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Addressing a product management's orphan: How to externally implement product eliminations in a B2B setting

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ABSTRACT

While product eliminations (PEs) may help suppliers reduce unprofitable products and the cost of increasingly complex portfolios, they often have deleterious consequences for customer–supplier relationships. This dilemma even increases as a supplier's attempt to mitigate deleterious consequences for customers through customer-oriented PE implementation may at the same time hinder optimal internal adjustments and related cost-saving potential, thus running counter to the actual purpose of PEs. This study investigates whether and how a supplier should act in the customer's interest to maximize gains from implementing PEs. We identify key approaches of customer-oriented PE implementation and performance outcomes. Using a multiple-informant supplier sample and a customer validation sample, we show that, depending on the availability of alternatives to customers and the type of PE implementation activity, customer-oriented PE implementation can either pay off considerably or be disadvantageous to a supplier. While PE compensation is always detrimental to overall PE performance, both PE communication and PE support are mostly beneficial. By contrast, PE participation is ambiguous to overall PE performance, as it generally helps retain customer goodwill but also decreases supplier cost-savings from PEs.

"After the elimination of the products, almost 20% of our customers terminated the business relationship. Next time, we will just bear the costs of retaining the products and not risk losing the customers."
—COO of a major machinery supplier

"The removal of products is a huge endeavor that requires considerable resources and often does not meet our expectations in terms of economic outcome."
—VP Sales of a leading chemical supplier

1. Introduction

For suppliers, product eliminations (PEs) represent a powerful tool not only to remove unprofitable products but also to reduce the complexity of their product portfolios. In doing so, suppliers can improve internal procedures and structures, thereby saving costs in various functional areas, such as production (e.g., for set-up and downtime) or marketing (e.g., for sales and communication activities) (Berry & Cooper, 1999; Ramdas, 2003). However, PEs may also have adverse consequences for affected customers, who may then experience disruptions in production procedures or costs for finding alternative products. Therefore, customers perceive PEs as being primarily in the supplier's interest, which may lead to lasting damage to business relationships (Harness & Marr, 2001; Van Hoek & Pegels, 2006). To preserve the business relationships with affected customers and ensure PE success, suppliers should focus on customer-oriented (i.e., external) PE implementation activities.

However, customer-oriented PE implementation activities to mitigate adverse consequences of customers can be quite costly for the supplier and impede necessary supplier-internal adjustments, thus countering the actual PE purpose to reduce costs. That is, supplier activities, such as involving customers in PE decisions or stocking replacement parts (Avlonitis, 1983b), require high financial investments. They can also delay adaptations to internal procedures in areas such as production or marketing, which diminishes cost savings from PEs and thus reduces a supplier's internal PE performance.

Thus, suppliers implementing PEs face a trade-off between mitigating adverse consequences for customers to maintain their goodwill (i.e., in terms of customer-oriented PE performance) and maximizing their own cost savings from PEs (i.e., in terms of internal PE performance). This supplier trade-off creates a "paradox of customer-oriented PE implementation," such that customer-oriented PE implementation

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Table 1
Overview of literature on PE implementation and study positioning.

Study	Study focus on implementation	Type of implementation	Perspective of study	Empirical basis	Consideration of supplier performance
Alexander (1964)	Partial	Internal (within the supplier)	Eliminating supplier	- None	No
Argouslidis (2004)	Partial	Internal (within the supplier)	Eliminating supplier	- In-depth supplier interviews (n = 20) - Supplier mail survey (n = 112) - Financial services industry	No
Vyas (1993)	Partial	Internal (within the supplier)	Eliminating supplier	- None	No
Avlonitis (1983a, 1983b)	Full	Internal (within the supplier)	Eliminating supplier	- In-depth supplier interviews (n = 20) - Supplier mail survey (n = 94) - Engineering industry	No
Harness and Marr (2001)	Full	Internal (within the supplier)	Eliminating supplier	- In-depth supplier interviews (n = 6) - Supplier mail survey (n = 56) - Financial services industry	No
Homburg et al. (2010)	Full	External (toward affected customers)	Affected customers	- In-depth customer interviews (n = 24) - Customer mail survey (n = 248) - Cross-industry survey	No
Our study	Full	External (toward affected customers)	Eliminating supplier	- In-depth supplier interviews (n = 18) - Supplier mail survey (n = 305) - Customer validation sample (n = 48) - Cross-industry survey	Yes

may be useful but also harmful for eliminating suppliers at the same time and thus either enhances or reduces a supplier's overall gains from PEs (i.e., its overall PE performance).

Despite the importance of PEs and their potential drawbacks, only little research has explored this topic. While scholars have devoted significant attention to the “other side of the coin”, i.e., the development of new products (Hauser, Tellis, & Griffin, 2006; Henard & Szymanski, 2001), they have almost completely ignored the removal of existing products. Exceptions have mostly focused on PE *decision making*, such as methods and criteria for detecting, evaluating, and selecting products for removal (e.g., Argouslidis & Baltas, 2007; Avlonitis, 1985a, 1987, 1993; Hamelman & Mazze, 1972).

Only a few studies address PE *implementation* (see Table 1). Most of them focus on *internal* PE implementation (Alexander, 1964; Argouslidis, 2004; Avlonitis, 1983a, 1983b; Harness & Marr, 2001; Vyas, 1993) and examine which activities an eliminating supplier should carry out to adapt its internal procedures to maximize savings from PE. These activities could involve the provision of implementation plans or clear assignment of responsibilities to employees (Alexander, 1964; Argouslidis, 2004), adjustment of internal production procedures or catalogues (Avlonitis, 1983a, 1983b; Vyas, 1993), or adaptation of internal IT systems (Harness & Marr, 2001). However, none of these studies explores how these internal implementation activities effectively influence suppliers' cost-savings from PEs as well as their overall economic performance resulting from PEs.

Moreover, prior research largely neglects customer-oriented (i.e., external) implementation issues of PEs and how they affect the overall success of PEs. The only exception in this regard is the study by Homburg, Fürst, and Prigge (2010), which focuses on the additional costs that PEs incur for PE-affected customers and finds that these customer costs can severely damage the supplier–customer relationship. The study also shows that customers' perceptions of supplier behavior during PEs can help mitigate how severely customers perceive their own PE-induced costs. However, the study does not consider how PE implementation activities affect an eliminating supplier's costs and thus overall gains from PEs, thus neglecting the supplier perspective of customer-oriented PE implementation.

Overall, the literature is silent on how suppliers can effectively carry out customer-oriented PE implementation and thus on how eliminating suppliers should deal with the trade-off between leveraging cost-saving potential from PEs and maintaining good business relationships with PE-affected customers. Thus, eliminating suppliers puzzle over the paradox of customer-oriented PE implementation and over which customer-oriented PE implementation eventually enhances or reduces their overall PE performance. Moreover, it is unclear how suppliers should design their customer-oriented PE implementation to solve or, at least, minimize this paradox and leverage overall PE performance.

Our study addresses this important gap in research. It especially explores how a supplier's customer-oriented PE implementation affects not only an eliminating supplier's external PE performance in terms of maintaining good relationships with customers but also its internal PE performance in terms of leveraging cost-saving potential from PEs. Focusing on a B2B context, in which potential relationship damages can be especially severe because suppliers typically rely on close relationships with only a few customers and eliminated products may be critical to the affected customers' manufacturing processes, our study makes

three key contributions. First, our study systemizes supplier activities of customer-oriented PE implementation and their potential supplier performance consequences and integrates them into a coherent framework. Second, using a multi-informant sample of eliminating suppliers and a customer validation sample, it shows how customer-oriented PE implementation activities can help suppliers retain customer goodwill after PEs, while leveraging PEs' cost-saving potential for ultimately benefiting suppliers' overall gains from PEs. In particular, PE compensation always reduces a supplier's overall PE performance, while PE communication and PE support are generally favorable. In turn, the usefulness of PE participation is ambiguous and depends on the specific situation. Third, the study demonstrates how the importance of these activities varies with customers' specific PE situation (i.e., the availability of alternatives). Overall, the study informs the discipline that in the case of PEs, customer orientation is a double-edged sword and thus must be employed with caution and care.

2. Development of conceptual framework

2.1. Unit of analysis

Our study's unit of analysis is a supplier's PE behavior toward customers affected by PEs. A PE is a supplier's permanent removal of a product from its portfolio without replacing it with a new product.

2.2. Summary of the underlying theory

As PEs are associated with disruptive change, we base our framework on Change Management Theory (CMT) (Lewin, 1947; Zand & Sorensen, 1975). CMT posits that implementation barriers such as opposition or inability to change may cause external change stakeholders (i.e., customers purchasing and using the eliminated products) to impede the success of a change (Armenakis & Bedeian, 1999; Kotter & Schlesinger, 2008). Several approaches and activities can help deal with these barriers (Lewin, 1947) and may reduce stakeholders' (e.g., customers') resistance to the change and retain their goodwill. First, organizations (e.g., suppliers) should focus on *gaining acceptance* of the change by addressing opposition to change through participation (Lines, 2004; Pasmore & Fagans, 1992) and communication (Ford & Ford, 1995; Isabella, 1990). Second, organizations should engage in *facilitating the change* by addressing inability to change through compensation (Mento, Jones, & Dirndorfer, 2002; Oakland & Tanner, 2007) and active support (Kotter, 1996; Porras & Hoffer, 1986).

CMT further indicates that the effectiveness and efficiency of these activities depend on the specific context (Al-Shahi, 2008; Kotter & Schlesinger, 2008). That is, the degree to which they can become critical success factors for mitigating change consequences is subject to individual contingency factors (Govindarajan, 1988), such as the availability of alternatives in the context of PEs.

2.3. Derivation of the conceptual framework

Following CMT, our framework includes constructs targeted at (1) gaining acceptance of PEs and (2) facilitating PEs (Fig. 1). Approaches intended to gain customer acceptance of PEs include PE participation and PE communication. *PE participation* is the extent to which a supplier involves customers affected by PEs in decisions on the manner of implementation. For example, these decisions could relate to the timing of PEs, the amount of stocking replacement parts, or the length of phase-out periods of eliminated products (Lines, 2004; Vyas, 1993). *PE communication* is a supplier's interaction with customers affected by PEs. It encompasses the supplier's external announcement of the PE and appropriate explanations for them (Ford & Ford, 1995; Tax, Brown, & Chandrashekaran, 1998).

Approaches intended to facilitate PEs are PE compensation and PE support. *PE compensation* is the extent to which a supplier provides adequate redress to customers for adverse consequences of PEs (Mento et al., 2002). It covers activities that help mitigate affected customers' financial and time-related investments by providing reimbursements for costs incurred by searching for substitute products or by developing substitutes in-house (Avlonitis, 1985b). *PE support* is the extent to which a supplier helps customers find appropriate, *concrete* solutions for PE-related problems. It covers the actual stocking and provision of replacement parts for eliminated products, offering other suitable products, and assisting in finding other appropriate product suppliers (Avlonitis, 1983b; Kotter, 1996).

CMT implies that implementation activities intended to gain acceptance of and facilitate change for stakeholders affected by the change (customers affected by PEs) can help reduce their resistance to the change (PEs) and maintain their goodwill toward the change maker (eliminating supplier) (Ford & Ford, 1995; Pasmore & Fagans, 1992). Therefore, customer-oriented implementation of PEs may help mitigate negative customer consequences of PEs. Therefore, we expect a positive impact of customer-oriented PE implementation on *external PE performance*, which refers to the degree to which the supplier succeeds in maintaining the goodwill of customers affected by PEs in terms of trust, satisfaction, and loyalty (Doney & Cannon, 1997; Mittal & Kamakura, 2001).

However, CMT also suggests that the degree to which implementation activities can mitigate change consequences of stakeholders varies with the stakeholder's specific situation (Al-Shahi, 2008). In a PE context, the PE-affected customer experiences a dramatic loss (i.e., the loss of a relevant product). For example, if a pump engine supplier eliminates certain engines from its portfolio, its customer (the pump manufacturer) will lack an important component, which may severely disrupt the customer's manufacturing procedures (see also Avlonitis, 1983a). As such, the *availability of alternatives*, i.e., the extent to which PE-affected customers can find “alternative sources of supply to meet a need” (Cannon & Perreault, 1999, p. 444) plays a key role in determining the importance of a supplier's customer-oriented PE implementation for mitigating customers' adverse consequences and maintaining their goodwill. It was thus included as a moderator into our model.

However, customer-oriented PE implementation may also prevent suppliers from leveraging cost-saving potential from PEs, as maintaining it can incur substantial costs or decrease supplier-internal efficiencies (Christensen & Bower, 1996; Rust, Moorman, & Dickson, 2002). Thus, we assume that these implementation activities negatively affect a supplier's *internal PE performance*, being the extent to which the supplier can reduce its costs internally through PEs in functional areas, such as production, procurement, or marketing and sales (Lovejoy & Sethuraman, 2000). Moreover, we expect both external and internal PE performance to enhance the suppliers *overall PE performance*, defined as the supplier's overall PE profitability (Berry & Cooper, 1999).

To control for other potential effects on PE performance, our model contains additional PE-related variables (quality of PE decision making and of internal PE implementation, extent of PE; Avlonitis, 1983b, 1985a), key characteristics of eliminated products (product specificity and interrelatedness; Homburg et al., 2010), and supplier firm size (Capon, Farley, & Hoenig, 1990).

3. Hypotheses development

3.1. Customer-oriented PE implementation on external PE performance

3.1.1. Gaining acceptance of PEs

CMT suggests that allowing change stakeholders to influence change implementation makes them more open to change, thus advancing their acceptance and respective goodwill (Lines, 2004; Pasmore & Fagans, 1992). In the context of our study, all customers affected by PEs are potential resisters as they are all in danger of suffering from the change (i.e., from PEs). Therefore, allowing customers (i.e., potential

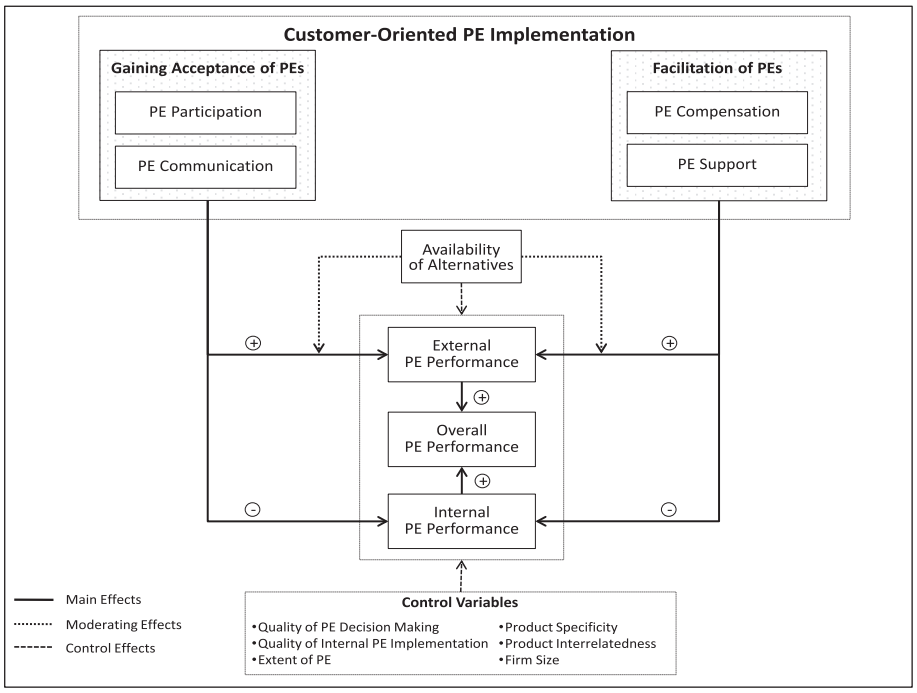


Fig. 1. Conceptual framework.

resisters to PEs) to provide input into decision making may foster their impression that the supplier is cooperative, flexible, and willing to respond to their needs, which increases customer satisfaction, loyalty, and trust (Ueltschy Murfield & Esper, 2016; Zhao & Cavusgil, 2006). Thus, *PE participation* should enhance affected customers' willingness to accept PEs. Specifically, by allowing customers to influence decisions on the duration of products' phase-out period and by discussing with them the number and procedure of stocking replacement parts (Avlonitis, 1983b; Saunders & Jobber, 1994), suppliers can help customers negotiate acceptable time conditions needed to adapt to PE-induced changes. Accordingly, they may perceive the eliminating supplier as customer-oriented, which may raise their trust and satisfaction as well as their willingness to continue the relationship with the supplier.

CMT further posits that communication activities can help stakeholders prepare and "see the need for and the logic of the change" (Kotter & Schlesinger, 2008, p. 134), thus decreasing their confusion and leading to greater acceptance (Mento et al., 2002). Furthermore, providing timely information and explanations to customers about issues of high relevance to them in the context of PEs can promote their perception that the supplier is a reliable business partner, thereby enhancing customer trust, satisfaction, and loyalty (Conlon & Murray, 1996; Palmatier, Dant, Grewal, & Evans, 2006; Vyas, 1993). Moreover, providing convincing reasons for PEs and highlighting future benefits for customers (e.g., improved quality of production or delivery procedures) may further motivate customers to accept PEs (Tax et al., 1998). As such, we reason that *PE communication* may help customers cope with PEs. Consequently, customers will more likely experience goodwill toward the eliminating supplier and be more willing to maintain the business relationship. Thus:

H1. The greater an eliminating supplier's (a) PE participation and (b) PE communication, the higher is its external PE performance.

3.1.2. Facilitation of PEs

According to CMT, compensating stakeholders for the burden and expenditures owing to change helps them manage related drawbacks, thus facilitating the change and retaining stakeholder goodwill (Oakland & Tanner, 2007). Furthermore, providing compensation for problems caused by the supplier indicates the supplier's willingness to support customers even at its own monetary expense, thus fostering customer trust, satisfaction, and loyalty (Smith, Bolton, & Wagner, 1999; Tax et al., 1998). Hence, eliminating suppliers should employ activities that can effectively support their customers in facilitating the changes induced by PEs. By engaging in *PE compensation*, suppliers may offer monetary compensation for investments that customers had to make to develop eliminated products in-house or costs they faced from searching for substitute products (Karmarkar, 1987). In doing so, suppliers signal their willingness to bolster customers' PE-induced changes, thus amplifying customers' trust in and satisfaction with the supplier as well as their motivation to continue the relationship.

CMT indicates that efforts to help customers solve problems caused by the change (e.g., PEs) also help them avoid associated downsides, thus contributing to retaining their goodwill (Kotter & Schlesinger, 2008; Porras & Hoffer, 1986). Supplier efforts to solve customer problems can establish customers' perception that the supplier is willing and able to help in difficult situations, fostering customer trust, satisfaction, and loyalty (Sanzo, Santos, Vázquez, & Álvarez, 2003). *PE support* can thus demonstrate the supplier's willingness to react to customers' needs during PEs. For example, by stocking important replacement parts (Avlonitis, 1983a), the supplier provides customers with a work-around for eliminated products to keep up their operations. Moreover, assisting customers in finding another supplier for eliminated products or providing them with useful knowledge for developing products inhouse helps customers find a new permanent solution. Thus:

H2. The greater an eliminating supplier's (a) PE compensation and (b) PE support, the higher is its external PE performance.

3.2. Customer-oriented PE implementation on internal PE performance

3.2.1. Gaining acceptance of PEs

CMT posits that allowing stakeholders to participate in decisions on the implementation of a change (e.g., PEs) is typically time consuming (Kotter & Schlesinger, 2008). Moreover, customer participation may require considerable discussion and "a high degree of resource binding

(staff)" (Nutt, 1998, p. 226). Hence, for change makers, allowing stakeholders to influence change implementation "has a detrimental effect on implementation success" (Lines, 2004, p. 210). Thus, customer participation may severely raise implementation costs and delay or impair proper leveraging of cost-saving potential from the change (Bryson & Bromiley, 1993). Consistent with this assumption, previous research (e.g., Macdonald, 1995) suggests that involving customers and being highly responsive to their expressed needs can require significant time and money, severely limit a supplier's freedom of action, and impede necessary internal adjustments, thus impairing economic performance outcomes.

In addition, CMT suggests that informing stakeholders about an upcoming change, explaining the reasons for it, and emphasizing potential positive outcomes require extensive interaction and documentation, binds resources, and impedes quick leveraging of change potential (Heracleous & Barrett, 2001; Nutt, 1998). In particular, the substantial financial and time-related costs required for appropriately communicating with customers also negatively affect a firm's economic performance outcomes (Frambach, Prabhu, & Verhallen, 2003; Rust et al., 2002). This is especially true in a B2B context with a high degree of personal interaction that cannot be standardized across customers (Webster, 1978). Therefore, intensively interacting with PE-affected customers (in terms of PE communication) may severely hamper the leveraging of potential cost savings from PEs and cause additional costs to the eliminating supplier. Thus:

H3. The greater an eliminating supplier's (a) PE participation and (b) PE communication, the lower is its internal PE performance.

3.2.2. Facilitation of PEs

CMT suggests that compensating stakeholders for the burden owing to change "can be too expensive if it alerts others to negotiate for compliance" (Kotter & Schlesinger, 2008, p. 136) as it requires considerable financial and human resources that could otherwise help increase firm profits (Mento et al., 2002). Hence, compensating customers for discomfort and losses owing to change-related problems can reduce a firm's economic performance (Fornell & Wernerfelt, 1987; Frambach et al., 2003).

In line with CMT, efforts to help stakeholders solve change-induced problems are often time consuming and expensive, thus binding significant human resources and hindering firms from using change potential effectively (Kotter & Schlesinger, 2008; Nutt, 1986). For example, stocking replacement parts for the eliminated product typically causes costs to the eliminating supplier, such as inventory costs but also costs related to the increased complexity of internal procedures; as such, PEs may prevent quick and full optimization of PEs' cost-saving potential in functional areas such as production or marketing. Moreover, offering adequate substitute products and assisting customers in finding another supplier incur considerable financial and time-related costs, such as for searching for appropriate substitutes or consulting customers. Therefore, efforts to solve customer problems give rise to extra expenses (Avlonitis, 1983b; Gilly & Hansen, 1985; Kelley, Hoffman, & Davis, 1993). Thus:

H4. The greater an eliminating supplier's (a) PE compensation and (b) PE support, the lower is its internal PE performance.

3.3. External and internal PE performance on overall PE performance

3.3.1. External PE performance

CMT emphasizes that the overall success of change depends significantly on the degree to which good relationships with external stakeholders persist after the change (Armenakis & Bedeian, 1999; Kotter & Schlesinger, 2008). Furthermore, previous research suggests that a supplier's external performance, such as customer trust, satisfaction, and loyalty, positively affects its economic performance by increasing sales (Dobni & Luffman, 2003; Fornell, 1992; Rust et al., 2002). Thus, we assume that in a PE context, the degree to which a supplier retains customer trust, satisfaction, and loyalty positively affects its overall PE performance.

H5. The higher an eliminating supplier's external PE performance, the higher is its overall PE performance.

3.3.2. Internal PE performance

According to CMT (Hammer & Champy, 1993), organizational change is typically associated with a redesign of organizational practices, which, however, may not only generate substantial cost savings but also result in a substantial release of resources (Harrington, 1991). In particular, through PEs suppliers can achieve substantial reductions of costs of production, inventory, logistics, product administration, marketing and sales, or procurement (Avlonitis, 1983b, 1987; Lovejoy & Sethuraman, 2000). Therefore, they release resources that can be more effectively invested. Thus, PE-induced reductions of supplier costs are likely to enhance the overall PE performance. Thus:

H6. The higher an eliminating supplier's internal PE performance, the higher is its overall PE performance.

3.4. The moderating role of availability of alternatives

3.4.1. Gaining acceptance of PEs

Previous studies suggest that the effectiveness of customer-oriented behavior depends strongly on "the specific environment or conditions in which [customer] orientation operates" (Perry & Shao, 2005, p. 592), and therefore on situational factors such as the availability of alternatives.

CMT (e.g., Lines, 2004) and prior work on buyer–seller relationships (Cannon & Perreault, 1999) indicate that when attractive alternatives are available, customers perceive switching costs as rather low and pay particular attention to how the supplier interacts with them, especially in critical stages of the relationship. In such a context, customers will react particularly favorably if the eliminating supplier shows particular interest in their situation and carefully solicits their acceptance for the cause of that situation (for the PE) (Tax et al., 1998). That is, when customers have alternatives available and do not depend on the supplier (Ulaga & Eggert, 2006), they may particularly embrace supplier activities such as the careful and comprehensive explanation for the PE (i.e., PE communication). Moreover, they may feel especially esteemed if the eliminating supplier allows them to co-determine major milestones of the PE (in terms of PE participation). Thus, when customers can easily switch to alternative suppliers, activities geared to gaining customer acceptance of PEs will be especially effective in fostering external PE performance.

By contrast, if attractive alternatives are not easily available, customers regard their switching costs as relatively high and may feel "trapped" in a situation in which they may not find a suitable substitute (Cannon & Perreault, 1999). Customers may therefore less embrace a supplier's attempts to explain the reasons for PE or to discuss aspects of the removal strategy with them. They may thus react less favorably to the supplier's PE participation and communication activities, such that their goodwill toward the eliminating supplier will hardly be improved.

3.4.2. Facilitation of PEs

CMT (Colletti & Chonko, 1997) and related literature (Cannon & Perreault, 1999) assert that if suitable alternatives exist, not only do customers regard their efforts to switch to other suppliers as low, but they also are highly sensitive to supplier activities intended to mitigate their problems, thus facilitating the situation (Cannon & Homburg, 2001). Hence, customers may respond particularly positively to a supplier's concrete solutions for PE-related problems (in terms of PE support) or its willingness to reimburse customers for PE-related efforts (in

Table 2
Final sample composition.

I: Industry		II: Annual revenues		III: Respondents	
Electronics	26%	< $ 50 million	11%	Sales manager	34%
Machinery & metal works	25%	$50–$99 million	19%	General manager	26%
Chemicals & pharmaceuticals	23%	$100–$199 million	20%	Product manager	15%
Automotive	17%	$200–$499 million	14%	Marketing manager	10%
Building materials	7%	$500–$999 million	7%	Production manager	7%
Other	2%	$1,000–$2,000 million	11%	R&D manager	5%

terms of PE compensation). Thus, when alternatives are readily available to customers, activities that help customers facilitate PEs should be especially effective in preserving customer trust, satisfaction, and loyalty, in turn increasing external PE performance.

By contrast, although customers may still value the supplier's attempts to facilitate PEs for them in case they face severe difficulties in obtaining an adequate alternative (Cannon & Homburg, 2001), these attempts might appear as rather a drop in the bucket in this situation, as they cannot fully solve customers' problems from PEs. Supplier activities in terms of PE compensation or PE support may thus not notably contribute to maintaining customers' satisfaction, trust, and loyalty. Thus, approaches intended to facilitate PEs for maintaining customer goodwill should be less effective:

H7. With increasing availability of alternatives, the positive impact of (a) PE participation and (b) PE communication on external PE performance becomes stronger.

H8. With increasing availability of alternatives, the positive impact of (a) PE compensation and (b) PE support on external PE performance becomes stronger.

4. Methodology

4.1. Data collection and sample

To test our hypotheses, we conducted a multiple informant study in a B2B context, acquiring an initial set of 1702 supplier firms in Germany from a commercial provider. We contacted these suppliers and asked whether they remove products on a regular basis. If this was the case, we tried to identify a high-level manager of each supplier who had been responsible for PE implementation. Subsequently, we sent a questionnaire to these managers (n = 1514) and began follow-up calls three weeks later. To ensure construct validity, we included two items that asked how competent respondents felt to answer the questions and how deeply they were involved in the implementation of PE. We discarded questionnaires when one of these items was rated lower than 5 on a seven-point rating scale. Overall, this procedure yielded a sample of 305 cases (response rate: 20.1%).

To check for a potential non-response bias, we compared construct means for early and late respondents (Armstrong & Overton, 1977; Colombo, 2000). We found no significant difference indicating that the sample is not subject to non-response bias. To double-check, we also analyzed whether the suppliers of the initial sample and the responding suppliers differed in industry or size (Gannon, Northern, & Carroll, 1971) and found that this was not the case. In addition, we asked non-respondents to fill out a condensed version of our questionnaire that included only major constructs (PE implementation and performance constructs) and demographics, resulting in a sub-sample of 76 cases (Lynn, 2003). Comparing their answers with those from our final sample revealed no significant differences. Thus, overall, our findings show that non-response bias is not a problem with our data.

We aimed to increase construct validity by including a secondary respondent who had also been highly involved in the implementation of PEs (Van Bruggen, Lilien, & Kacker, 2002). Therefore, we re-contacted the 305 respondents and were successful in 218 cases. The main reason for the decline of potential secondary respondents was that one manager (the primary informant) had the sole responsibility for PE implementation. We then sent the same questionnaire to the 218 individuals our primary informants named, which resulted in 152 secondary informants (response rate: 69.7%).

To explore the consistency of responses, we calculated the average deviation from the mean (ADM(J)) for each supplier in our sample and each construct, and averaged these deviations across all constructs (Burke & Dunlap, 2002). We identified 11 multi-informant cases with an ADM(J) value equal to or > 1, which corresponds to difference of two points on a seven-point scale and thus is a “substantial difference” (Kumar, Stern, & Anderson, 1993). For these cases, we used only the response from the primary informant. We validated this decision using two approaches. First, we calculated the $r_{WG(J)}$ index (James, Demaree, & Wolf, 1984); for all 11 cases that did not pass the previous consistency test, results were well below the recommended threshold of 0.60 (Brown & Hauenstein, 2005). Second, we compared the answers of the primary and secondary informants to the two questions on how competent respondents felt to answer our questionnaire and on how deeply they were involved in PE implementation (Kumar et al., 1993). Again, for all 11 previously identified cases, the answers to these questions were significantly lower for the secondary than the primary informant. Thus, consistent with the approach of previous studies (Homburg, Grozdanovic, & Klarmann, 2007), our analyses draw on a sample of 305 cases that consists of multi-informant responses when available and appropriate (the 141 cases that passed the consistency test) and single-informant responses otherwise (the 164 cases for which we had no secondary respondent data or for which the data were inappropriate). Table 2 shows the final sample composition.

For pooling multiple- and single-informant data, we conducted further analyses. First, for cases in which we were able to collect data from two respondents, we calculated the correlation between the responses of the primary and the secondary informant for each construct. Correlations ranged from.66 to 0.81 (p < 0.01), providing confidence in using single-informant data for the cases in which only the response from one manager was available (Celly & Frazier, 1996; Frazier & Rody, 1991). Second, we tested whether the suppliers in the multiple-informant sub-sample differed from those in the single-informant sub-sample with respect to size, industry, or other key constructs. We found no significant differences. Third, we estimated our model separately in the different sub-samples; the pattern of results remained stable across both. A test for invariance regarding the structural coefficients in both sub-samples revealed that the null hypothesis of no differences cannot be rejected (Homburg et al., 2007). In sum, these findings provide confidence in our use of the 305 cases encompassing both types of responses.

4.2. Measure development and assessment

We followed standard psychometric scale development procedures (Gerbing & Anderson, 1988). Owing to the lack of empirical research on PE, we newly created the constructs on customer-oriented PE

implementation and on PE performance using previous research and pre-study interviews (Strauss & Corbin, 1998), thereby following a multi-step procedure. First, we conceptually derived the different approaches of customer-oriented PE implementation from a review of the CMT literature as well as the types of performance outcomes of PE. Then, we carefully screened the studies dealing with PE implementation (see Table 1) and extracted all relevant aspects on company activities with regard to customer-oriented PE implementation and performance. Second, we conducted in-depth interviews with 18 managers who were intensively involved in planning, conducting, and evaluating PE implementation in the past (all from suppliers in the five focus industries of our study, Table 2). To identify PE implementation activities that promote firm success, we focused on suppliers that were experienced and relatively successful in PEs. We used semi-structured interviews (about 90 min on average) that involved questions on PE implementation, especially on what measures suppliers take to mitigate negative customer consequences of PEs and expected performance outcomes. Taken together, the literature review and interviews revealed a set of 12 items for customer-oriented PE implementation (subject to the four implementation approaches), 11 items for external PE performance (subject to three performance dimensions), and six items for internal PE performance. Third, to measure the constructs, we ran an exploratory factor analysis using Varimax rotation. With regard to customer-oriented PE implementation, all items were reflective in nature, as they are caused by an underlying construct (Jarvis, MacKenzie, & Podsakoff, 2003). The analysis revealed four factors with eigenvalues above 1, which were well in line with our conceptually derived activities, and all items loaded onto the expected factor. We verified the results with confirmatory factor analyses, showing that constructs with the chosen three items revealed the best construct measures and highest fit values among possible other item combinations (Voss, Spangenberg, & Grohmann, 2003). Overall, we were thus able to use relatively parsimonious scales while still capturing the relevant aspects of the underlying construct.

With regard to external PE performance, we compared the two options of measuring the construct with 11 separate reflective items or applying item parceling (Bandalos, 2002), which implies using the three underlying dimensions of satisfaction (four indicators), loyalty (two indicators), and trust (five indicators) as separate reflective indicators. Researchers recommend the latter approach for reducing model complexity and avoiding model over-specification while preserving the construct's multi-dimensional nature (Little, Cunningham, Shahar, & Widaman, 2002). In our study, item parceling yielded the better construct measures, so we used that approach to assess external PE performance.

We measured internal PE performance by a formative scale. The pre-study interviews yielded six items that capture the different types and extents of PE-induced reduction of costs in each of the PE-affected functional areas of the supplier firm. They all represent different aspects of the underlying construct, thus forming an index (Jarvis et al., 2003). We averaged these six formative indicators to build a composite indicator (Edwards, 2001). We measured overall PE performance with a single item (Homburg et al., 2007) and intensively validated it with multiple tests. The availability of alternatives is based on three reflective indicators (Cannon & Homburg, 2001). Except for firm size (one indicator), we measured all other control variables with three reflective indicators each.

Including all latent variables in a multi-factorial confirmatory factor analysis yielded good fit measures (χ^2/df = 1.45, NNFI = 0.95, CFI = 0.96, RMSEA = 0.04, SRMR = 0.05). To test for convergent validity, we calculated psychometric properties on both the construct and item levels for all reflective constructs. On the construct level (Table 3), the values for coefficient alpha, composite reliability, and average variance extracted (AVE) all surpass the recommended thresholds of 0.70, 0.60, and 0.50. On the item level (see Appendix A), the values for item reliability (mostly above 0.40) and item factor loading (all above 0.60; $p < 0.01$) also largely meet the recommendations in the literature (Bagozzi & Yi, 1988). Moreover, we applied Fornell and Larcker's (1981) criterion (Table 4) and a chi-square difference test (Bentler & Bonett, 1980), which both indicated discriminant validity for all constructs.

4.3. Validation of constructs related to PE performance

To further assess the construct validity of the dependent variables, we performed additional analyses. First, we assessed the validity of the managers' evaluations of external PE performance (i.e., customer satisfaction, loyalty, and trust after PEs). For this purpose, we again contacted the responding suppliers and requested a list of typical customers who had been affected by PEs in the past. In total, 48 suppliers provided the requested information. Corresponding tests with respect to size, industry, and key constructs provided no evidence of non-response bias.

We then asked the corresponding customers to answer questions about their satisfaction, loyalty, and trust after compared with before the PEs. To avoid biased responses, we assured customers that the supplier in question would receive their feedback only in an anonymous form. We obtained a sufficient number of customer responses ($n = 228$) from all but three suppliers, corresponding to roughly five customer responses per supplier. We then averaged the customer responses for each supplier and correlated them with the managers' initial evaluations. High correlations for customer satisfaction (0.76, $p < 0.01$),

Table 3
Construct measures.

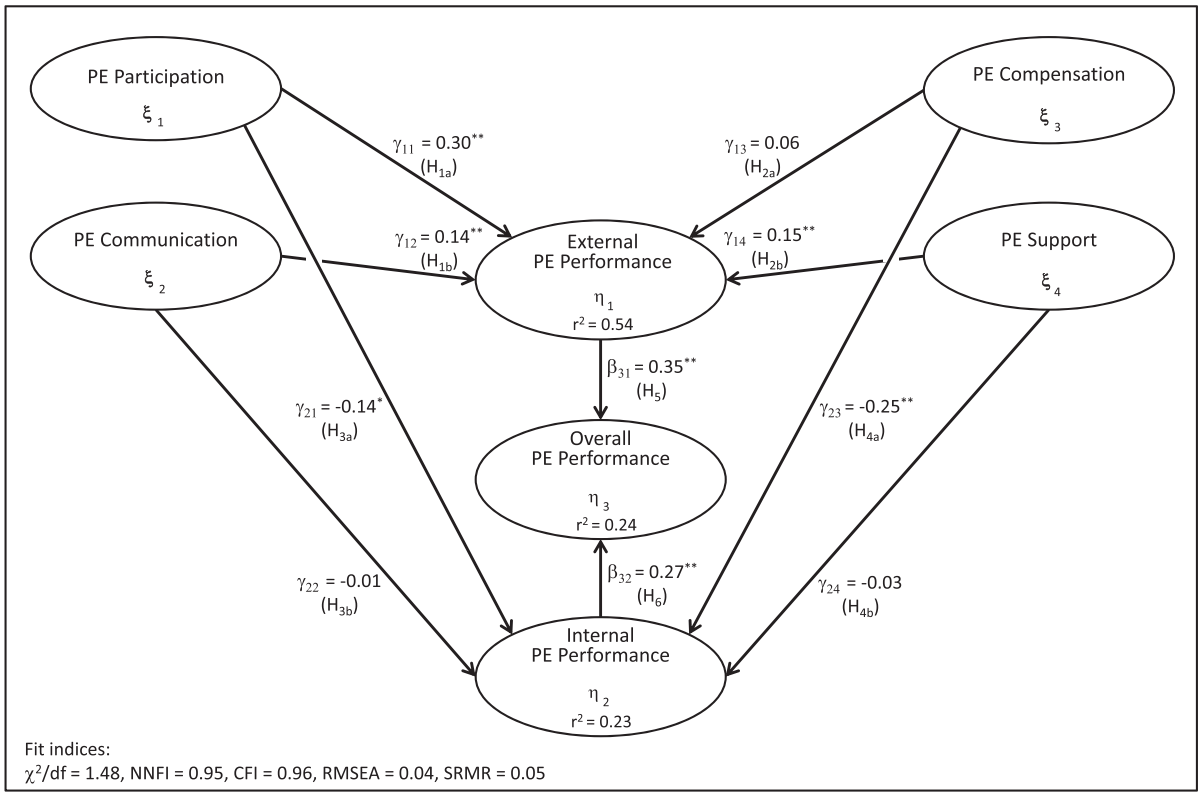
Category	Construct	Items	CA	CR	AVE	Mean	SD
Customer-oriented PE implementation	PE participation	3	0.79	0.81	0.60	5.41	1.04
	PE communication	3	0.89	0.90	0.75	2.83	1.34
	PE compensation	3	0.81	0.82	0.60	2.86	1.33
	PE support	3	0.79	0.82	0.61	5.55	1.13
PE performance	External PE performance	11	0.87	0.87	0.70	5.67	0.74
	Internal PE performance	6	-[a]	-[a]	-[a]	3.91	0.77
	Overall PE performance	1	-[a]	-[a]	-[a]	4.43	0.81
Moderator	Availability of alternatives	3	0.90	0.91	0.76	4.55	1.56
Control variables	Firm size	1	-[a]	-[a]	-[a]	5.23	1.26
	Quality of PE decision making	3	0.83	0.85	0.65	3.81	1.35
	Quality of internal PE implementation	3	0.88	0.88	0.71	5.44	0.96
	Extent of PE	3	0.87	0.90	0.75	2.41	1.18
	Product specificity	3	0.88	0.88	0.71	3.05	0.97
	Product interrelatedness	3	0.91	0.91	0.77	2.32	1.11

Notes: CA = coefficient alpha, CR = composite reliability.
[a] Not applicable because construct was measured with a formative or single-item scale.

Table 4
Correlations and squared correlations.

		AVE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Customer-oriented PE implementation	1. PE participation	0.60	–													
	2. PE communication	0.75	−0.36**(0.13)	–												
	3. PE compensation	0.60	0.03 (0.00)	−0.09 (0.01)	–											
	4. PE support	0.61	0.20**(0.04)	−0.05 (0.00)	0.26**(0.07)	–										
PE performance	5. External PE performance	0.70	0.37**(0.14)	−0.09 (0.01)	0.05 (0.00)	0.36**(0.13)	–									
	6. Internal PE performance	–[a]	0.00 (0.00)	−0.01 (0.00)	−0.22**(0.05)	−0.02 (0.00)	0.18** (0.03)	–								
	7. Overall PE performance	–[a]	0.19**(0.03)	−0.13*(0.02)	−0.03 (0.00)	0.13*(0.02)	0.38**(0.14)	0.34**(0.12)	–							
Moderator variable	8. Availability of alternatives	0.76	−0.14*(0.02)	0.22**(0.05)	−0.13*(0.02)	−0.14*(0.02)	−0.12*(0.02)	−0.05 (0.00)	−0.14*(0.02)	–						
Control variables	9. Firm size	–[a]	−0.01 (0.00)	0.11 (0.01)	0.00 (0.00)	0.03 (0.00)	−0.07 (0.01)	−0.16**(0.02)	−0.16**(0.02)	−0.01 (0.00)	–					
	10. Quality of PE decision making	0.65	−0.01 (0.00)	0.00 (0.00)	0.07 (0.01)	−0.08 (0.01)	−0.05 (0.00)	0.09 (0.01)	0.07 (0.01)	0.04 (0.00)	−0.06 (0.00)	–				
	11. Quality of internal PE implementation	0.71	0.26**(0.07)	−0.11 (0.01)	0.03 (0.00)	0.24**(0.06)	0.42**(0.18)	0.34**(0.11)	0.44**(0.19)	−0.14*(0.02)	−0.08 (0.01)	0.02 (0.00)	–			
	12. Extent of PE	0.75	−0.05 (0.00)	−0.06 (0.00)	0.15**(0.02)	0.03 (0.00)	−0.16**(0.03)	−0.10 (0.01)	0.08 (0.01)	−0.22**(0.05)	0.06 (0.00)	0.07 (0.00)	0.02 (0.00)	–	-	
	13. Product specificity	0.71	−0.27**(0.07)	0.16**(0.03)	−0.02 (0.00)	−0.19**(0.03)	−0.42**(0.18)	−0.07 (0.00)	−0.14*(0.02)	0.22**(0.05)	−0.07 (0.00)	0.04 (0.00)	−0.19**(0.04)	0.17**(0.03)		
	14. Product interrelatedness	0.77	−0.04 (0.00)	−0.02 (0.00)	0.09 (0.01)	−0.04 (0.00)	−0.23**(0.05)	−0.03 (0.00)	−0.10 (0.01)	0.11 (0.01)	−0.25**(0.06)	−0.08 (0.01)	0.01 (0.00)	0.02 (0.00)	0.19**(0.04)	–

** $p < 0.01$.
* $p < 0.05$.
[a] Not applicable because construct was measured with a formative or single-item scale.



Notes: Empirical basis: n = 305; ** $p < 0.01$, * $p < 0.05$; completely standardized coefficients are shown.

Fig. 2. Results of the hypotheses testing: main effects model.
Notes: Empirical basis: $n = 305$; **$p < 0.01$, *$p < 0.05$; completely standardized coefficients are shown.

loyalty (0.78, $p < 0.01$), and trust (0.69, $p < 0.01$) provide support for the validity of the managers' evaluations of external PE performance. Second, to assess the construct validity of the managers' evaluations of the overall PE performance, we correlated the responses of the primary and the secondary informant with each other (Celly & Frazier, 1996; Frazier & Rody, 1991). The high correlation (0.77, $p < 0.01$) affirms the construct validity of this measure.

5. Results

5.1. Model estimation procedure

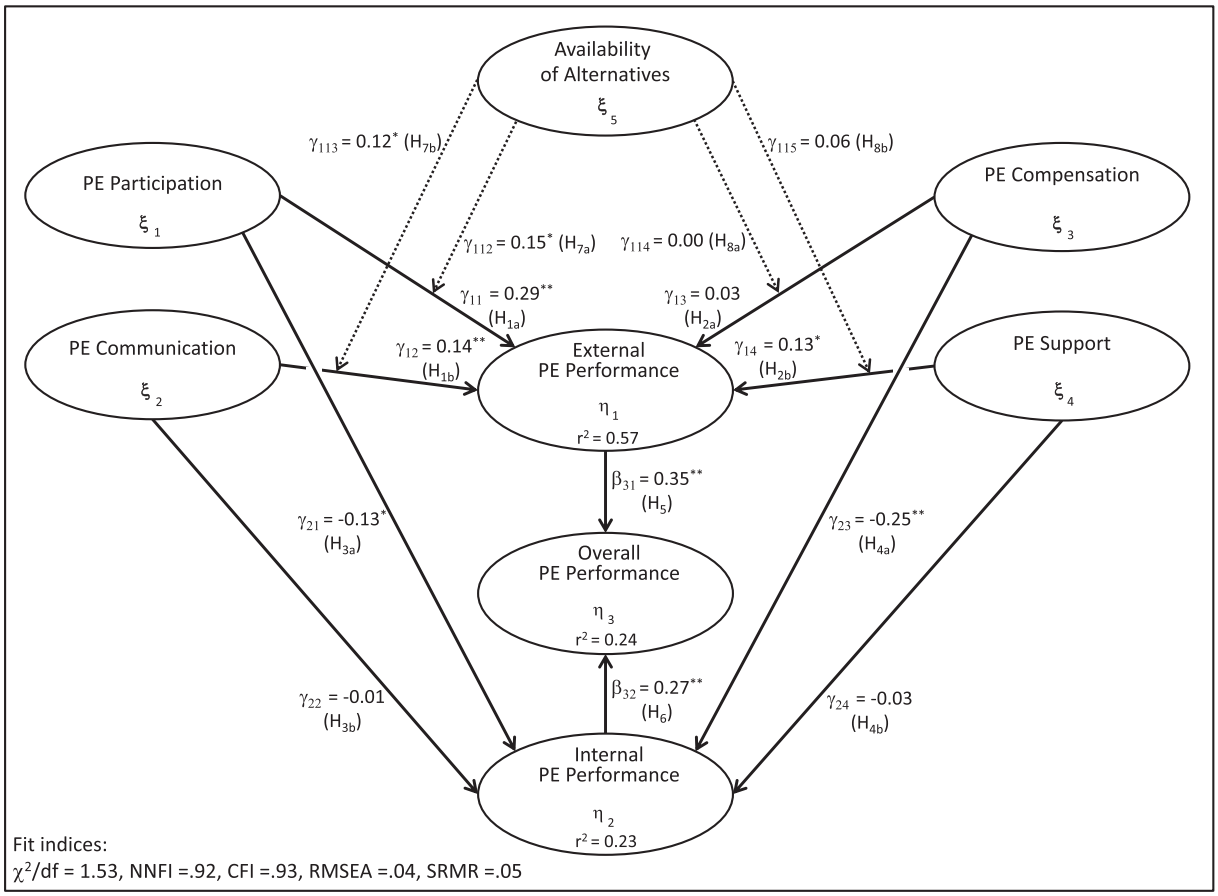
To account for the latent variables in our model and the use of more than one dependent variable resulting in multi-stage relationships, we applied structural equation modeling (SEM) to test our hypotheses. As almost all variables are of a reflective nature and our sample size is sufficiently large, we employed a co-variance-based SEM approach by using Mplus (Muthén & Muthén, 2007). This approach also allows for estimating overall fit measures. We tested our hypotheses in three steps. In a first step, we assessed a base model that encompassed only the control variables and the performance outcome variables, but no PE implementation constructs (χ^2/df = 1.52, NNFI = 0.96, CFI = 0.97, RMSEA = 0.04, SRMR = 0.05). In a second step, we also include the focal predictor variables and the moderator variables (main effects model; Fig. 2), which served as the basis for testing our hypotheses on main effects (χ^2/df = 1.48, NNFI = 0.95, CFI = 0.96, RMSEA = 0.04, SRMR = 0.05). In a third step, our model (Fig. 3) also includes the interaction terms between the moderator variable (availability of alternatives) and the focal predictor variables, which served as the basis for testing our hypotheses on moderating effects (χ^2/df = 1.53, NNFI = 0.92, CFI = 0.93, RMSEA = 0.04, SRMR = 0.05). In all three steps, the overall fit measures indicate an appropriate fit of our models with the data.

5.2. Test on common method bias

Despite our use of multiple informants, we also assessed whether the strengths of the observed relationships between the constructs in our model were seriously inflated or deflated by common method variance. To assess the prevalence of this bias, we applied a single common method factor approach (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Therefore, we added a first-order factor to our model, with all the independent and dependent construct measures as indicators (MacKenzie, Podsakoff, & Fetter, 1993). Findings show that when we control for the effects of this single common-method factor, the pattern of relationships between constructs remains stable in direction and significance, indicating that common method variance is not a problem in our study.

5.3. Test on potential endogeneity

We also tested for potential *endogeneity* using an instrumental variable approach. That is, we needed to identify variables that are not part of (i.e., exogenous to) our model and therefore can serve as instruments to assess potential endogeneity. We applied the number of customers, number of innovations, variance of customer demand, and number and type of product as instrumental variables. These variables are all classified as relevant (incremental explanatory power at $p < 0.01$) but also exogenous to our model (all Sargan tests with $p > 0.05$). The subsequent Wu–Hausman tests (Hausman, 1978; Wu, 1973) did not reject the null hypothesis that the constructs of customer-oriented PE implementation are exogenous (all $p > 0.05$). Thus,



Notes: Empirical basis: n = 305; ** $p < .01$, * $p < .05$; completely standardized coefficients are shown.

Fig. 3. Results of the hypotheses testing: moderating effects model.
Notes: Empirical basis: n = 305; ** $p < 0.01$, * $p < 0.05$; completely standardized coefficients are shown.

endogeneity should not be a problem in our study.

5.4. Results of hypotheses testing related to main effects model

5.4.1. Results on main effects

Fig. 2 shows the results for the hypotheses testing of the main effects. With respect to PE participation ($\gamma_{11} = 0.30, p < 0.01$; H1a) and PE communication ($\gamma_{12} = 0.14$, $p < 0.01$; H1b), the results show evidence of their expected positive effect on external PE performance. While we also find that PE support ($\gamma_{14} = 0.15$, $p < 0.01$; H2b) increases external PE performance, the results provide no evidence of a corresponding effect of PE compensation ($\gamma_{13} = 0.06, p > 0.05$; H2a).

By contrast, we find a significant, negative impact of PE compensation on a supplier's internal PE performance ($\gamma_{23} = -0.25$, $p < 0.01$; H4a). PE participation also exhibits a significant, negative impact on the supplier's internal PE performance ($\gamma_{21} = -0.14$, $p < 0.05$; H3a), while we find no respective significant effects for PE communication ($\gamma_{22} = -0.01$, $p > 0.05$; H3b) or PE support ($\gamma_{24} = -0.03$, $p > 0.05$; H4b). Moreover, as predicted, we find a significant and positive impact of the supplier's external PE performance ($\beta_{31} = 0.35$, $p < 0.01$; H5) and internal PE performance ($\beta_{32} = 0.27, p < 0.01$; H6) on its overall PE performance.

5.4.2. Validation of main effects

To validate our results, we estimated a model that included the responses from customers when applicable. That is, for cases in which customers of the eliminating supplier had provided answers to the questions (items) regarding external PE performance, we substituted the responses of the supplier for the responses of the customers. We then re-estimated the model and found that the pattern of effects remained stable in both direction and significance, which lends further support to our empirical results.

5.4.3. Control effects

With regard to external PE performance, the results reveal significant effects of firm size ($\gamma_{16} = -0.16$, $p < 0.01$), quality of internal PE implementation ($\gamma_{18} = 0.32$, $p < 0.01$), extent of PE ($\gamma_{19} = -0.09$, $p < 0.05$), product specificity ($\gamma_{1\ 10} = -0.24$, $p < 0.01$), and product interrelatedness ($\gamma_{1\ 11} = -0.20$, $p < 0.01$), but not of the availability of alternatives ($\gamma_{15} = 0.03, p > 0.05$) or the quality of PE decision making ($\gamma_{17} = -0.04$, $p > 0.05$). In addition, firm size ($\gamma_{26} = -0.13, p < 0.05$), the quality of PE decision making ($\gamma_{27} = 0.11, p < 0.05$), and the quality of internal PE implementation ($\gamma_{28} = 0.39, p < 0.01$) significantly affect internal PE performance.

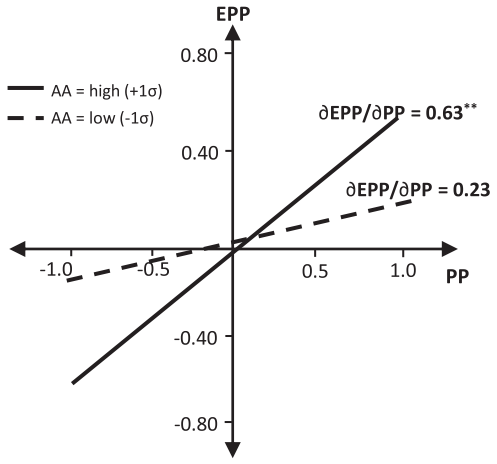
5.5. Results of hypotheses testing related to moderating effects

To examine the moderating influence of the availability of alternatives, we mean-centered the data, included latent interaction terms between this variable and the respective predictor variable in the model (Fig. 3), and again assessed it with SEM. This approach is similar to the way moderated regression analysis typically tests moderating effects (Cohen, Cohen, West, & Aiken, 2003). Research indicates that it is particularly suitable for examining moderating effects in SEM (Marsh, Wen, & Hau, 2004; Schumacker & Marcoulides, 1998) and is used widely across disciplines (Cortina, Chen, & Dunlap, 2001; Homburg,

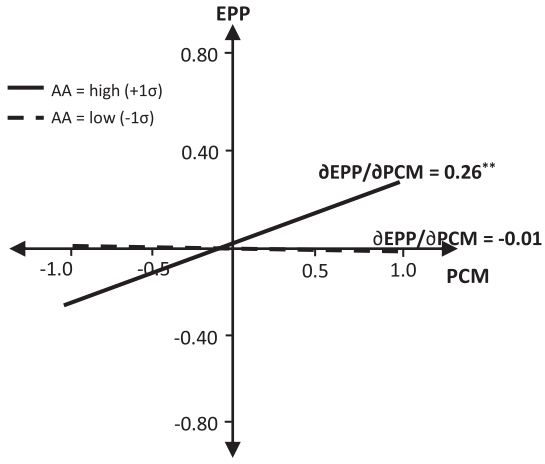
Dependent Variable: External Product Elimination Performance (EPP)				
		Marginal Effects when the Availability of Alternatives (AA) is…		
Predictors:	**Simple Slope Equation**	… low (-1σ)	… mean	… high (+1σ)
PE Participation (PP)	∂EPP/∂PP = .43 + .13×AA	.23	.43**	.63**
PE Communication (PCM)	∂EPP/∂PCM= .13 + .09×AA	-.01	.13*	.26**
PE Compensation (PCP)	∂EPP/∂PCP = .03 + .00×AA	.03	.03	.03
PE Support (PS)	∂EPP/∂PS= .18 + .01×AA	.17*	.18*	.20*

Visualization of Simple Slope Results

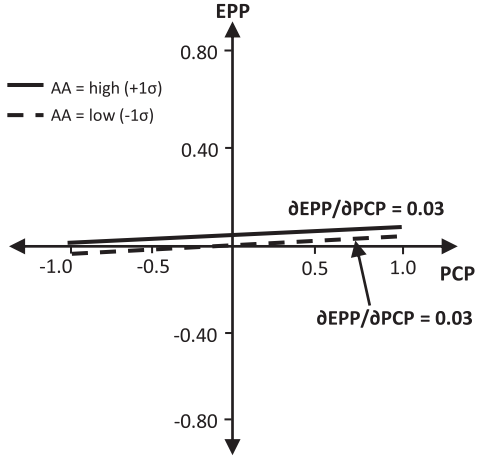
Simple Slopes of PP over AA+1σ and AA-1σ



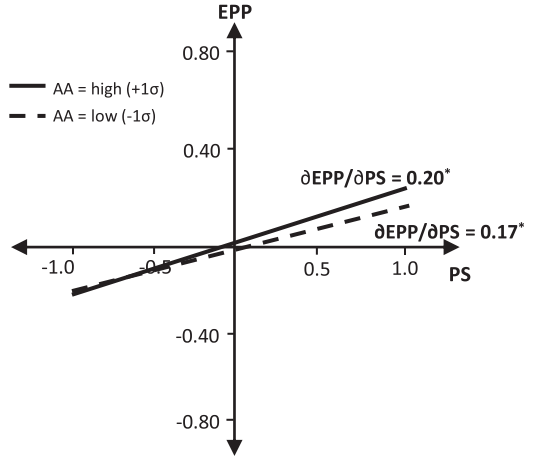
Simple Slopes of PCM over AA+1σ and AA-1σ



Simple Slopes of PCP over AA+1σ and AA-1σ



Simple Slopes of PS over AA+1σ and AA-1σ



** $p < 0.01$, * $p < 0.05$; unstandardized coefficients are shown.

Fig. 4. Results of simple slope analyses (marginal effects).
**$p < 0.01$, *$p < 0.05$; unstandardized coefficients are shown.

Müller, & Klarmann, 2011; Mackenzie, Podsakoff, & Podsakoff, 2011).

The results confirm a positive moderating impact of the effect of PE participation ($\gamma_{112} = 0.15$, $p < 0.05$; H7a) and PE communication ($\gamma_{113} = 0.12$, $p < 0.05$; H7b) on external PE performance. However, there is no support that the corresponding effect of PE compensation ($\gamma_{114} = 0.00$, $p > 0.05$; H8a) and PE support ($\gamma_{115} = 0.06$, $p > 0.05$; H8b) would increase in the case of high availability of alternatives.

5.6. Results of simple slope analyses

To further explore the contingency effects, we analyzed the simple slopes (marginal effects) of PE participation, communication, compensation, and support over three levels of the availability of alternatives (AA): one standard deviation below the mean (− 1σ), at the mean, and above the mean (+ 1σ) (Cohen et al., 2003). To derive the simple slopes, we calculated the first partial derivative ∂ of external PE

performance (EPP) on the respective variable of customer-oriented PE implementation (COPEI), i.e., on PE participation (PP), PE communication (PCM), PE compensation (PCP), or PE support (PS):

$$\frac{\partial EPP}{\partial COPEI} = \gamma_{1COPEI} + \gamma_{1COPEI \times AA} \times AA \quad (1)$$

To calculate the slopes, we used the unstandardized coefficients and the mean-centered data (Aiken & West, 1991). We followed the approach for estimating simple slopes in SEM as Preacher, Curran, and Bauer (2006) suggest. The results of the slope analyses confirm our results from the moderating analyses and reveal additional insights (see Fig. 4).

For PE participation and PE communication, the slopes (marginal effects) become significantly stronger when the availability of alternatives is high ($\partial EPP/\partial PP_{AA + 1\sigma} = 0.63$; $\partial EPP/\partial PCM_{AA + 1\sigma} = 0.26$, both $p < 0.01$) than in the case of a medium availability ($\partial EPP/\partial PP_{AA\ mean} = 0.43$; $p < 0.01$; $\partial EPP/\partial PCM_{AA\ mean} = 0.13$, $p < 0.05$). Both effects turn non-significant when the availability of alternatives is low ($\partial EPP/\partial PP_{AA\text{-}1\sigma} = 0.23$; $\partial EPP/\partial PCM_{AA\text{-}1\sigma} = -0.01$, both $p > 0.05$). By contrast, the marginal effects of PE compensation and PE support do not change with varying availability of alternatives. For all investigated situations (high, medium, and low availability of alternatives), the marginal effects of PE compensation remain non-significant ($\partial EPP/\partial PCP_{AA + 1\sigma} = 0.03$, $\partial EPP/\partial PCP_{AA\ mean} = 0.03$, $\partial EPP/\partial PCP_{AA\text{-}1\sigma} = 0.03$, all $p > 0.05$), whereas the marginal effects of PE support remain consistently at a significant level ($\partial EPP/\partial PS_{AA + 1\sigma} = 0.20$, $\partial EPP/\partial PS_{AA\ mean} = 0.18$, $\partial EPP/\partial PS_{AA\text{-}1\sigma} = 0.17$, all $p < 0.05$).

5.7. Post-hoc analyses: results of mediation analyses

Following recommendations in the literature (Iacobucci, Saldanha, & Deng, 2007; James, Mulaik, & Brett, 2006; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), we conducted mediation analyses based on SEM to test whether external and internal PE performance fully or partially mediate the impacts of PE participation, communication, compensation, and support on overall PE performance. As our analyses include more than one mediator (i.e., external and internal PE performance), we follow the procedure suggested by Taylor, MacKinnon, and Tein (2008) and MacKinnon et al. (2002). Having discriminant validity established for all constructs (Table 4) as a major pre-requisite for mediation (Mathieu & Taylor, 2006), the results show five effects (Fig. 2) that fulfill the requirement of having path coefficients from the predictor to the mediator variable and from the mediator to the dependent variable that are significantly different from zero (James et al., 2006; Shrout & Bolger, 2002).

In a next step, we analyzed the statistical significance of the indirect effects (MacKinnon et al., 2002; Mathieu & Taylor, 2006) for these five potential mediation effects (Table 5, Part A). The results reveal significant indirect effects of PE participation, communication, and support on overall PE performance mediated by external PE performance and significant indirect effects of PE participation and compensation on overall PE performance mediated by internal PE performance.

In a final step, we tested for partial versus full mediation (Table 5, Part B) and added direct effects of the four relevant predictor variables (PE participation, communication, compensation, and support) on overall PE performance to our model. All newly introduced direct effects on overall PE performance were non-significant ($p > 0.05$), while the other effects remained stable. To detect the type of mediation, we conducted additional chi-square-difference tests to check whether these direct effects significantly improved the model fit, which would be an indication of a partial mediation; however, the findings show no significant improvement in the model fit ($\Delta\chi^2 = 3.66$, $p > 0.05$). Overall, the results provide strong evidence that the effects of PE communication, participation, and support on overall PE performance are *fully* mediated by external PE performance and that the effects of PE participation and compensation are *fully* mediated by internal PE performance, further demonstrating the mediators' importance for research and practice.

Table 5
Mediation analyses.

A. Estimation of indirect effects			
Predictor variable	Mediator variable	Dependent variable	Indirect effect
PE participation	External PE performance	Overall PE performance	0.10**
PE communication	External PE performance	Overall PE performance	0.05*
PE support	External PE performance	Overall PE performance	0.05**
PE participation	Internal PE performance	Overall PE performance	−0.04*
PE compensation	Internal PE performance	Overall PE performance	−0.07**
B. Tests for type of mediation			
Added effects of customer-oriented PE implementation on overall PE performance		Full mediation model[a]	Partial mediation model
		Only indirect effects	Direct and indirect effects
Δdf to full mediation model		–	4
df		517	513
χ^2 value		764.27	760.61
$\Delta\chi^2$ to full mediation model		–	3.66 (n.s.)

n.s. not significant.
* $p < 0.05$.
** $p < 0.01$.
[a] Corresponds to the model in Fig. 2.

6. Discussion

6.1. Research issues of customer-oriented PE implementation

This study advances theoretical understanding of the management of PEs, which has so far been largely neglected in the literature. It also allows for contrasting its findings with the other side of the "product management coin", i.e., new product development (NPD), and thus develops some novel themes and ideas about product management and its role in the context of buyer–seller relationships.

6.1.1. Impact of customer-oriented PE implementation on external PE performance

One study goal was to structure customer-oriented PE implementation activities and examine whether and how these activities foster an eliminating supplier's external PE performance. First, our study shows that customer-oriented PE implementation can substantially enhance customer goodwill to continue a trusted and satisfactory relationship with the eliminating supplier. This holds especially true for the implementation activities PE participation, communication, and support. Therefore, we can conclude that, in general, all activities intended to gain customer acceptance (i.e., PE communication and support) are beneficial for maintaining good relationships with affected customers, while activities that facilitate PEs are only beneficial when offering concrete assistance (in terms of PE support).

Second, our study reveals that in contrast with other situations, such as NPD (Atakan, Bagozzi, & Yoon, 2014; Song & Parry, 2009), compensating customers monetarily for PEs has no favorable effect in general. Two reasons may account for this non-finding, which can be illustrated by contrasting PE to NPD. On the one hand, on the customer side, new products are primarily associated with potential gains, whereas eliminated products are especially linked to potential losses. Thus, even if potential gains and losses were equal in both contexts,

prospect theory (Kahneman & Tversky, 1979) suggests that a specific amount of monetary compensation in a NPD context would be more likely to exceed perceived customer losses and thus be more valued by customers than in a PE context. On the other hand, in a PE context, the burdens and expenditures on the customer side may be not so much monetary as psychological, such as customer uncertainty about the business partner's reliability, flexibility, and cooperativeness (e.g., Festinger, 1957; Homburg et al., 2010). In this case, the potential of monetary compensation to retain the goodwill of customers affected by PE and, thus, to foster external PE performance is likely to be limited.

Third, the study shows that the absolute impact of customer-oriented PE implementation activities on external PE performance depends on the availability of alternatives. Specifically, when customers can easily find alternatives to the eliminating supplier, activities related to gaining acceptance of PEs (PE participation and communication) become more important for shaping customer goodwill toward the supplier. However, when customers have trouble finding adequate alternatives, these activities no longer shape customer goodwill. Moreover, there is no change in importance of activities intended to facilitate PEs (PE compensation and support) with regard to customer goodwill, regardless of whether customers have adequate alternatives readily available or not. Therefore, PE compensation still cannot help maintain customer goodwill in any such situation, whereas the impact of PE support is generally beneficial, regardless of the respective situation. A possible explanation for this pattern is that the availability of alternatives refers to customers' opportunity to enter into relationships with other suitable suppliers, up to the point of terminating the entire business relationship with the eliminating supplier. The extent of this possibility thus determines the importance for the supplier to act on a relational level and to address the “softer” and also more process-oriented activities, such as PE participation and communication. Overall, we can conclude that *gaining acceptance of PEs* (through PE participation and communication) and thus acting primarily on a relational level helps retain external PE performance better than *facilitating PEs* (through PE compensation and support) and thus acting primarily on a functional level.

6.1.2. Impact of customer-oriented PE implementation on internal PE performance

Beyond its benefits, we show that customer-oriented PE implementation also involves substantial downsides for eliminating suppliers. Some implementation activities originally intended to offset perceptions of a supplier's customer unfriendliness when eliminating products can also impair the supplier's internal PE performance. Overall, this study is the first to investigate the cost-*saving* potential for eliminating suppliers from PE implementation. This is particularly noteworthy, as the only other study exploring PE implementation toward customers focuses on the perspective of PE-affected *customers* and the costs they incur from their suppliers' PEs (Homburg et al., 2010).

In particular, we show that involving customers in decisions on how to carry out PEs (i.e., PE participation) can prevent a supplier from properly leveraging cost-saving potential from PE. This happens presumably because affected customers have different ideas and goals about how they wish PEs to be executed than the eliminating supplier. Moreover, PE compensation offered to affected customers often seems to be of an amount that can considerably offset cost-savings retained from PEs, thus diminishing internal PE performance as well. Therefore, we show that PE implementation activities related to gaining acceptance of as well as facilitating PEs can have substantial downsides for eliminating suppliers.

6.1.3. Impact of customer-oriented PE implementation on overall PE performance

Finally, our study demonstrates that customer-oriented PE implementation may be ambiguous with regard to maximizing an eliminating supplier's overall gains from PEs: By retaining the goodwill of customers affected by PEs, customer-oriented PE implementation generally helps increase the gains from PEs. However, it may also hinder quick and optimal adjustments within the functional areas affected by PEs and incur additional financial and time-related costs, thereby harming the supplier's overall gains.

In particular, we can conclude that the overall outcome of customer-oriented PE implementation depends on what implementation activities eliminating suppliers choose and how they deal with them. That is, PE communication and PE support are clearly beneficial, as they substantially enhance customer goodwill without impairing cost-saving potential of PEs. However, while PE support does so regardless of whether customers have suitable alternatives readily available or not, PE communication becomes considerably more beneficial when customers can easily find alternatives, whereas it shows no favorable effects in the case of low availability of alternatives.

Compared with these two supplier implementation activities, PE compensation proves to be only unfavorable: It reduces cost savings that could be generated from PEs but, in general, does not enhance the retention of customer goodwill, not even in the situation of high availability of alternatives. Therefore, PE compensation is not a viable approach for implementing PEs toward customers.

Thus, PE participation may act as a double-edged sword, as it leads to beneficial and detrimental outcomes for suppliers. That is, while involving customers in PE implementations and being highly responsive to their expressed needs primarily fosters customer acceptance of PEs, it creates only limited actual surplus for the supplier, as the ideas generated by customers for implementing PEs are not likely to ease but rather to complicate the implementation of PEs. Moreover, giving in too much to customers' requests on how to implement PEs may require significant time and money, severely limit freedom of action, and impede internal adjustments necessary for achieving the actual PE purpose of cost reduction, thus reducing PEs' overall benefits in terms of cost-saving potential for the supplier. Thus, the downsides of PE participation are likely to largely offset its beneficial effects.

Moreover, in situations in which customers can easily access suitable alternatives, the study demonstrates that PE participation can be more effective, as its positive impact on external PE performance increases significantly. By contrast, in the case of low availability of alternatives, PE participation may be rather problematic, as in this case its benefits of alleviating external PE performance no longer exist (see Fig. 4). Thus, overall, our study also advances the discipline by showing that in a PE context, customer orientation needs to be applied with caution.

6.1.4. Impact of customer orientation in a PE versus an NPD context

NPD and PE are two sides of the product management coin. Therefore, our results also yield implications for NPD research. In particular, we show that, in comparison with NPD studies that typically find a considerable beneficial impact of a customer orientation (e.g., Carbonell, Rodriguez-Escudero, & Pujari, 2009), the net benefit of a customer orientation in a PE context is rather small or even zero or negative, especially in PE situations characterized by low availability of alternatives.

By contrast, our study shows that customer-oriented implementation of PEs involves responding to customers' expressed needs and thus is primarily reactive in nature. These needs typically refer to specific

customer problems caused by PE decisions, which customers view as customer unfriendly. Thus, customer needs and expectations of supplier activities related to PE implementation tend to be specific, numerous, and highly demanding, entailing significant additional financial and time-related costs for suppliers. Our finding that customer participation is considerably less beneficial in a PE context than studies suggest for an NPD context (Blazevic & Lievens, 2008; Martin & Horne, 1993) illustrates this well. Customer participation in NPD primarily leads to important benefits, such as the generation of new ideas, insights, and knowledge (Arnold, Fang, & Palmatier, 2011), that significantly outweigh corresponding costs (Fang, Palmatier, & Evans, 2008). By contrast, we show that involving customers in decisions on PE implementation can hinder quick and effective internal adjustments, which, depending on the situation (i.e., low availability of alternatives) may not be able to outweigh its beneficial impact.

6.2. Limitations and avenues for future research

First, as a primer on a supplier's PE implementation, our study takes a bird's-eye view on the topic. This puts our analyses on a higher level of abstraction that precludes examination of the relative importance of the implementation actions that we use to operationalize the constructs of our model. Future studies could thus focus on selected aspects of our model and test hypotheses on a more detailed level.

Second, to keep the model at a manageable level, we concentrated on identifying the critical success factors of PE implementation toward customers and treated internal issues, such as the quality of internal PE implementation and PE decision making, only as control variables. Future research could focus on gaining novel and specific insights into internal PE implementation and examine, for example, activities intended to overcome institutional barriers (Battilana & Casciaro, 2013). These activities concentrate on anchoring the change in managerial subsystems, such as in organization (e.g., process manuals) and human resource management (e.g., target definitions). Another worthwhile avenue would be to examine whether appropriately carrying out PEs or choosing the correct products to eliminate is more important. However, for this purpose, additional data on more detailed facets of PE decision making would be required, such as the frequency of the evaluation of products in the portfolio and the completeness of product scope of this evaluation.

Third, while our study focuses on the availability of alternatives as a major relationship-related contingency variable in the context of PE, future studies should examine the moderating impact of additional variables, such as product-related contingency variables (e.g., product age, portfolio size). Fourth, because our study draws on a B2B sample, our findings apply only to this context. Future studies could examine which of our findings also hold true in a B2C setting, which is characterized by a lower degree of direct and individual supplier–customer interactions. As our research also seems applicable to the service industry, future studies might analyze whether the effectiveness of PE implementation depends on the type of product (goods vs. services).

6.3. Managerial implications

6.3.1. Proactively manage PE implementation toward customers

Overall, we show that to mitigate disruptive change for customers affected by PEs, eliminating suppliers should proactively address resulting adverse consequences through customer-oriented PE implementation activities that go beyond activities carried out to implement PEs within the supplier firm (i.e., internally). Such customer-oriented implementation activities could demonstrate customer orientation in a context that, to customers, does not at all appear to be customer oriented. However, we also advise managers to be careful when carrying out PEs toward customers, as both hypotheses testing and mediation analyses reveal that not all PE implementation activities benefit external PE performance; they may also impair internal PE performance and thus reduce the overall PE performance.

6.3.2. Carefully ponder benefits and risks of customer-oriented PE implementation

In addition to informing practice about the necessity but also the risk of customer orientation in a PE context, our study provides normative guidance to managers on whether to act in the customer's interest and if so, how. In general, to gain customers' acceptance of PEs, we encourage suppliers to promptly and comprehensively notify customers about upcoming PEs (i.e., to engage in PE communication). We also recommend to help affected customers find solutions for PE-related problems (e.g., offering suitable substitute products, stocking replacement parts for eliminated products), thereby helping customers properly deal with PEs. By contrast, we advise against providing compensation for PE-induced problems, as this activity adds to costs but does not help retain customers' goodwill.

Activities for PE participation need to be applied carefully. When considering involving customers in decisions on PE implementation activities, managers should carefully determine the degree and types of decisions for which to include their customers. It seems suitable to involve customers in decisions that will likely have a less severe impact on internal procedures, while offering more customer participation in PE implementation decisions that either need customer feedback anyway or will not affect internal procedures and cost-saving potential to a large extent.

6.3.3. Consider the availability of alternatives for customers

Finally, we advise managers to adapt the extent and type of customer-oriented PE implementation efforts to a key characteristic of PE situations—that is, customers' degree of availability of alternatives. In the case of high availability of alternatives, in which customers can easily switch to other suppliers, managers should concentrate on allowing affected customers to participate in PE implementation decision making. In this case, the benefits from retaining customer goodwill to maintain the supplier–customer relationship are likely to outweigh significantly potential setbacks with regard to cost-savings from PE that may result from potential sub-optimal internal adaptations. Moreover, in this PE situation, we recommend that managers also strongly engage in respective communication activities.

In the case of low availability of alternatives, however, managers should focus on providing elimination-related support to affected customers. For this PE situation, we warn against allowing customers to have a major say in PE implementation decision making, as the internal drawbacks of these activities may outweigh any external (i.e., customer-related) benefits. Similarly, though having no internal drawbacks, communication activities are not a must in this PE situation, as they seem to have no beneficial external (i.e., customer-related) impact.

Finally, managers should keep in mind that regardless of the availability of alternatives for customers, compensation activities are not likely to pay off in a PE context. Thus, no matter whether customers can access adequate alternatives easily or not, managers of PE implementation processes should refrain from providing considerable redress, as these activities are not sufficiently cherished by customers but tend to harm internal PE performance.

Appendix A. Scale items for construct measures.

	Constructs	Items	Item reliability	Factor loading
Customer-oriented product elimination implementation	(1) PE participation[a]	When implementing product eliminations, we …		
		… involve affected customers in the decision on the exact date of eliminations.	0.39	0.62**
		… involve affected customers in the decision on the way of executing eliminations.	0.72	0.85**
		… involve affected customers in the decision on the implementation of the eliminations.	0.69	0.83**
	(2) PE Communication[a]	When implementing product eliminations, we …		
		… timely notify affected customers about the eliminations.	0.83	0.91**
		… properly explain affected customers the reasons for the eliminations.	0.94	0.97**
		… highlight potential positive effects of the eliminations to affected customers.	0.49	0.70**
	(3) PE compensation[a]	When implementing product eliminations, we …		
		… strive to provide adequate compensation that meets the needs of affected customers.	0.51	0.71**
		… aim to provide adequate financial compensation for customer investments owing to eliminations.	0.86	0.93**
		… offer adequate monetary compensation to customers for the burdens and expenditures owing to eliminations.	0.45	0.67**
	(4) PE support[a]	When implementing product eliminations, we …		
		… aim to offer other adequate products for eliminated products to affected customers.	0.80	0.90**
		… offer to stock replacement parts for eliminated products to affected customers.	0.67	0.82**
		… help affected customers to find other appropriate suppliers for eliminated products.	0.35	0.59**
Product elimination performance	(5) External PE performance[a]	(a) *Customer Satisfaction*	0.75	0.87**
		(b) *Customer Loyalty*	0.53	0.73**
		(c) *Customer Trust*	0.81	0.90**
	(a) Customer trust[a]	Even after the product eliminations, …		
		… our customers perceive us as being benevolent.		
		… our customers perceive us as being honest with them.		
		… our customers believe the information we provide them.		
		… our customers perceive us as being reliable.		
		… our customers perceive us as being trustworthy.		
	(b) Customer satisfaction[a]	Even after the product eliminations, …		
		… our performance still exceeds our customers' expectations.		
		… our customers are still very satisfied with our performance.		
		… our customers do not regret that they chose us as a business partner.		
		… our customers still think that overall, they have had good experiences with us.		
	(c) Customer loyalty[a]	Even after the product eliminations, …		
		… our customers still remain loyal to us.		
		… our customers extend the business relationship (e.g., by purchasing additional products or higher volumes of products).		

	(6) Internal PE performance[b]	How did the following indicators change through the product eliminations? Costs of production Costs of procurement Costs of marketing and sales Costs of product administration Costs of logistics Costs of inventory	d	d
	(7) Overall PE performance[cd]	Please rate the economic performance of your product eliminations (in terms of overall profitability).	d	d
Moderator	(8) Availability of alternatives[a]	Our customers affected by the product eliminations had adequate alternative suppliers for the eliminated products.	0.81	0.90**
		Other suppliers in the market could offer adequate alternative products to the eliminated products.	0.89	0.94**
		Other suppliers in the market have the same capabilities as we do.	0.59	0.77**
Control variables	(9) Firm size[a]	Please indicate the overall number of employees of your firm.	d	d
	(10) Quality of PE decision making[a]	When deciding about product eliminations,		
		… the decision maker usually reach a satisfying result in the end.	0.68	0.82**
		… the final decision is usually correct (from an objective point of view).	0.89	0.94**
		… decision makers commonly agree on the decision.	0.40	0.63**
	(11) Quality of Internal PE implementation[a]	After deciding to eliminate a product…		
		… we carry out the internal implementation of the product eliminations according to the requirements of the decision makers.	0.82	0.90**
		… we develop a detailed implementation plan including all necessary information for elimination implementation plan.	0.71	0.85**
		… we definitely stop manufacturing the product that is to be eliminated.	0.61	0.78**
	(12) Extent of PE[a]	The product eliminations concerned a large number of our customers.	0.87	0.93**
		The product eliminations concerned a high number of our products.	0.96	0.98**
		The product eliminations concerned a high amount of our business.	0.43	0.65**
	(13) Product specificity[a]	The eliminated products were especially designed and produced for the affected customers.	0.66	0.82**
		The eliminated products were used only by those customers that they were specifically produced for.	0.78	0.89**
		The eliminated products were tailored directly to the needs of our customers.	0.68	0.82**
	(14) Product interrelatedness[a]	The eliminated products were purchased by customers together with other products of our company.	0.88	0.94**
		The eliminated products and other products of our company were used together in our customers' production process.	0.71	0.84**
		The joint use of the eliminated products and other products of our company led to product synergies for our customers and our company.	0.72	0.85**

[a] 7-point rating scale (1 = “strongly disagree,” 7 = “strongly agree”).
[b] 7-point rating scale (1 = “strongly increased,” 7 = “strongly decreased”).
[c] 7-point rating scale (1 = “very low,” 7 = “very high”).
[d] This construct was measured with a formative or single-item scale, so these criteria were not computed.
** $p < 0.01$.

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