revenue–cost dilemmas: The critical roles of supplier–customer coordination. *Journal of Marketing, 81*(1), 136–154.